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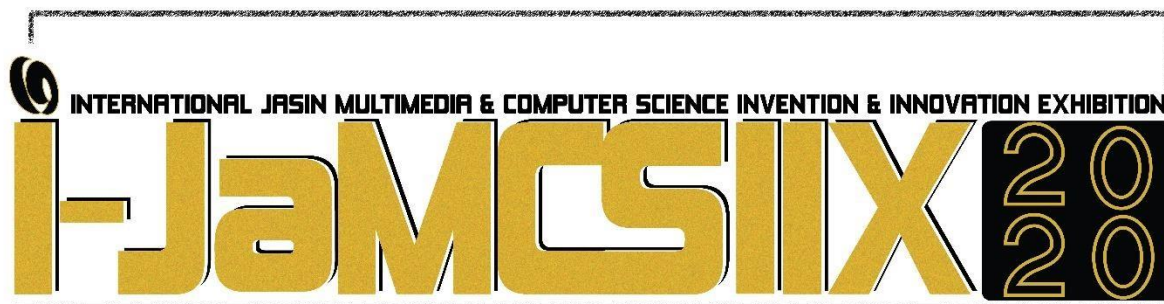
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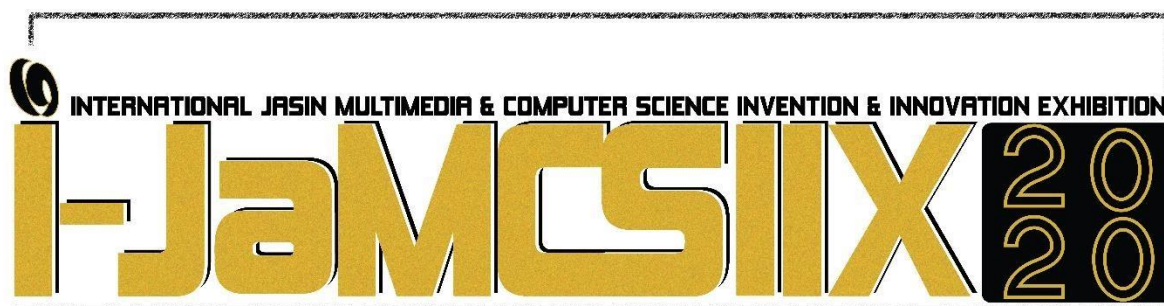
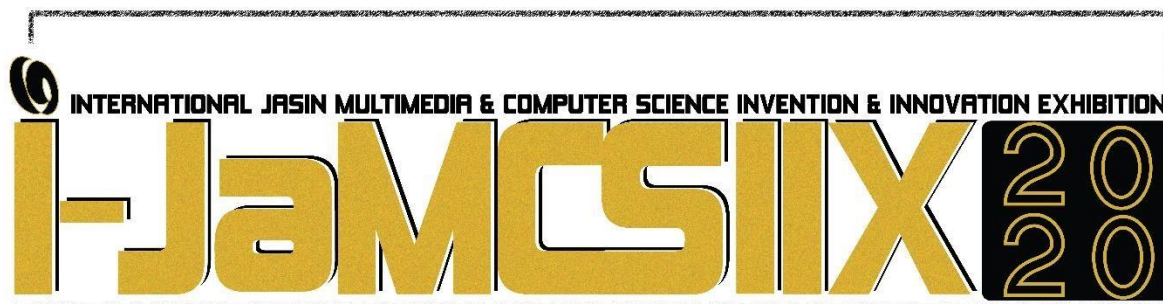


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The Fenugreek Herbal Tea Product for Women's Health

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ABSTRACT

This study explores the phytochemical review of a medicinal plant, called *Trigonella foenumgraecum* L. or fenugreek. It is known regionally as halba in Malay or hilbeh in Middle East. This traditional herb is used to treat dysmenorrhea, in the episodes of painful uterine contractions, during menstruation. Community retail outlets would provide this natural resource as polypharmacy, which involves a mixture of fenugreek and other herb, e.g. cinnamon. The pharmacological properties of the fenugreek were investigated, including antidiabetic, antioxidant, anti-inflammatory, anticancer and antimicrobial activities. Much information is available for this species, e.g. in the form of herbal capsule and tea product. From the literatures, laboratory experiments were conducted, in order to quantitatively validate the bioactive components. The isolation of its natural molecules, for example diosgenin, an important steroidal sapogenin, could be achieved without extraction. It is expected that fenugreek seeds could function as a mild galactagogue.

KEYWORDS: fenugreek, review, tea, *Trigonella*, women

1 INTRODUCTION

The fenugreek (*Trigonella foenum-graecum* L.) belongs to the Fabaceae or Leguminosae family [1]. This herb is grown in the North Africa, South Asia, Middle East and Mediterranean Europe [2]. It is used in pharmaceutical, nutraceutical and functional food industries, owing to its phytochemicals in the seeds and leaves [3]. The fenugreek is an important traditional medicine [4]. The leaves and seeds are used to lower the cholesterol and blood glucose level. It is reported as antimicrobial [1], anti-cancer [5] and anti-inflammatory agents [6]. The most important constituents in the fenugreek seeds are steroidal sapogenins such as diosgenin, yamogenin, tigogenin, flavonoids such as quercetin, phytic acid, apigenin, luteolin, orientin, vitexin and isovitexin, alkaloids (trigonelline), complex carbohydrate (galactomannan) and amino acids (e.g. 4-hydroxyisoleucine) [3].

2 OBJECTIVE

There is still a lack of analysis on the fenugreek components, derived from different polarity of organic solvents. Moreover, previous experiments specialized solely in single solvent extraction. Therefore, the objective of this study is to perform the literature search on *Trigonella foenum-graecum* L. by reviewing the electronic journals [7-11]. Laboratory experiments involving the maceration of the seed samples are on schedule, subsequent to this critical review, in a hope to examine the chemical composition in the fenugreek seeds extract. A form of tea product for fenugreek is also suggested.

3 SIGNIFICANCE(S)

This study reviews the plant profile, biological activities, medicinal use and chemical composition in the seeds of *Trigonella foenum-graecum* L. The finding will benefit community in which it provides the information on how fenugreek can help in maintaining women's health.

4 METHODOLOGY/ TECHNIQUE

The literature search on *Trigonella foenum-graecum* L. was conducted electronically (e.g. Science Finder, Medline, Scopus, Pubmed, Web of Science and Google Scholar). The English and Malay articles were analyzed and reviewed [12]. Meanwhile, the crude drug, which is the fenugreek seed, was obtained from trade. Similarly, the polyethylene pouch of two different sizes were purchased from the retail. Two types of pouches were used, which include the small (90 cm x 70 cm) and medium (110 cm x 105 cm) sizes. The seeds (2 table spoons, 2 grams of the fenugreek seeds, Fig. 1 [13]) were placed inside those pouches.



Fig. 1: The fenugreek seeds are round to rectangular shape, and commonly are in irregular, brick shaped.

5 RESULT

From the literatures, an example of duplicate publication on *T. foenum-graecum* is observed [14-15]. Preclinical data and clinical findings are provided [16-17] and some updates are listed and shown in Table 1. Laboratory experiments were also conducted, in order to quantitatively validate the bioactive components. The isolation of its natural molecules, for example

diosgenin, an important steroidal sapogenin, could be achieved without extraction. It is expected that fenugreek seeds could function as a mild galactagogue [13, 19]. The chemical structure of the tea component, for example, the polysaccharide, is shown (Fig. 2). It is found as the phytochemical with no toxicological effect and could potentially act as a drug candidate against breast cancer [20, 21].

Table 1: Pharmacological activities of fenugreek extracts.

Pharmacological activities of <i>Trigonella foenum graecum</i> L.	Source
Fenugreek seed and its oil as the antimicrobial agent to be used as a food preservative or in medical industries	[1]
The methanol, ethanol, dichloromethane, acetone, hexane and ethyl acetate extracts of the fenugreek exhibit antioxidant activity	[2]
The antioxidant activity of the ethanol extract was evaluated using DPPH free radical scavenging assay and it was found to have significant antioxidant activity	[22]
The anti-bacterial activity of fenugreek against <i>E. coli</i> and <i>Staphylococcus</i> was reported to be more effective with methanol extract. The leaf extracts were found to have maximum antibacterial as compared to the seeds extracts.	[23]
The administration of <i>T. foenum-graecum</i> seed powder solution had pronounced effects in improving lipid metabolism in type II diabetic patients with no adverse effects.	[24]
The computational results reveal that fenugreek's galactomannan can be ascribed as potential drug candidate against breast cancer and type 2 diabetes rendered by higher molecular dock scores, stable molecular dynamics simulations results, and lower binding energy calculations.	[23]

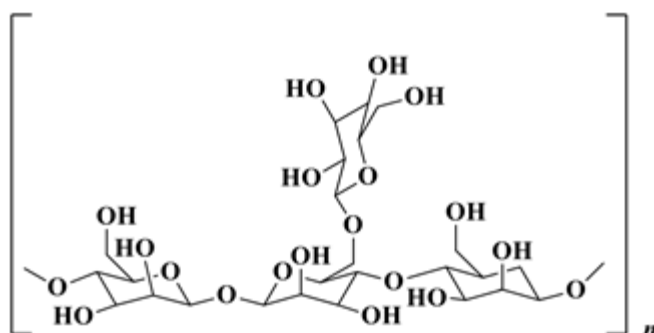


Fig. 2: The structure of fenugreek's galactomannan.

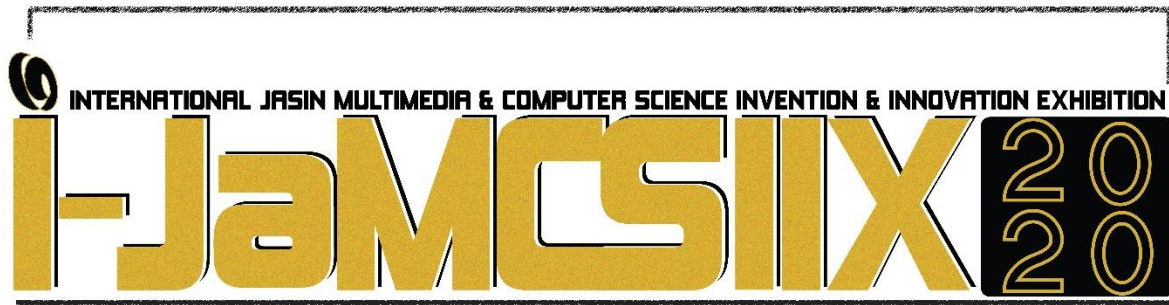
CONCLUSION

The demand for fenugreek products to be used as an alternative medicine is growing worldwide. Therefore, the knowledge and scientific evidence of botanical *Trigonella* is important for consumers. In conclusion, the chromatographic methods for the extracts could be adapted, without difficulty, from the fenugreek monograph of British Pharmacopoeia.

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ECO Smart Result Checker

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ABSTRACT

We created a mobile app that can manage the result of students effectively in a paperless environment. This product is a green product that programmed online to assist the students and educators in result management. This mobile app makes the result checking task become more systematic and easier via integrated technology and promotes a paperless and ECO-friendly education industry. The traditional way of displaying the students' result is a printed paper containing assessment results of all students. Assessment results are something private and confidential. Most often, the student may feel awkward if his or her result is shown publicly. The printed paper is usually displayed on the notice board outside of the lecturer's office. Students need to present personally at the lecturer's office to check the result. Most of the time, although lecturers would hide the students' name on the name list and replace with student identification number when the results are posted, students are still able to see and get to know each other's results. The private and confidential of the students' result are not protected. To secure the students' results privately and confidentially, a mobile app was invented to enable the students to assess their individual assessment results online at anytime and anywhere. It is energy and time saving, students can check their results through this mobile app without present physically to the lecturer's office.

KEYWORDS : Result, Mobile app, Paperless

1 INTRODUCTION

To promote a paperless society within the education industry, a green product that enables students to check individual result through mobile app was created. The rationality of choosing a mobile app as the platform to promote the paperless society is the smartphone penetration in university students in Malaysia is very high nowadays [1] [2] [3]. Smartphone are practical gadgets that are popular among students today. It is a tool primarily used for communication purposes and a tool that encourages application in teaching and learning today [4] [5] [6]. Most university students are actively using a smartphone for educational purposes. The types of application (app) frequently used by university students are text messaging, search engines, calculators, English dictionary, YouTube, camera, and voice recorder [7] [8] [9].

2 OBJECTIVE

The objective of this mobile app is to make the result checking task become more systematic and easier via integrated technology and promote a paperless and ECO-friendly education industry.

3 SIGNIFICANCE

This mobile app has the following novelty and usefulness: (1) For the benefit of students, it provides a private and confidential way for students to check their own assessment results. (2) For the advantage of students, it is a convenient and effective way for students to check their results online. (3) For the benefit of lecturers, this mobile app provides a paperless and effective way to display students' assessment results.

Students able to assess their assessment results online at anytime and anywhere. It is energy and time saving, students can check their results through this mobile app without present physically to lecturer's office. The commercial potential of this green product is that it can be customized for all subjects with different types of assessment. This product can be commercialized to all educators in all levels of education including primary, secondary and tertiary education institutions. The social impact of this mobile app is promoting a paperless society within the education industry.

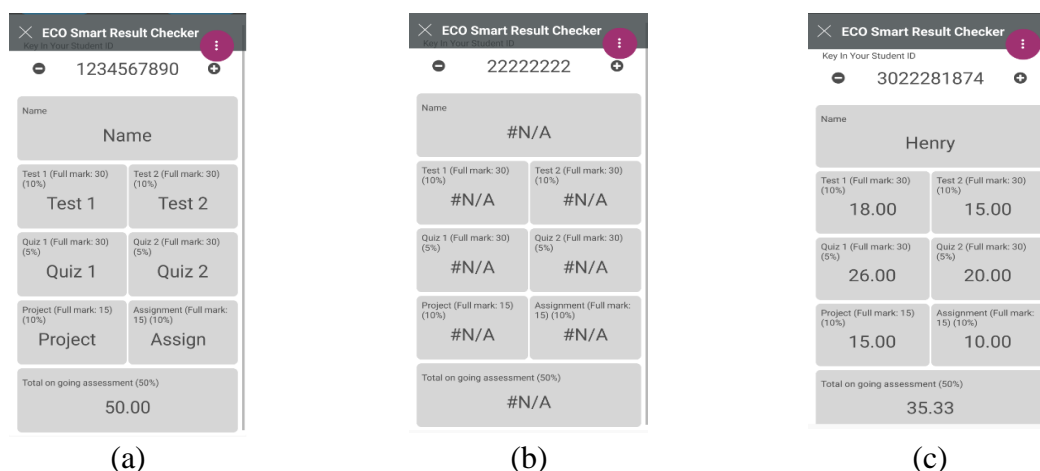


Fig. 1: ECO Smart Result Checker interface in different situations. (a) interface that students view when they login to this app. (b) when a student key in the identification number wrongly. (c) when a student key in the identification number correctly.

4 METHODOLOGY/ TECHNIQUE

The mobile app uses the Microsoft Excel file as data storage and source. The necessary entries such as student identification number, name, assessment result for test, quiz, project and assignment (that are stored in Microsoft Excel) are selected as the elements in the mobile app. When a student needs to use the mobile app to check his/her results, the student needs to key in his/her student identification number (ID number) registered at the university. Every student has a unique student ID number in the university. When the app receives the valid student ID,

the student's name will appear on the screen of the app. In this way, the student may verify if the app has received the correct information from the first entry (ID number). The result will only be displayed if the student ID is valid. In this case, the students can see their own result in a confidential way.

This mobile app was pilot tested and implemented in several classes in a university. A survey on the feedback of the implementation was done and the results of the survey were analysed. Fig. 1 show the ECO Smart Result Checker interface in different situations. Fig. 1(a) is the interface that students view when they login to this app. Fig. 1(b) is the interface when a student key in the identification number wrongly. Fig. 1(b) is the interface when a student key in the identification number correctly.

5 RESULT

A survey with a sample size of 80 respondents was conducted to investigate the evaluation towards the usage of the mobile app. The respondents were students who used the mobile app to check their assessment results. Fig. 2 presents the students' evaluation of the implementation of the mobile app. Fig. 2 (a) shows that approximately three-quarters of students feel secure when they know the mobile app provides an access restriction to result and 27.50% of students feel neutral if they are the only one could access their own results. In Fig. 2 (b), there are 31.25% and 47.50% of students strongly agreed or agreed that able to access the results online is easy.

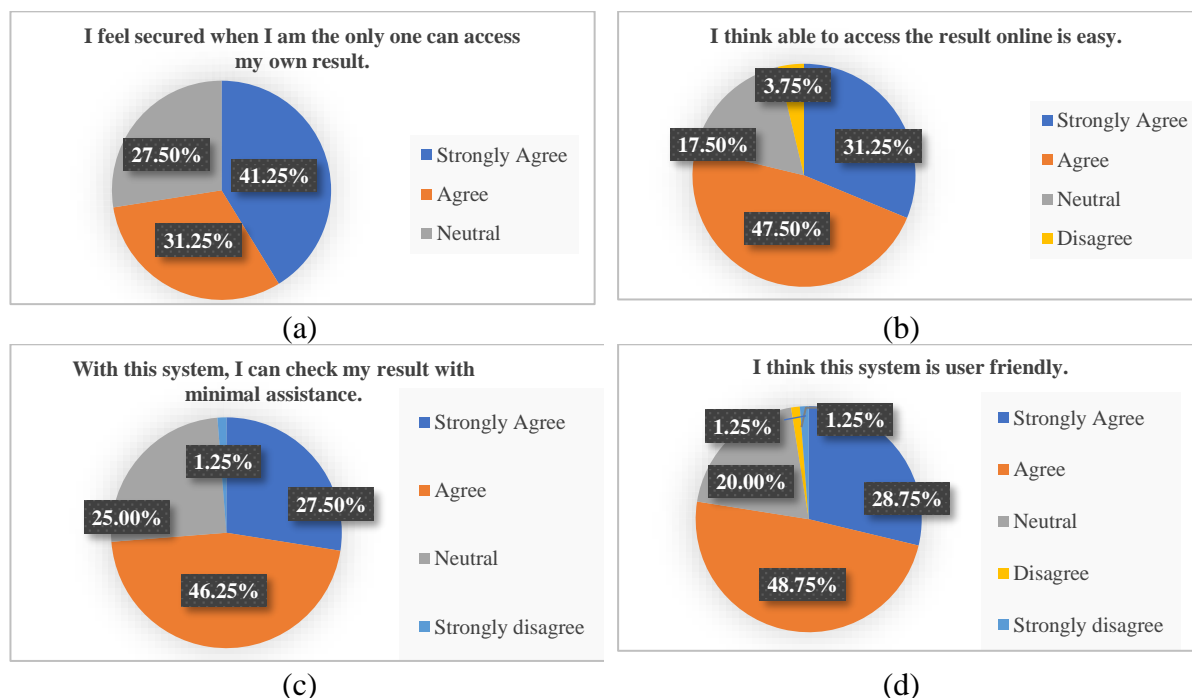


Fig. 2: The students' evaluation of the Mobile App. (a) Students sense of secure when their results could only access by themselves. (b) Students perception regards checking results online (c) The need of assistance in using the Mobile App. (d) Students' viewpoint of using the Mobile App.

Fig. 2 (c) indicates that more than 70% of students strongly agreed or agreed that they could use the mobile app with minimal assistance from the lecturer and one-fourth of students

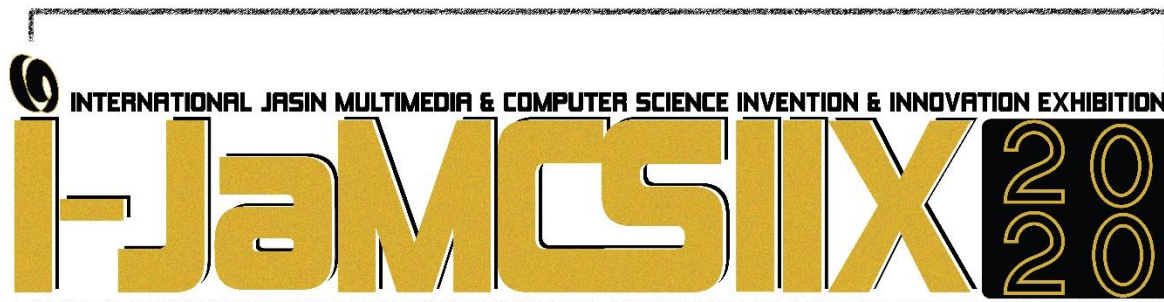
hold a neutral view regards the difficulty of using this system. Fig. 2 (d) is the students' response as end users using this app. More than three-fourths of the students strongly agreed or agreed that the mobile app interface is user friendly and one-fifth of students hold a neutral opinion regards this app.

6 CONCLUSION

The mobile app was designed with the intention of making the result checking process easier and more confidential. With the implementation of this mobile app, the majority students as the users of the mobile app felt secure when they knew there is a restricted access to the result. Most of the students agreed that able to check their results online is convenient and easy. Most importantly, the mobile app has made the result display and checking in a paperless way. Hence, it promotes a paperless society within education industry.

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Prototype of New Composite Weightage and Offset Thickness Design of Acetabular Cup in THR

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ABSTRACT

Defect bone at hip joint of human body will required surgical operation which commonly known as Total hip replacements (THR). Succession rate of the surgical procedures depending on many factors. Currently the THR operation could not guarantee 100% succession rate which dislocation, fracture, inflammation, edge-loading effect and rejection of new materials are among the concerned issues. The objective of this study particularly to make a prototype of new composite weightage and offsetting thickness of acetabular cup in order to increase the surgical post-operative succession rate. Firstly, a new design was drawn using SolidWorks software which the articulation area was offset by increasing the superior region. Then, the FE analysis conducted via ANSYS WORKBENCH to simulate the effect of offsetting the acetabular cup design. Secondly, a new material composition of Ep-UHMWPE with various weightage and thickness were studied experimentally according to ASTM D638-02A. Simulation and experimental analysis results show good agreement that 5mm thickness improvise mechanical properties up to 66% in term of Von-Mises stress, total deformation and contact pressure. Thus, offsetting superior region thickness could potentially improvise the implant lifespan especially during the normal gait condition. Adding Ep (Epoxy) into existing material (UHMWPE) at ideal weightage also increasing the mechanical properties of the acetabular cup. However, further studies are required to design a second prototype with higher articulation efficiency and material's biocompatibility.

KEYWORDS: Acetabular Cup, Finite Element Analysis (FEA), THR Design, Composite Material

1 INTRODUCTION

Ultra-High Molecular Weight Polyethylene (UHMWPE) is widely employed thermoplastic used in advanced engineering application due to its excellence properties such as high impact

resistance [1] and wear resistance compared to other thermoplastic materials [2], [3]. For decades, the increasing demand of artificial joint implant from the global market has made UHMPWE to become one of major research interest among researchers and industries. Joint implant specifically at the hip implant required these types of materials especially in Total Hip Replacement (THR).

On the other hand, designing a hip implant also pivotal in order to reduce adverse effect post-operations principally on the motion [4]. Articulation of femoral head with acetabular cup need to be smooth as many issues on stress effect, contact pressure, crack, dislocation and wear could potentially require revision after operation [5]. Thus, it is vital to study the mechanical aspect of any implant design and material selection that will improve the implant itself.

2 OBJECTIVE

The objective of this study is to improve the implant life particularly on the articulation area of the THR. New composite weightage added with offset design of acetabular cup may surpass the normal implant life in term of mechanical properties aspect.

3 SIGNIFICANCE (S)

The existing material and design of hip implant for THR are vary depending on various conditions. Currently, UHWMPE is the most usage material for the acetabular cup as it is considered as the most biocompatible to human body with less adverse effect on the patient. However, data shows that UHWMPE could not give a higher lifespan with wear, cracks, deformation and etc. are among issues related. The design of the implant also need to revamp as issues related to motion and stress could be potentially dangerous to the patients.

4 METHODOLOGY

Two separate experimental procedures was carried out to study the mechanical properties of Ep-UHWMPE with different thickness according to ASTM standard. The thickness was chosen at 3mm and 5mm, respectively considering the acetabular cup thickness requirement. The coding of the formulation had been tabulated for every variation conducted in this experimental work with five different variants. Epoxy resins were obtained from the Faculty of Applied Science, UiTM with the coding of Morcote BJC-29 supplied by Vistec Technology Sdn Bhd. Meanwhile, UHWMPE graded GUR 4120 was supplied from Ticona Engineering Polymer, China in powdered form with molecular weight of $5 \times 10^6 \text{ g mol}^{-1}$ and density of 0.93 g/cm^3 . The mass was determined by density equation as equation below.

The samples were loaded into a universal testing machine (Shimadzu) possessed by Faculty of Applied Science, Universiti Teknologi MARA with the machine code name of UiTM/PS01/A/090108/20080001118. The machines equipped with 20kN load cell capability. Test was conducted under ambient laboratory conditions, $23 \pm 1^\circ\text{C}$. The load was applied at a constant displacement rate of 3mm/min.

A prototype named P0 was developed with new design of offsetting the superior region by increasing to 5mm thickness. The design was drawn by using SolidWorks and FE analysis was conducted via ANSYS WORKBENCH V15. A constant loading mimicking normal gait cycle was exerted on the femoral head at 2450N [6–8]. Two constrained area were

applied at the pelvis bone as shown in Fig. 1. Two separates analysis were conducted with normal design and offsetting design in order to compare the new design optimization in term of mechanical properties.

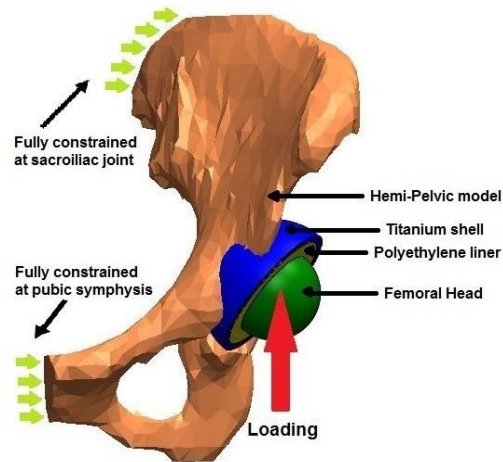


Fig. 1 The FE modelling and boundary condition of offset design acetabular cup

5 RESULT

Experimental procedures as accordance to ASTM [9] carried out find that EpUHMWPE with 5mm thickness produced higher Young's Modulus which increase stiffness of the materials. EpUHMWPE2 recorded the highest values of Young's Modulus in both thickness condition. Adding weightage more than 2% will reduced the stiffness of the composite materials.

Fig. 2 a) and b) shows the tensile stress-strain curves of the composite variant of 3mm and 5mm thickness, respectively that were tested in this experiment. The 3mm thickness variant shows that EpUHMWPE2 produced the highest ductility properties compared to other variants which highest strain value of 2.75 recorded in the testing with almost more than 25% elongation. On the other hand, the 5mm thickness variant shows that EpUHMWPE2 exhibits highest brittleness compared to other variant. It is important that the superior region of the acetabular cup to produced less ductility in order to increase articulation motion without deformation.

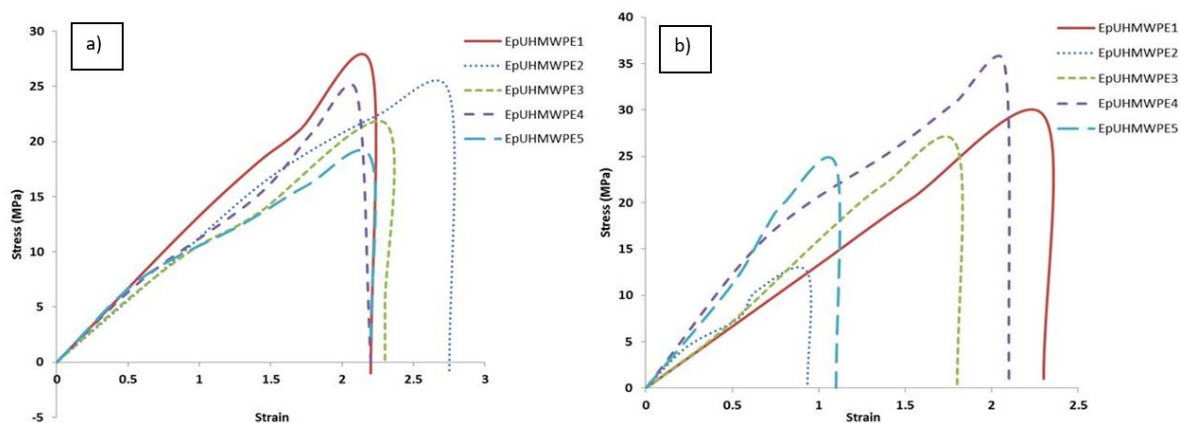


Fig. 2: The tensile stress-strain distribution upon new weightage of EpUHMWPE materials. a) The 3mm thickness condition, b) The 5mm thickness condition

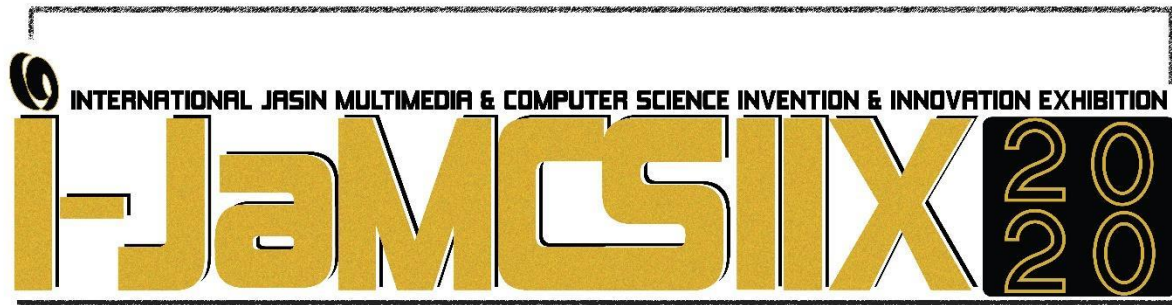
On the other hand, the simulation conducted via ANSYS WORKBENCH V15 shows that new offset thickness design with new composite materials improved the mechanical properties up to 66% in term of Von-Mises stress, total deformation and contact pressure compared to existing material and design.

6 CONCLUSION

A prototype named P0 was designed based on the analysis conducted via experimental weightage and FE analysis. Offsetting the superior region to 5mm thickness may increase the mechanical properties up to 66% where thickness plays important role in order to reduce concentration stress when doing daily living activities (ADL). The experimental data also agreed that 5mm thickness sample at appropriate weightage formulation will perform better compared to 3mm thickness sample. However, further studies are required to design a robust offset superior region thickness and material biocompatibility thus, implementation could be made in future.

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i-Saturate: The New Discovery of Stopping Criterion in Genetic Algorithm

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ABSTRACT

A stopping criterion for evolutionary algorithms like Genetic Algorithm (GA) is crucial in determining the optimum solution. It is common for a stopping criterion like *maximum generations* or *fittest chromosome repetition* used in GA to solve hard optimization problems. However, these stopping criteria require human intervention to make certain changes. In this study, a new stopping criterion called *i-Saturate* that measures saturation of population fitness of every generation chromosome (in GA searching process) is reported. The searching process would stop when the fitness deviation of the population was small. A model using *fittest chromosome repetition* was developed to compare the efficiency with *i-Saturate*. It was found that the performance of the developed model was good at the low mutation rate (0.01, 0.02) but the *i-Saturate* model was better when mutation rate was greater than 0.03. The probabilities of the *i-Saturate* model finding global optimum solution were very close to 1 when mutation rate was above 0.07. It was concluded that the *i-Saturate* model has demonstrated better searching ability than the comparative model and it intelligently stops searching without human intervention.

KEYWORDS: Stopping Criterion, Genetic Algorithm, Optimization, Machine Learning

1 INTRODUCTION

Historically, the Darwin Evolution Theorem has inspired John Holland [1] to introduce GA in 1975 that imitates the process of genetic inheritance evolution [2]. GA begins the search by a population of randomly generated feasible solutions where they are encoded into chromosomes [3] and each of them is assigned with a fitness function. They are placed into an environment analogue of natural evolution where they need to survive, adapt, and propagate their genetics to the future generations [4]. The evolution takes many generations to converge to a perfectly adapted chromosome (global optimum solution) [4]. The timing for ending the evolution (searching process) is crucial. If the search ended too early (premature convergence), the identified solution might be only the best in that generation (local optimum) but not the best of all possible solutions (global optimum solution) [5]. The choice of the stopping criterion would determine if the global optimum solution could be found before the searching is terminated.

Hence, the stopping criterion of GA was investigated in this study since the right choice of stopping criterion could greatly help in determining the optimum solution.

2 OBJECTIVES

To accomplish this study, we proposed the density or saturation of population fitness as the new stopping criterion which served as a measurement key to end the searching process. We named this proposed stopping criterion as *i-Saturate* (Fig 2). *i-Saturate* measures density or saturation of population fitness (F) of M chromosomes of every generation. It stops searching when the population becomes saturated with fittest chromosome where the fitness deviation of the population was small ($[(1/M) \sum (F_{ij} - F)^2] < \delta, \delta \rightarrow 0$).

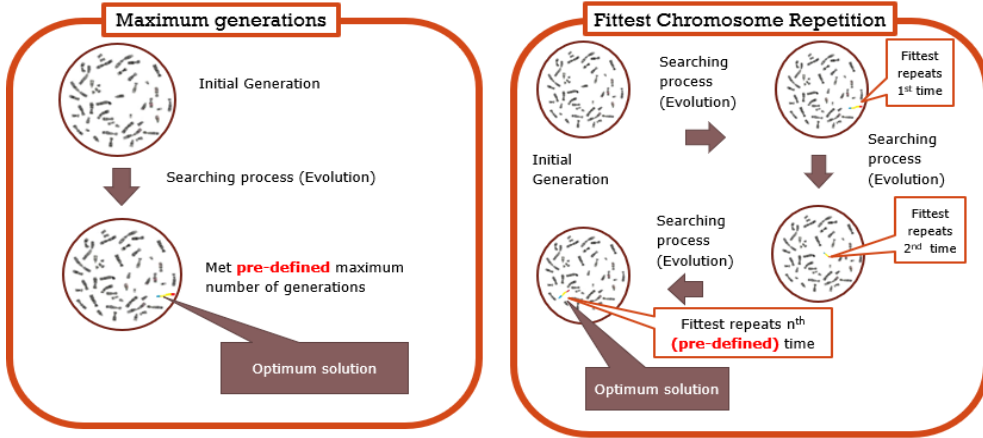


Fig. 1. Common stopping criteria

i-Saturate would be compared to a conventional stopping criterion (*Fittest chromosome repetition*) (Fig 1) which the searching stops when there is no improvement of fittest chromosome for some successive generations. Therefore, besides proposing a new stopping criterion, the research objective of this study is to compare the efficiency of *i-Saturate* with the conventional stopping criterion in the hope that the right choice of stopping criterion could be discovered.

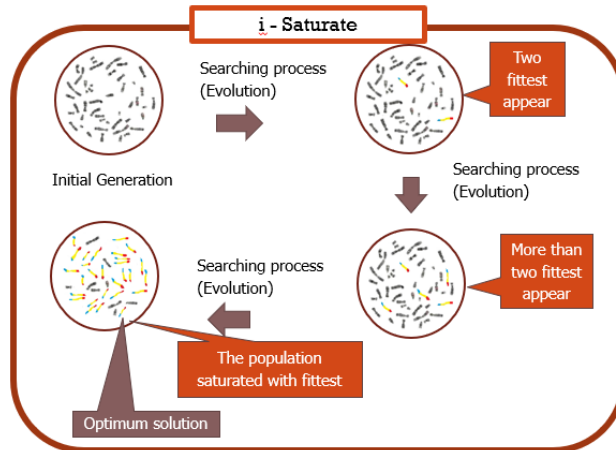


Fig. 2. *i-Saturate* (proposed stopping criterion)

3 SIGNIFICANCE (S)

GA has been widely applied in research areas such as pure sciences, engineering and social sciences [6]-[10]. Though GA can provide good solutions at reasonable computational cost

[11], it may not be able to guarantee the optimality of solution due to their stochastic nature [5]. The timing to end the evolution in GA processes is crucial to achieve optimal solutions. Therefore, the decision of having an appropriate stopping criterion would greatly affect the capability of the algorithm [12].

Generally, there are two stopping criteria (Fig. 1) that have been widely used: (1) *Maximum generations* [12] and (2) *Fittest chromosome repetition* [9]. For the first criterion, the user needs to define a maximum number of generations and the size of the population would sometimes influence the duration required for convergence [13]. For the second criterion, again, the user needs to determine the appropriate number of successive repetitions for dismissing the search. The successive repetition of the fittest chromosome is greatly influenced by the size and complexity of the research problem [12]. Since these two criteria need human intervention in pre-setting/predefined, a research that reduces the possibility of human intervention and dependency on human decision could give contributions in the field of enhancing GA works.

4 METHODOLOGY/TECHNIQUE

To test the proposed stopping criterion, two models with different stopping criteria were developed. The first model, named as Normal stopping criterion (Nsc) model, was designed with an algorithm that ends the searching process when *fittest chromosome repetition* have reached the plateau, prefix upper bound. The second model, named as the Saturation stopping criterion (Ssc) model, was created with the proposed stopping criterion, *i-Saturate*. The searching was stopped when the generation saturated with the fittest chromosomes.

5 RESULT

A good model of algorithm should be able to produce a simulated result that is very close to actual value under various circumstances of different crossover rate and mutation rate. Therefore, Nsc and Ssc models were tested for their capabilities in forecasting simulation by using a set of time series data range [1300, 1600]. In this research, both models carried out a forecasting simulation experiment with 1000 trials to accumulate the statistical records of stopping criteria efficiency. The genetic drift / parameters of both experiment models are standardized as in Table 1.

Table 1. Genetic drift / parameters for experiment models

Population size, M = 20 chromosomes
Crossover rate, CR = [0.5, 0.9] with rate interval 0.1
Mutation rate, MR = [0.01, 0.1] with rate interval 0.01

Fig. 3 shows the comparison of Ssc and Nsc models performances under (a) CR=[0.5, 0.9] with interval rate 0.1 and (b) under MR=[0.01, 0.1] with interval rate 0.01. From both the graphical representations, the Ssc model has demonstrated tracking ability better than the Nsc model. Fig.3 (a) illustrates the probabilities of the Ssc model in generating good simulation model were close to 1 especially when CRs were high, meanwhile, in Fig. 3 (b), the Nsc model was better at the low mutation rate (MR=[0.01, 0.02]) but the prevailing characteristic of the Ssc model emerged when MR was greater than 0.03. The possibilities of the Ssc model having a good forecast were very close to 1 when MR was above 0.07. From both the graphical representations, the Ssc model has demonstrated better searching ability than the Nsc model.

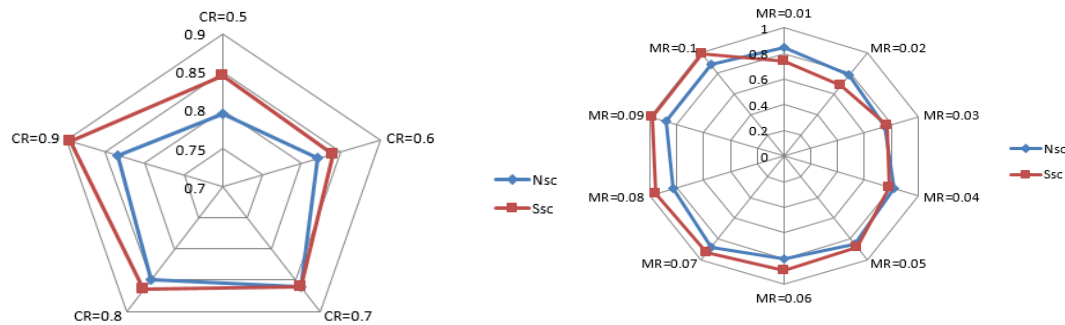


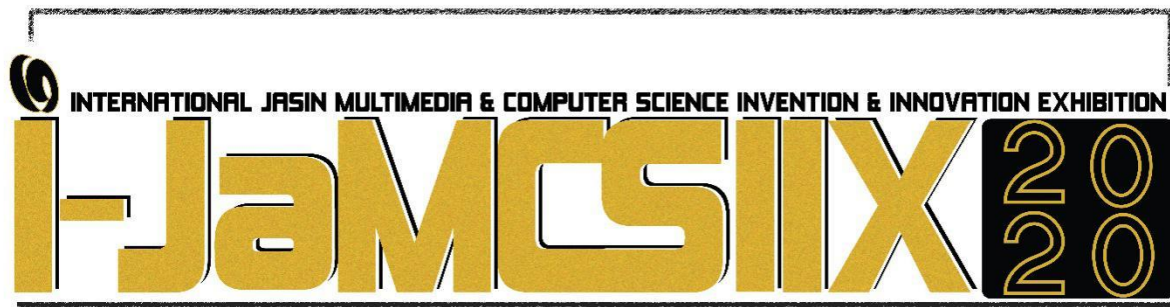
Fig.3: under $CR=[0.5, 0.9]$ with interval rate 0.1 and under $MR=[0.01, 0.1]$ with interval rate 0.01

6 CONCLUSIONS

The right choice of stopping criterion could enhance the capability of Genetic Algorithm. As the research has demonstrated, the Ssc model that adopted *i-Saturate* was better in finding a global optimum solution though MR and CR were not high. The capability of the Ssc model boosted when CR and MR had been set high. Thus, our proposed stopping criterion, *i-Saturate* has shown a great improvement in enhancing the algorithm ability in solving the optimization problem and reducing the risk of premature convergence. *i-Saturate* is also developed with no pre-setting by humans makes this stopping criterion diverse from other common stopping criteria. For future study, *i-Saturate* may also be tested in other fields of optimization such as engineering and one may research on the influence of different genetic operators in evolution.

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Babysitter Finder Mobile Application with Geofencing

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ABSTRACT

Babysitter is a person who takes care of children with paid amount of rate and working hour that demanded by babysitter itself. Working parents need babysitters to look after their children while they are working. Finding a babysitter is a tedious work as some parent has their own requirement. Moreover, they had limited time. Other than that, parent usually finds babysitter manually by asking their relatives, neighbor and friends. This may lead to imprecise information about the babysitter. Therefore, a mobile application is developed to solve the problem. This application uses geofencing technology that suit with the problem statement and objectives of the project. Geofence is used to fence babysitter's location within 500 meters from user. When parent enter in the babysitter's location, the application will trigger notification that there is a nearby babysitter. Parent also can view babysitter's profile such as age, contact details, location, availability and price. Thus, parent will get the accurate information about the babysitter since the information directly from the person. As conclusion, every function of the system has been tested and the result of each modules come out as the system expect. The objective of the system successful achieve which the system can pop up notification as indicator that user in the babysitter location. This is proved that the system can detect nearby babysitter location at the user current location. As well as user move out from the babysitter location, system can detect and give notification to user that they already exit from babysitter location

KEYWORDS: Geofencing, mobile application, babysitter

1 INTRODUCTION

Babysitter is someone who takes care of children while are working and someone pay to do this [1]. In recent news reported that for the past six years, government made initiatives to increase the amount of woman in workforce and decision making in the corporate sector that

strive to increase the contribution of woman in workforce to the economy and to promote greater inclusiveness in the workforce. According to former Prime Minister Datuk Seri Najib Tun Razak, during Talent Corporation Malaysia (TalentCorp) that by organized a Women in the Workforce Dialogue with a group of women represent for those who have a returned to work under TalentCorp's Career Comeback Programme [2]. He participation rate (FLPR) increase from 46.8% in 2010 to 54.1% in 2015, [2]. Most parents contribute for family income in order to survive and maintenance households. Working parent tend to send their children to daycare centers for children as long as they are cared for while out a work [3]. Thus, this leads to the increases of needed babysitter.

2 OBJECTIVE

The objectives of the project are to design a mobile application that be able to find babysitter which locate in Rawang, Selangor. Second objective is to develop a mobile application prototype by using geofencing technique and to test the functionality of the mobile application.

5 SIGNIFICANCE (S)

Developing a mobile application for parent to be able identify the babysitter in Rawang, Selangor. This mobile application is easy to use and less time consuming in terms of retrieving information about babysitter. Moreover, this mobile application opens an opportunity for those stay at home to make money by working at home.

4 METHODOLOGY/TECHNIQUE

The methodology has been used in the project is waterfall model. In this project there are four phases that include in the development of project which are analysis, design, implementation and testing. Waterfall model is a sequential process which is the progress is decreasing like waterfall. Each of the process must execute until finish one process in order to go to the next process. This application is developed to find the babysitter with ease and fast. Babysitter itself will provide their information and requirement in the application. Thus, parent able to retrieve clear information directly from the babysitter itself. Besides, this application uses geofencing technique that able parent to notified if there is babysitter in the radius. Geofencing is location-based services (LBS) where it is proactive that support smart notifications when user enters and leaves a specific geographical area [4].

Other than that, geolocation has been applied in the application. Geolocation have capability to detect and record where user is located. Geolocation information can be obtained from user's IP address, Wi-Fi connection or GPS coordinates [5]. Geolocation is used when babysitter's location is retrieved once she registered this application. Therefore, parents able to view babysitter's location in the map. The method of testing is functionality testing to ensure each function is working.

5 RESULT

This system has two main functions which user can directly find babysitter through the map and find the babysitter in list view forms. In the map, there is geofence with 500 meters radius from the babysitter locations. When a parent enters or exit from the babysitter's location, there will be triggered notification. Fig. 1 shows the slide notification (a) and popup notification (b) when parent enter and exit from the babysitter's location (c).

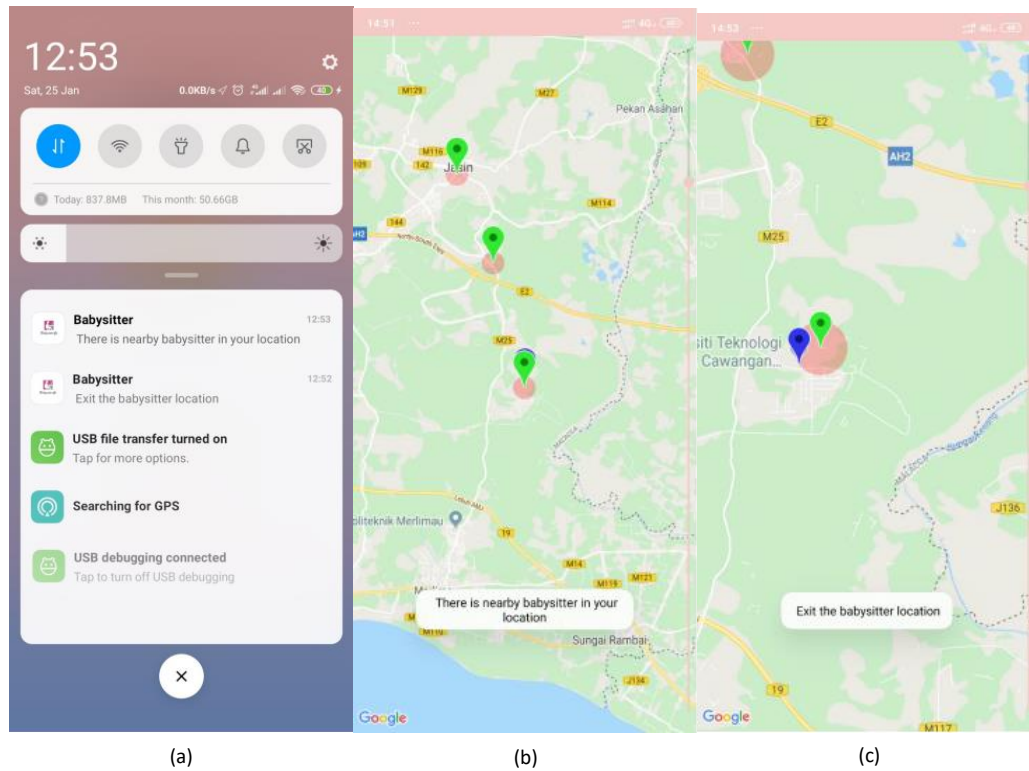


Fig. 1: Triggered notification

Parent also can view babysitter from the list view of registered babysitter. The list will display information about babysitter such as name, age, gender and address. Fig. 2 (a) shows the list of registered babysitters. After user click on the list, user will view babysitter's page details (price, contact information and working hour) as shown in Fig. 2 (b).

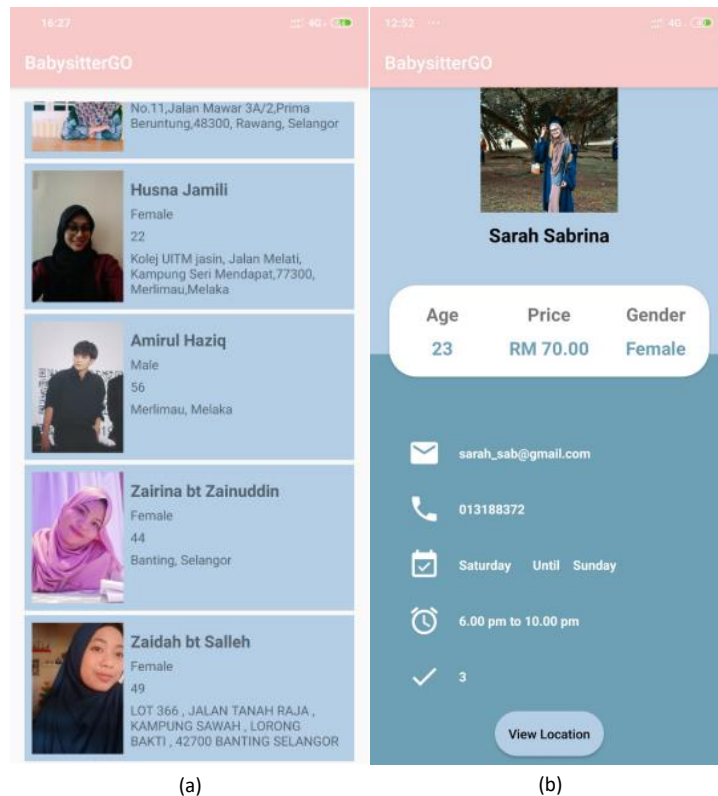


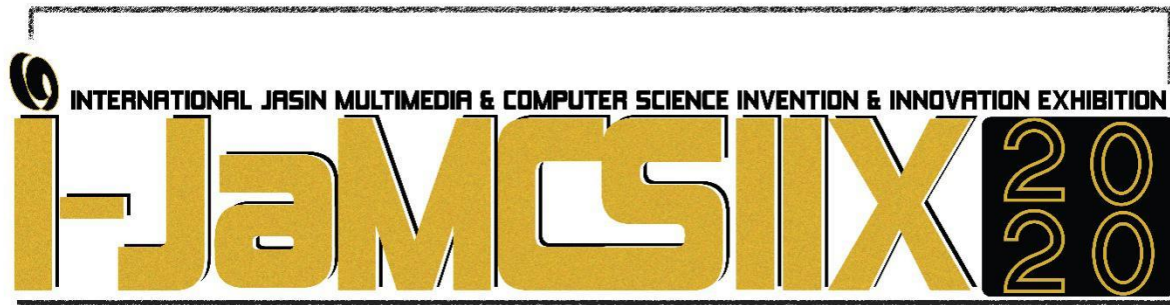
Fig. 2: List of babysitters

6 CONCLUSION

To summarize, this system involves two users which are parent and babysitter. For parent, geofencing method is used to find any nearest registered babysitter within 500 meters radius. Other than that, parent also able to find route from their current location to the babysitter's location. This application provides user friendly interface that easy to understand and use the application. Waterfall design methodology is used as the system flow to develop this application. This application has been tested for each function. Each of the functions successfully working and display expected output as the system program.

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SUMATO Awning

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ABSTRACT

Automated awning has been created and introduced to facilitate daily human activities. Various advantages such as the area will be maintained without the control of humans as well as save time. The main theme of this project is to prevent the clothesline or more focused on protecting the tables and chairs outside of a restaurant and the house's patio area. However, there is a shortage of existing inventions. Not all existing automated awning systems use raindrop and temperature sensors. Most can only be controlled manually. Thus, 'Sumato Awning' was introduced to address the problem. It is built from 2560 Arduino Mega, using the YL38 raindrop sensor and LM35 temperature, the awning can function itself. Then, the 16*2 LCD is used to display the motion and status of the awning operation. Among the other components used are buzzer to generate alarm sound, after the awning is fully flat, the LED will be lit to provide adequate lighting and water-mist fan for the consumer's comfort.

KEYWORDS: Arduino, Temperature sensor, Motor, Automatic fan

1 INTRODUCTION

'Sumato Awning' project was created and important to address the daily problems of the community especially the restaurant and home environment. Typically, to protect the dining area outside the restaurant from the rain or sunny weather. This is to ensure the convenience of customers. Next, the design idea is to use a layer of waterproof and non-absorbent based material. This is to ensure rainwater only flows on the roof other than as a UV stabilizer. It could block between 93% to 99.9% of UV radiation [1]. In addition, the design improvements made are based on existing products. Most of the existing automated awning come by itself, which is no importance or lack of comfort features especially for restaurant and residential use. Therefore, 'Sumato Awning' is designed with space saving which the ability to compress to the walls. It will supply enough light by the LED installed under the protected area. Not only that, for the comfort value, the water-mist fan will be install to supply enough air. Finally, nano-finished as the external surface can keep the maintenance free with dirt as it will unable to ad-hold to the surface [2].

2 OBJECTIVES

The weather in Malaysia is uncertain. It cannot be expected exactly even by weather forecasts. The common approach is by using awning that was operated manually. Awning is used for certain restaurants to protect their restaurants from raining or sunny. There are a lot of great and advance designs such as Crystalia Glass retractable skylights and roofs in Brooklyn, New York which provided an automatic glass roof [3]. However, those automatic glass roof is not suitable to be applied in Malaysia due to the equatorial climate. On the other hand, there are also lightweight, inexpensive and suitable roof types for use in certain restaurants in Malaysia. However, it does not work automatically. Therefore, this awning project proposed is lightweight, affordable, large and automatic controlled by a motor and detected by two sensors for two different conditions. The main objectives of this project are to design an automatic awning system, 'Sumato Awning' that functions after detect the presence of rain or high temperature by using Arduino Mega as micro-controller. Next is to implement awning system that can be monitored by IFTTT apps.

3 SIGNIFICANCE(S)

This project will help saving the time and energy of restaurant workers and residents to control the awning manually. Since it is a system that works independently, people can concentrate and focus more on restaurant operations and daily chores. This awning system will continue to open automatically when detecting the presence of rain by using raindrop sensor. Even so, when the rain stops, it will again compress the layers of the roof to the wall. It will persist and repeat the same steps whenever it detects the presence of water or high weather temperatures. Other than saving time, in terms of restaurant income, it will increase their business income because there will be no operational disturbance that can affect the number of customers who are visiting especially during rainy days. This is because of the lack of seating that normally added by putting chairs and tables outside the restaurant. Lastly, it will contribute to the convenience of consumers as the awning is equipped with LEDs to provide lighting and water-mist fans that will provide adequate ventilation under the protected area. So, restaurant customers and residents will always feel comfortable with the features of comfort that are included in the 'Sumato Awning' project.

4 METHODOLOGY

a. Flowchart of the project

Fig. 1 shows the flowchart for this project. This project uses two sensors. Firstly, the rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display "Raining, Awning Active" and the servo motor will move the awning to be opened. Secondly, the temperature sensor is functioned when the temperature limit is reached. The LCD will display, "Sunny Day, Awning Active". Automatically, the awning opened. Buzzer will then beeping to notify users. Since the awning has opened, the LED which indicate lamp will be turned on to provide sufficient lighting. Then, fan (water mist fan) will be turned on to provide adequate ventilation. Finally, WiFi Module installed to control the awning to be closed or opened through mobile applications and to see the status of the awning itself. Thus, the awning can be opened and closed in a very short time.

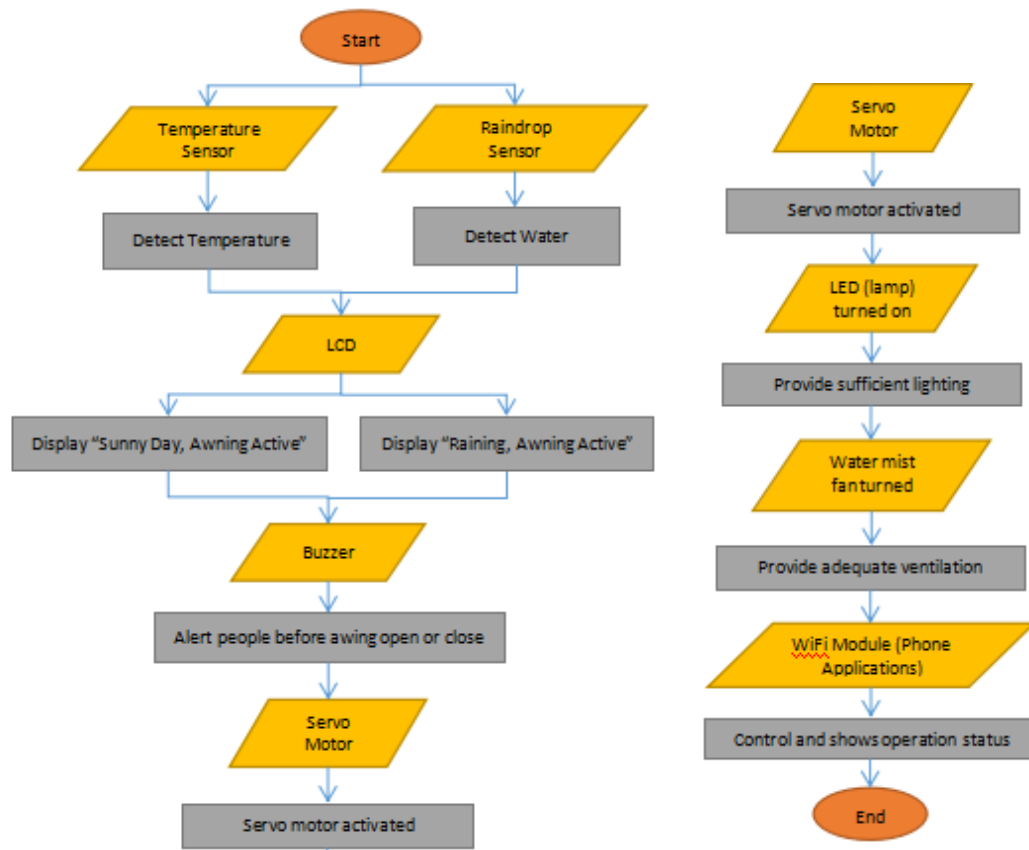


Fig. 1: Flowchart of Sumato Awning

b. Block diagram of the project

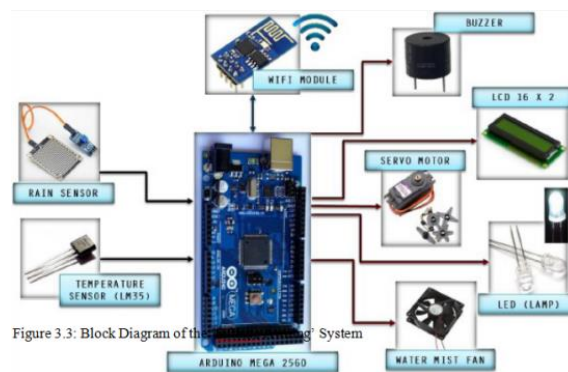


Figure 3.3: Block Diagram of the "Sumato Awning" System

Fig. 2: Block diagram of Sumato Awning

Fig. 2 shows the block diagram for this project. There are two parts which are input and output. This project is developed by using Micro-controller board ATmega2560-16AU. This awning will operate based on two input sensors, raindrop sensor (YL 38) and temperature sensor (LM35). The outputs are Liquid Crystal Display (LCD) 16 x 2, servo motor (MG996R), buzzer, 9V fan and Light Emitting Diode (LED). Rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display the operation mode of the awning. LED and fan which indicate lamp and water mist fan will be turned on automatically. Hence, WiFi Module used to control the awning to be closed or opened through mobile applications and to see the status of the awning itself.

5 RESULT



Fig. 3: Result of Sunny; temperature > 35°C

Fig. 3 shows the result during the sunny day. Temperature sensor sensed surrounding temperature higher than the limit set. Then, LCD will display, “Sunny Day, Awning Active”. Buzzer will beep to notify user and the the awning opened automatically. Since the awning has opened, the LED and fan which indicate lamp and water mist fan will be turned on automatically.



Fig. 4: Result of Raining

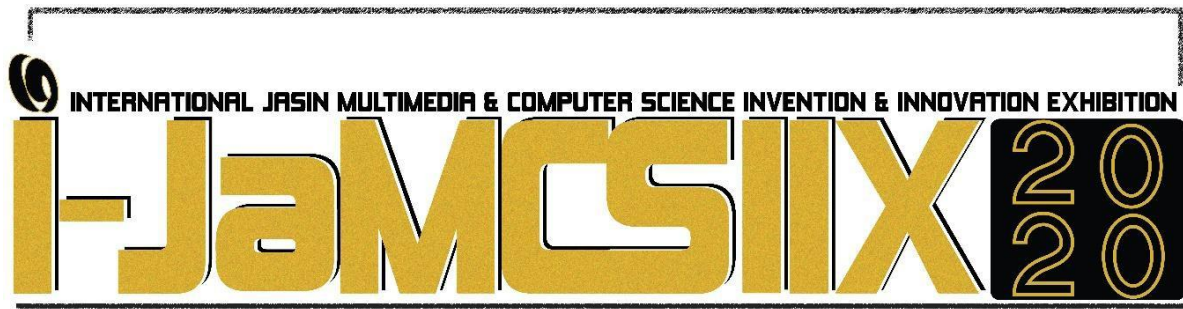
Fig. 4 shows the result during the raining day. The rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display “Raining, Awning Active”. Buzzer will beep to notify user. Servo motor will then move the awning to be opened. Since the awning has opened, the LED and fan which indicate lamp and water mist fan will be turned on automatically.

6 CONCLUSIONS

‘Sumato Awning’ has more advanced system and technology than the existing awning system. In this regard, the problem in restaurants and clothesline that are exposed to rain and heat can be overcome. In fact, it can be monitored through applications on mobile phones. In the future, it can be expected that the use of automated intelligent smart systems will be widespread not only with smart awning systems. It will contribute significantly in the business industry such as restaurants and housing areas due to its characteristic features. Furthermore, this project could be continued by future researchers by adding various features of the privilege.

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Smart Water Dispenser Monitoring System

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ABSTRACT

People become dehydrated if they do not drink enough water. To solve this problem, it is essential to monitor how much water that consumed every day. So, objective of this product is to develop smart monitoring water dispenser using Arduino Mega 2560 as microcontroller that controlled the amount of water dispensed by this water dispenser. For this product, button system is used to determine the volume of water to drink. Every button has their own amount of water that they will dispense. The amount of water will then be being recorded and display to LCD and app Blynk in your smartphone.

1 INTRODUCTION

Water is important for our body whether to keep ourselves clean or keep our body healthy. Human need to drink 2.5 litres of water every day. Not drinking water for just a few days can have serious consequences on our health like dehydrated. There are many way people get their drink water. One of the main way they can get water is from dispenser water. A water dispenser, known as water cooler is a machine that cools and dispenses water with a refrigeration unit. It is commonly located near the restroom due to closer access to plumbing. A drain line is also provided from the water cooler into the sewer system. There also many types of dispenser water like Wall-mounted, Table top water dispenser, direct-piping water dispenser or freestanding. This water dispenser may have different sources, but are often classified into two major categories, namely natural mineral and purified water [1].

Many inventions were made to control the water disparities in order to make the whole system automatic. To achieve this a lot of product had come up with different design and model, yet there is still no product that focusing on how much the water had been use. Thus a monitoring device for this particular problem need to be address and develop to allow this idea become bigger and real.

2 OBJECTIVE

Nowadays, people always forget about drink the water. They always busy with their work until they forget to drink water. Water is most important resources that need by every living thing. Without water, we all going to die because of get dehydrated. One day in future, the resources might have gone sooner or later for some reason contamination happen. Plus, few of people did not really know how to save and appreciate the water resource. Somehow they used water for their own properties rather than necessary things in their life [2].

Based on these problem statements, the objective of this project is to develop smart monitoring water dispenser using Arduino as microcontroller. Next, the objective of this project is also to monitor water dispenser system using Wi- Fi Module (ESP8266) through smartphone Blynk apps.

3 PROJECT CONTRIBUTION

The purpose of this project is to remind people how important to drink enough water in our daily life. By using our features in this product, a little improvement in our products can monitor enough water in our body. Our product is suitable for all generation, any kind of culture background, this might help them from these problems. In addition, our product is very useful for patients in hospitals who needs this product especially to decrease their sugar in body.

4 METHODOLOGY

a) Block Diagram and Schematic Diagram of the project

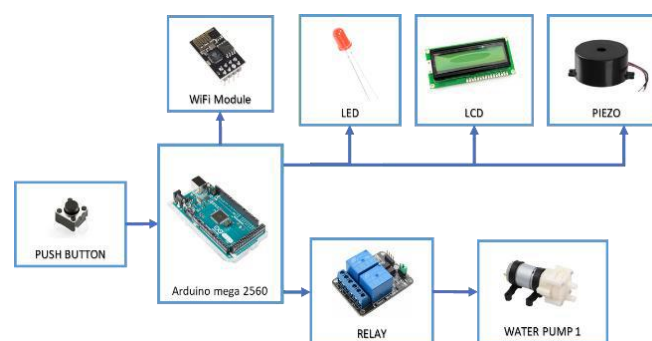


Fig. 1: Block Diagram

Fig. 1 above shows the project block diagram. With the help of block diagram, the flow and process work of project can be easily organizing. This block diagram here shows how many input and output will be used in this project and the sub unit that need to make sure this project work as an expected. For this project the only input that is used is push button, while for the outputs the components that used are LED's, LCD and water pump. As additional, we also added a wireless feature into this project.

b) Flowchart of the project

Based on Fig. 2, it shows step by step on how the project work and operate. This flowchart is use to guide us on how to make the program for this project. The program started with by displaying the user a “Press any button” which means that the user would have to pick any one button out of three button that been provided and each button had their own volume of water that they will pour. The three choice are 150mL, 250mL and 500mL. If any of this button is press, the pump will pump the water with correct amount. Next, every time the button is press, the microcontroller will calculate and sum how many the button being press and display it to the LCD. This flowchart is continuing with an indicator system. If the total water reach 2 litre which the average human body need water per day, than green LED will turn on but if the water does not reach 2 litre than green LED will turn on.

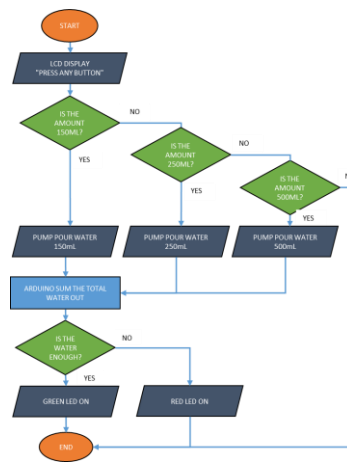


Fig. 2: Project Flowchart

5 RESULT

This section will show the demonstration of the prototype of this project.

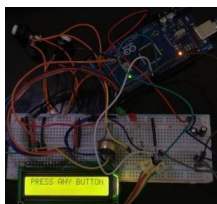


Fig. 3: User need to press any button



Fig. 4 :Volume of water dispenser

Fig. 3 shows that the consumer can choose whether they want to pour how much water while Fig. 4 shows after they choose one of the button, the LCD will display how much water is dispensing through the pump.

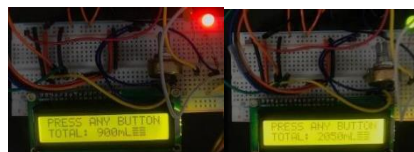


Fig. 5 :Total amount of water dispense

Fig. 5 shows if the amount of water is below than 2000ML, the red LED will on to

indicate the consumer need to pour more water to get 2000ML and above, green LED will on to indicate the consumer has enough water.

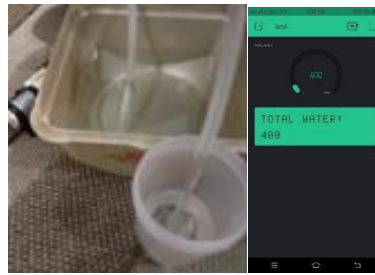


Fig. 6 :Water flow through hose and total water also display in the Blynk Apps

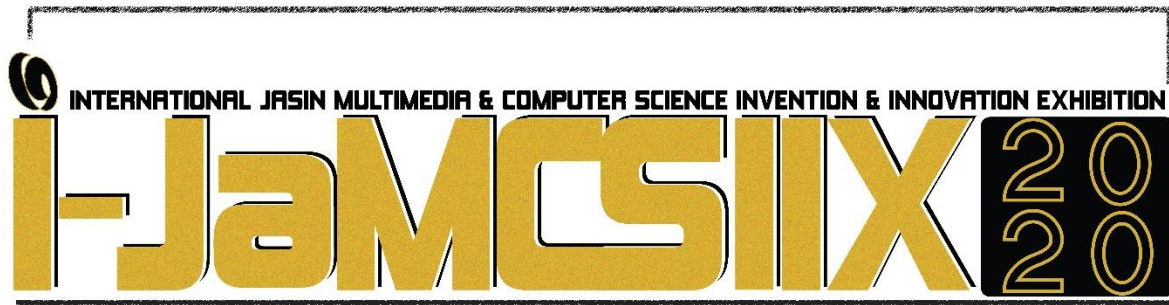
Fig. 6 shows that how the water flow through hose and how the display on their smartphone by using Blynk apps.

6 CONCLUSION

To sum up, this project has successfully achieved all the objectives for the simulation and prototype. Based on this project, using Wi-Fi compared to Bluetooth or Global System for Mobile communication (GSM) is easier for specific users to get the information to see their total amount of water drinks. To make an efficient running program, two LEDs are placed in front of the prototype as an indicator to drink more water.

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Korean Learning Mobile Application for UiTM Students

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ABSTRACT

The learning method that is not attractive lead learner to feel bored and do not want to read a book. There is also insufficient face to face a learning session which only two hours per week to learning Korean language with the lecturer. Therefore, this project is developing a mobile application to learn Korean language by using educational game technique. Korean learning Mobile application for UiTM students is intended to be used by UiTM students who enrolled for the Korean language subject, Korean language lecturer and anyone that interested in learning Korean language. The purpose of this system is to help users to learn Korean language more easily at anywhere and anytime. Currently, UiTM students used traditional book-based learning as a learning platform. This required much time to find the information since they need to read line by line of the book until they found the information that they require. Gamification techniques refer to the use of game symbols, game elements and concepts in a context other than games to increase motivation and interaction and influence user behaviour. The mobile application functionality has been evaluated. The result shows the system can run smoothly and meet the user's expectations. In conclusion, this application is able to use by Android users only, this limitation can be improved in the future so anyone either Android user or iOS user can use this application system.

KEYWORDS: android, Korean language, gamification

1 INTRODUCTION

Nowadays, Universiti Teknologi MARA (UiTM) offered the variety of course to the students. One of the courses is the third language that have been divided into several language such as Korean, Japanese, Arabic, French, Mandarin, German, Thai, Spanish and Italian [1]. This course has been offered in order to help the student to have more communication skill to ease them for their future career and get respected [2]. There are three level that must to be passed by the students. Another document called the Hunmin Jeong-eum Haerye explain that the

consonant was design after the shapes of the mouth have been makes when saying the letters while the vowel designed after the principles of Yin and Yang. The Korean alphabet is made up of 3 atomic vowels and 5 atomic consonants and then extends them to the 28 basic of alphabets that consist of 17 consonant letters and 11 vowel letters [3].

This project uses gamification learning technique in order to help student to gain knowledge from the formal learning by using mobile device with several learning module and quiz question in order for the learner to know their skill level of the Korean language. Gamification, is the use of game design elements in non-game settings, is often suggested as a way of bridging knowledge gaps, through understanding, and encouraging change in behaviour [4]. Gamification is a new field of research, which consists of incorporating game features in non-game texts. In this context, a business method can be strengthened. Of example, it can also be commonly used in the scope of learning. By studying the personality of software professionals, a gamification design process will enhance the software development process [5].

2 OBJECTIVES

The main objectives of this project are:

- a. To develop a mobile application to learn Korean language for UiTM students by using a gamification technique.
- b. To test the functionality of the mobile application to learn Korean language for UiTM students.

3 SIGNIFICANCE (S)

By developing this mobile learning application, it may help students to improve their capability of learning the Korean language through mobile application as alternative learning material. It also may help students to memorize vocabulary through mobile application. Moreover, this application may act as teaching aid for Korean language lecturer. This application may be use anytime and anywhere depend on the user.

4 METHODOLOGY/TECHNIQUE

Mobile Application of Korean Learning system use an educational game Techniques to attract user to learn Korean Language by using Mobile devices. The gamification element can be found in Quiz module which this module was divided to two section. First section is Vocabulary Quiz and second is a Grammar Quiz. For Vocabulary Quiz, student will be answered by playing the flipping card which is known as memory game. This memory games used to help students on memorizing their vocabulary. This games also has three level which is easy, medium and hard level. Every level of the games has its difficulties. The game will flip the card until it finds its match, but only two cards will be open at the same time. For Grammar Quiz, students will be given several questions to be answered according to the level that they choose.

Next, marks also one of the game elements. This element has been implementing in Grammar Quiz module. In this module, each of question has been answered correctly will

increase the mark. Firstly, the quiz starts with zero score. User start to answer the question, for example if the first question has been answered but get the wrong answer then the score will remain but when the answer is correct the score will be increasing to 1.

In addition, the next game element that has been used is timing. Each game level will be provided the timer to answer each question which is 30 seconds. For each question the timing will renew to 30 seconds again. Moreover, sound also will be implementing in this system. A sound is a sound captured and interpreted without the use of narration or music to establish a particular narrative or artistic point. The sound also needed to create a creativity and efficient presentation.

Lastly, is a flipping card known as memory game. This memory games used to help students on memorizing their vocabulary. This games also has three level which is easy, medium and hard level. Every level of the games has its own difficulties. The game will flip the card until it finds its match, but only two cards will be open at the same time. For example, if students played for medium level, they need to find match of 8 cards by flip the card. If the card is not match, it will flip back, and the process continue until it meets their matching card. The level considers complete when all the card has been matching

5 RESULT

Mobile Application of Korean Learning system use a Gamification Techniques to attract user to learn Korean Language by using Mobile devices. The gamification element can be found in Quiz module which this module was divided to two section. First section is Vocabulary Quiz and second is Grammar Quiz. Vocabulary quiz uses a game element which is Memory Game in order to improve user memory of vocabulary while playing the game. Fig. 2 shows the example of Memory Game. The Memory game consists of two similar sets of cards in an ordered arrangement that are face-down. The cards are revealed two at a time and for a player to grab a matching pair of cards must be exposed simultaneously. Then, for the Grammar Quiz, the level of quiz has been chosen and displayed successfully. This quiz will provide a few grammar questions with the multiple-choice answer that need to be choose as the answer. Fig. 3 shows the example of quiz question need to be answered. This system also providing sound as gamification element. A sound effect is a sound captured and interpreted without the use of narration or music to establish a particular narrative or artistic point. The sound also needed to create a creativity and efficient presentation. From the Fig. 1, it shows that this project uses a sound in the learning session. This sound will read the vocabulary of Korean language to help students speaking fluently.

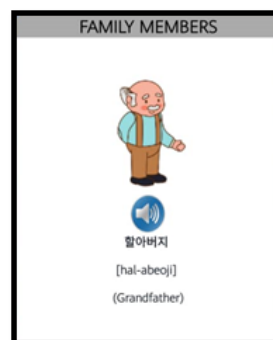


Fig. 1: Sound in vocabulary learning



Fig. 2: Vocabulary Quiz



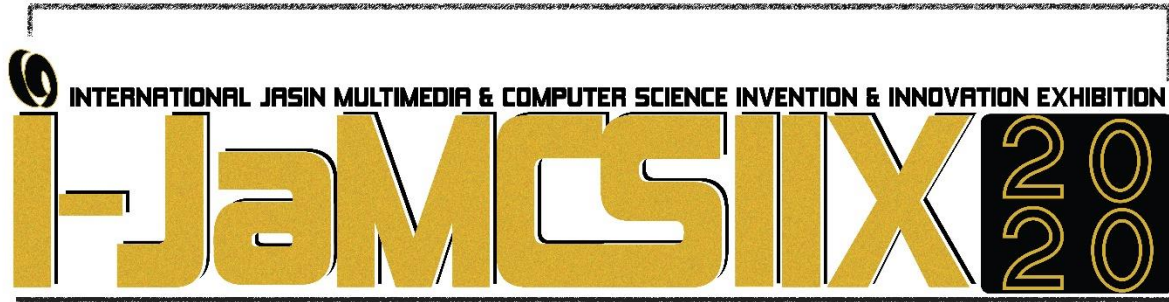
Fig. 3: Grammar Quiz

6 CONCLUSIONS

Mobile application of Korean Learning is an application that is used by UiTM students, lecturer or anyone that interest to learn Korean language. Based on survey conducted, 94.9% respondent agree that the mobile application to learn Korean language can help them in the study and understanding more for this course. Students nowadays are so busy with activities and classes. Sometimes they have no time to study and it is difficult for them to bring a book anywhere and only bring short notes to revise their topic. Two hours learning session per week with their lecturer are not enough to catch up on everything. Thus, this mobile application has been developed in order to solve this problem. The technique that has been used in this application are gamification technique with interesting interface and sound. This technique has been applied in quiz module. Furthermore, the functionality of this application has been tested. It has shown a positive result to make it easier for users to use the application.

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Smart Home Automation System

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ABSTRACT

Smart Home Automation System is a project to develop a prototype of home automation system using an-Arduino MEGA 2560 microcontroller. This project include the automatic opening and closing door system, automatic light control system and automatic fan controlled system based on temperature of the room. The door will be using Ultrasonic sensor and rotational moving motor connected to gear which will drive rail to slide the door open and close. Then, the lights will automatically turn on when someone enter the house (within the range of the house area). After that, the automatic fan control is based on the temperature of the room. As technology is advancing so houses are also getting smarter. Usually, conventional switches located in different parts of the house makes it difficult for elderly or physically handicapped people to do so. This home automation system is providing a solution to these problems. Therefore, this home automation system should be required by elderly and physically handicapped people as it is important to consider issue of controlling , monitoring electrical appliances and energy management in their houses.

KEYWORDS: Arduino, Ultrasonic sensor, Motor, Automatic fan

1 INTRODUCTION

The usage of home automation is getting popular and widely used in this new era of modernisation. Home automation is adopted for reasons of ease, security and energy efficiency to the consumers especially for handicapped or elderly users. This system is mainly implementation by sensors, controlling devices and then send data to microcontroller. It can prevent the people from wasting electricity if they forget to turn off the light or fan. This is because the system will be operated when the Ultrasonic sensor detect the presence of person entering the house. People nowadays have a lot of work to do in their daily routine. This system operates as a helper to ease the user to control electricity in the house, secure the security by using Bluetooth connection. In the other words, this system is more efficient and friendly user for both handicapped and elderly users. This is because the electricity can be operated without using the common method which is user need to switch on or switch off manually to control the light, fan and door. This system introduce the automation system by detecting the motion of the user within the range of the house area.

This project is to develop smart home automation system that integrated with Arduino as microcontroller [1]. This system is the new project which it uses the sensor to switch on the light and fan. The purpose for this project is to minimize the switch uses in the house. This is because every people always forget to switch off the light or fan when they are in a rush to go out of the house. This system introduces automated system where it uses motion sensor as the switch to switch on the light and fan [2]. Furthermore, this project is to identify the function of Arduino as the microcontroller of the system. Most of us do not know about Arduino and the function of it, so this system can introduce how Arduino is working.

2 OBJECTIVES

People always tend to forget to switch off switches in the house and electronic appliances when they are in a rush. Thus, with the existence of home automation system, there is less energy consumption as the action of forgetting to switch off electrical appliances can be prevent. Other than that, handicapped and elderly always have a problem to reach switches that a little bit higher. With the expansion of technology, everything is at the tip of our fingers, there is so much we can do. We can live without having to burden anyone. With the rise of home automation system in the recent times, improving standard of living, ease the use of home appliances is what home automation is offering. It offers one gets to control his entire house by only using a sensor, from opening the door, switching on the lights or fans and also offers efficient use of energy.

As for the objectives of this project, it is to develop a prototype of smart home automation system that integrated with Arduino as microcontroller. Next, to automatically switch on the light when people enter the house by using ultrasonic sensor to detect people's motion. Lastly, to detect surrounding temperature and turn on fan when temperature surrounding is high.

3 SIGNIFICANCE(S)

This project will help the people to overcome the wasted electricity problem. This is because, more people always forget to turn off the electricity when they are rushing to work. This is one of the method to minimize this problems. The ultrasonic sensor acts as a motion detection whether there is a person or not in that house to operate the electricity especially for light and fan. Since most of the work that is needed to be done by the worker has been efficiently done by the system, the people have no longer worry about the wasting electricity at home. Other than that, this project can control the fan to operate based on the temperature reading. It can reduce the movement of people to control the fan using the switch. People will feel more comfortable and does not have to move to turn on the switch manually.

4 METHODOLOGY

Flowchart

Fig. 1 shows the flowchart of the system. Firstly, the input must be initialized to make sure the system works correctly. Then, it was divided into three part where PIR sensor, Ultrasonic sensor and LM35 temperature sensor. This system will looping repeatedly until the power source is off. This system depend on the condition that set in the programme.

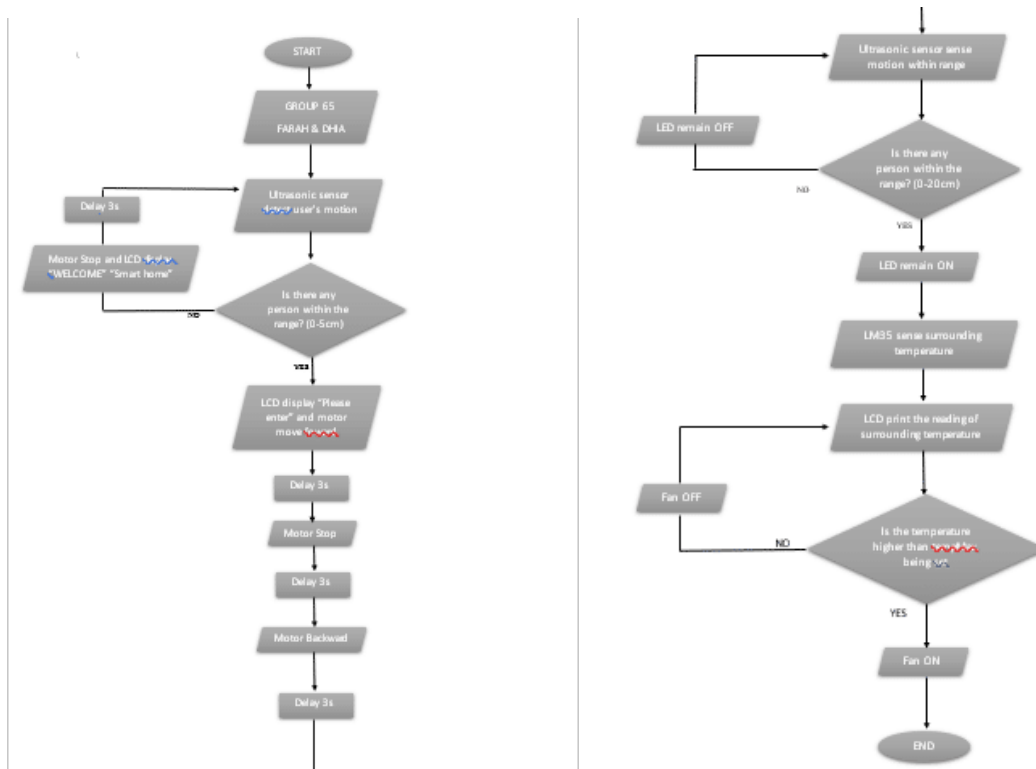


Fig. 1: Flowchart of the system

Block Diagram

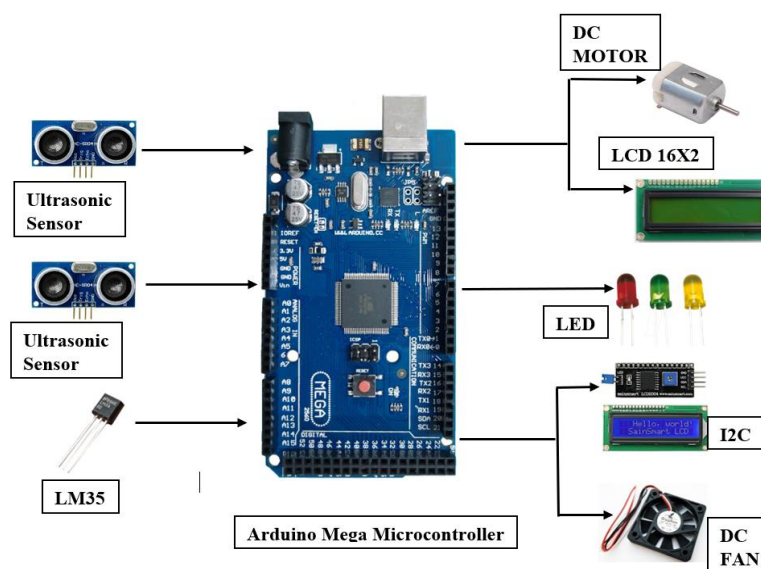


Fig. 2 : Block Diagram

Fig. 2 shows the block diagram of the system. There are three inputs and four outputs for this project. LM35 temperature sensor will sense the temperature and display it on 16x2 LCD. Then, the DC fan motor will operate based on the range of the temperature. For ultrasonic sensor, it will sense the object that move into the house. Then, the LED will light up as the sign of the operation by ultrasonic sensor. Furthermore, the PIR sensor also detect the object movement and it will operate the servo motor to open the door.

5. RESULT

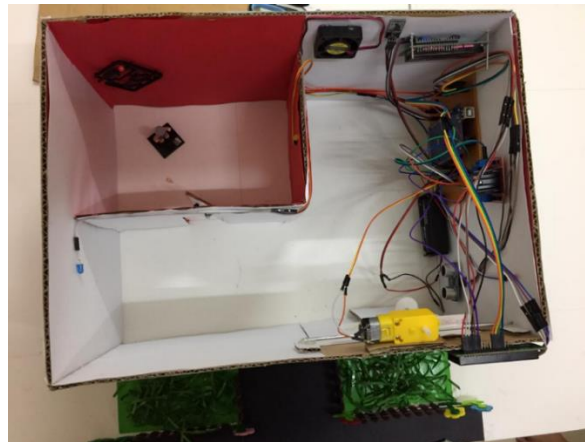


Fig. 3 : The arrangement hardware on the prototype

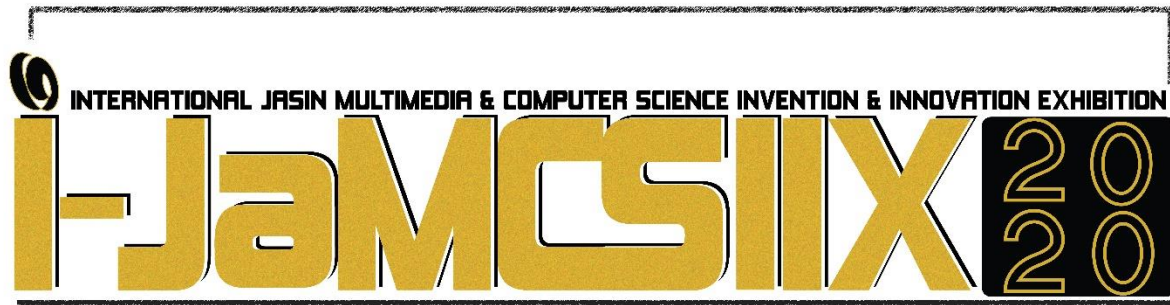
Fig. 3 shows the arrangement of hardware on the prototype. This arrangement shows how the simulation working on the real house. In this section, this project entitled Smart Home Automation System will be discuss, the operation works when Arduino Mega will supply to the components such as LCD, I2C, DC Fan and LED for the system to operate. The system will fully working once the connections are connected. There are three systems in this project which are smart automated fan, smart automated light and smart automated door. The operation for the door started when ultrasonic sensor sense motion within the range set in coding, it will lead for door to automatically slide open and delay instruction was given before the door automatically slide to close the door. Next, the operation for automated light operates when ultrasonic sensor inside the house detects motion of the user, it will light up the LED inside the house and will light off once the user get out of the house or outside the range of the house. Next, automated fan operates when LM35 temperature sensor read the temperature surrounding and will display it on LCD.

6 CONCLUSIONS

As the conclusion, a prototype of smart home automation system can be developed with Arduino Mega 2560 as microcontroller. Besides, ultrasonic sensor and LM35 temperature sensor acts as a medium of communication. Other than that, automated light system is running when people enter the house by using ultrasonic sensor to detect people's motion. Next, the surrounding temperature can be detected and switched on the fan when surrounding temperature is higher than range set by using LM35 temperature sensor. Hence, all the objectives were achieved.

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The Sense of Agency of Virtual Hand Representation for Online Shopping

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ABSTRACT

The advancement of virtual reality technology has made real-life manipulation possible in virtual environment since there is a feeling of control, also known as the sense of agency. However, to create a greater virtual experience (e.g., perception of size) of a real-world model (e.g., smartphone) with its model representation in digital or virtual environment (VE) is difficult. For example, the representation model (e.g., in an online shopping website) might visually differ in size compared to the physical world. This study addresses the problem by introducing a calibration method to best match the ratio of virtual hand representation with its associated object in VE and in the real world. This project creates a prototype made by off the shelf motion sensor (i.e., Leap Motion) and Unity software. User can virtually inspect online products as if he is holding the product in the real world. This study evaluates the sense of agency by comparing experience of participants before and after using the proposed prototype. Results showed that the sense of agency is much higher in the proposed method compared to conventional online shopping (i.e., no virtual inspection).

KEYWORDS: virtual environment, sense of agency, virtual hand, online shopping

1 INTRODUCTION

Virtual reality (VR) enables physical items and spaces to be reconstructed through their digital representation [1]. The sense of agency, or the feeling of control is the subjective awareness of initiating, executing and controlling one's own behavior in the real world [2]. In VR, a sense of agency is one of the components in presence phenomenon [3]. The study in [3] claims that the more realistic the virtual experience, the greater the individual's belief in interacting with the digital environment, for example, to improve the virtual experience by using the virtual body as self-avatar in the virtual environment. Self-avatars already used in virtual environments as entities for interacting and manipulating. In this situation, embodying the avatars influenced perception [4]. One of a human body parts that can be used to manipulate virtual model is human hand. This part is a very complex mechanism, hence there many studies attempt to calibrate between physical and its virtual hand representation. For instance, the research in [5]

use the glove as an input device to track the hand to manipulate objects. The glove presents a quick calibration routine and can match accurately the virtual model for a different user. The work mapped motions of an unrestricted human hand to a non-anthropomorphic planar robot hand. A different format of glove (i.e., data glove) has been studied for VR [6]. There is an advance method to track human hand, i.e., body-tracking technology [7]. This method tracks user hand motions (e.g., fingers, wrist) and maps it to the hand's virtual representation [8]. The virtual hand can visually portray exact movements and gestures of the human hand. However, this method less popular in e-commerce website due to few hardware constraints (e.g., require a depth camera sensor).

E-commerce stores shows unprecedented growth in Malaysia [9]. More customers choose online shopping because of better facilities and devices (e.g., fast network, smartphones). In addition, e-commerce stores provide much better services compared to retail store (e.g., offering more selections, postage service, collection at a point, extra offer for online items, fast payment). However, the downside is the physical appearance of the products are limited (no physical inspection). Most online shops only display products using texts and pictures while physical shops allow customers to interact by viewing the products from all sides [10]. Users have a problem to estimate overall product size or dimensions by using only snapshots of two-dimensional (2D) products [11]. This limitation will create a dissociation between the consumer and the brand image [12].

This project addresses the problem by introducing virtual inspection of products. Users can interact with 3D model representation in an online shopping system with their avatar hand. This project proposes a hand tracking calibration method to improve the sense of agency of the user. This project includes a Leap motion device for the motion tracking since it allow users to interact a virtual environment in a non-intrusive and intuitive manner [13].

2 OBJECTIVES

The objective of this project is as follows:

1. To identify a calibration method for virtual hand representation.
2. To embed virtual hand representation into an online shopping environment.
3. To evaluate the sense of agency after virtual hand representation has been embedded in online shopping.

3 SIGNIFICANCES

In many domains, the use of VR is well established. VR offers many advantages like visualizing, experiencing and analyzing [14]. It simulates a physical presence, providing visual experiences. This is highly advantageous in the marketing sector. VR experience is more enriching than common media used, and it led the development among new generations. Applying VR experience within a shopping environment makes it more user-friendly thus attracting higher customer satisfaction [15]. In addition, these influence the customers' experience in virtual shopping.

4 TECHNIQUE AND EXPERIMENT

Calibration process

The calibration process is done in two steps. Firstly, the system acquires three readings of user's palm-size (i.e., palm unit) and average the values. Secondly, the system uses the palm unit to resize the 3D model representation accordingly. The readings are captured using a Leap Motion sensor and the program is written in C# language.

Sense of Agency Evaluation

This project evaluates the sense of agency (SOA) of the proposed method. The evaluation for SOA was assessed through a questionnaire adopted from work in [4]. The procedure to this SOA experiment will be explained in the next section.

Procedures

In this study, there were two experiments. The participants were explained about the task flow before they begin each experiment. All participants are familiar with online shopping activity.

In the first experiment, participants conventionally buy a smartphone via familiar online shopping platform (i.e, Shopee). Then, the physical smartphone was handed over to them as a result of the purchase. The user then inspected the physical device and answer questionnaires.

Participants will be provided with a short break (i.e., 3 minutes) before continuing the second experiment. In the second experiment, participants have to buy smartphone given the representation model is in 3D and can be virtually inspected. The participants were briefed with instructions of Leap Motion controller. Then, the participants hover hands in Leap Motion viewing range. The proposed system then recorded the participant palm width for calibration. Then, the system calibrated the hand where it scaled the 3D smartphone model according to actual hand scale. The participants inspected the model with their virtual hand. After that, the participants will be given the smartphone that they purchased. Participants then observed and inspected the smartphone and answer questionnaires.

Apparatus and Participants

The experimental apparatus includes a laptop system and a Leap Motion controller. The laptop is running on Windows 10 operating system with 12GB RAM and 1TB storage space. Twenty-two participants (10 males and 12 females, age ranging from 18 - 25 years) took part in the experiment. This number of participants has also been decided in [14]. The participants are all online shoppers and have different backgrounds. However, none of participant's experience Leap Motion controller.

5 RESULT

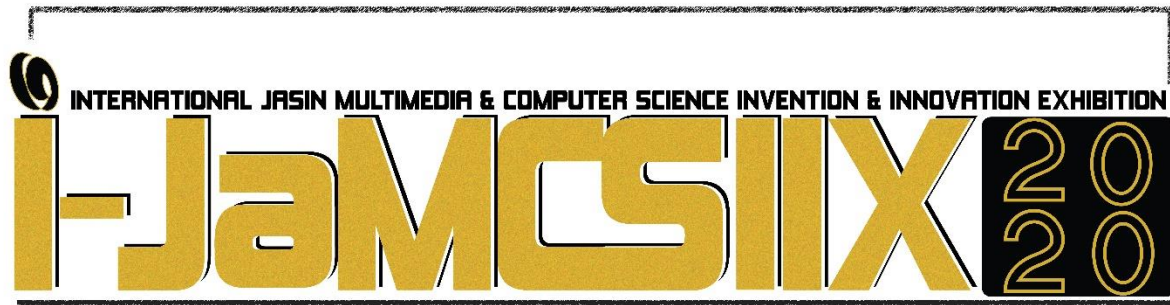
A total of 22 individuals (10 males and 12 females) participated. Based on data gathered, mostly online shoppers are among 18 until 25 years. Participants rank all conditions in order of preference once at the end, after having experienced each condition in practice. In general, users preferred the virtual hand representation. 91% of the participants preferred to shop with the aid of ability to virtually inspect 3D model with a virtual hand.

6 CONCLUSIONS

Our findings indicate that virtual hand representation (that we have calibrated) improves the sense of agency (i.e., the feeling of shopping as in real life). We can conclude that scaling the size of the 3D model using where the size of body representation as a fundamental metric is significant. We believe that this work can be expanded to many other areas other than shopping (e.g., medical, architecture, construction).

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ANATEKS: An eContent learning for ‘Technical Analysis’

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ABSTRACT

‘Technical analysis’, a branch of stock market study is a popular and heavily used technique in stock trading. Few knowledge and educational materials have been produced to assist beginners in this industry. The present learning tools, named ANATEKS, a short form for ‘*Asas Analisis Teknikal Saham*’ was developed as an eContent educational platform catering for the first-time learners in technical analysis. The platform provides introductory information on the subjects in a compact duration via short videos. Using smartphones and computers, the materials are accessible through ANATEKS website linked to youtube. Such medium complements the existing conventional learning via lectures and book reading. It helps to boost learning experience in a convenient, timeless, fun and fast way. The potential target includes the students of Universiti Teknologi MARA (UiTM) Melaka enrolled in the technical analysis course and the general public who is the first timer in Bursa Malaysia trading. Uniquely, the videos are prepared by beginners in this area, suiting the tagline ‘learning from peers.’ Guided by SCANMIC methodology in producing a successful eContent learning method by Hassan & Li [1], overall ANATEKS fulfil majority of the SCANMIC paradigm features making it a useful learning medium for new investors. Future recommendation includes the inclusion of industry experts learning materials in the form of videos and pdf documents, coupled with knowledge sharing interactive features in the website.

KEYWORDS: ANATEKS, Technical Analysis, SCANMIC, eContent, University Repository.

1 INTRODUCTION

‘Technical analysis’, a branch of stock market studies, is gaining interest among stock market practitioners and academicians. In finance, technical analysis refers to a method to predict stock prices based on historical data. It has been a popular and heavily used technique for decades already in financial practice and has grown to an industry on its own [2]. Thus, to be able to equip oneself with technical analysis knowledge is indeed an added advantage to investors and prospective employees in the stock market industry.

Consistent with the above, UiTM has introduced FIN555 Introduction to Technical Analysis subject in its Bachelor of Business Administration (BBA) Finance curriculum. The objective is to equip the students with hands-on skills and knowledge on investment decision tools using technical analysis, in a practical environment assisted by software packages. The following table entails the teaching and learning activities for FIN555 students:

Table 1: FIN555 Teaching Methodologies

	Teaching Methodologies	Remarks
1.	Lectures	Introduce the theories, concept and the application of technical analysis in stock trading.
2.	Computer Aided Learning	Application of the subject is done via Chart Nexus, a technical analysis software.
3.	Presentation and Project-based Learning	Students learn while preparing and completing the assigned projects.
4.	Textbook Reference	Martin J. Pring, <i>Technical Analysis Explained</i> , McGraw Hill, 5th Edition, McGraw Hill.

Learning in the form of books and lectures may not be sufficient for those who has problems with readings, making learning less effective. Our survey reveals that 87% the respondent is of the opinion that Technical Analysis is an interesting subject. Impressively, 89% and 87% agrees that it is interesting to learn Technical Analysis via lectures and software respectively. However, only 34% voted on books learning, implying its unpopular usage.

In this respect there is a need to explore the possibilities of assisting the course learners with additional learning materials such as e-content items. E-content helps the learning process using videos and other softcopy materials. E-content increase convenience and accessibility via internet devices such as smart phones in a fun, very cheap and time friendly environment. Results of some studies suggest that involvement with computers through the use of eContents and other new technologies, can promote positive attitudes towards learning and higher achievement among learners [3]. In line with the current technological climate, at the end, we propose an e-content learning medium called “ANATEKS: Learning from Peers” to assist students and learners to understand better the subject learnt.

2 OBJECTIVE

The objective of the study is to propose an additional learning medium in investment particularly the technical analysis subject in stock trading. Using e-Content learning methodology guided by SCANMIC paradigm by Hassan & Li [1], we wish to produce a successful eContent learning medium. We propose an e-content learning medium called “ANATEKS: Learning from Peers” to assist instructors and learners to understand the subject matter practically, fast and in a meaningful way. It has the potential to be a knowledge sharing medium especially for beginners in the industry.

3 SIGNIFICANCE(S)

Students and the general public can take advantage of this new type of content presentation. Shiratuddin, Hassan and Landoni [4] posit that eContent can help promote academics work worldwide, assist students to immediate access to lecture notes, modules, and textbooks, and be designed to equally satisfy authors and readers. In the present case, videos prepared by beginners guided by the respective trainers were designed to boost students' interest and understanding in the subject matter.

4 METHODOLOGY/TECHNIQUE

ANATEKS is an eContent platform using website as the main interface. Users have the experience to learn technical analysis subject using videos linked to Youtube. In addition, the reading materials and notes are also available in ANATEKS website. The diagram below summarizes the workflows:

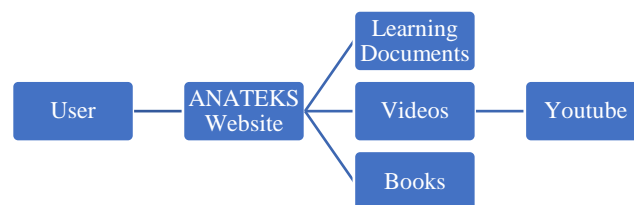


Fig 1: Process Flow of ANATEKS eContent.

We adopt the SCANMIC methodology by Hassan & Li [1] in producing ANATEKS as a successful eContent learning method as follows:

Table 2: SCANMIC Paradigm Adapted from Hassan & Li.

SCANMIX Items	Descriptions
Screen Layout or Appearance	Content should be structured and designed in such a way that users will find information easily and effectively.
Consistency	Consistency in design is vital in determining users' familiarity in terms of for example, navigation icons, colouring scheme, and page structure.
Accessibility	Should take into consideration whether their information are accessible to all target users who use different technology to access the Internet.
Navigation	Good navigation will help users find information easily and quickly especially for large amount of information.
Media Use	The use of multimedia elements could enhance information presentation if used properly and effectively.
Interactivity	Visitors should be provided with interactivity elements such as giving response, feedback, and searching for information.
Content	Content provided should be useful, relevant, and up-to-date.

5 RESULT

SCANMIC: **Screen Layout** or Appearance, **Consistency** and **Navigation** issues are dealt with via simple to use website. **Accessibility** is a concern in making the eContent materials. The videos are accessible through multiple medium: university repository in its Resource Centre, the internet via youtube and website. The devices used is through common device such as the smart phone and computers. Meanwhile, cost of accessibility has been reduced via free channels i.e. internet and youtube. Time factor has also been considered as these videos is available 24/7.

Table 3: FIN555 topics, video particulars and accessibility medium.

No	Technical Analysis Topic	Type	Type	Length (Minutes)	Medium	
					Website	Youtube
1	Support and resistance	Video	MP4	6.08	✓	✓
2	Trendlines	Video	MP4	5.29	✓	✓
3	Volume	Video	MP4	6.10	✓	✓
4	Moving Average (MA)	Video	MOV	6.37	✓	✓
5	Envelopes	Video	MOV	5.01	✓	✓
6	Bollinger Band	Video	MP4	5.41	✓	✓
7	Rate of Change (ROC)	Video	MP4	5.52	✓	✓
8	Relative Strength Index (RSI)	Video	MP4	5.10	✓	✓
9	MA Convergence Divergence	Video	MP4	5.54	✓	✓
10	Stochastic	Video	GOM	6.01	✓	✓

Note: The topic listed stated above is as per the FIN555 course content.

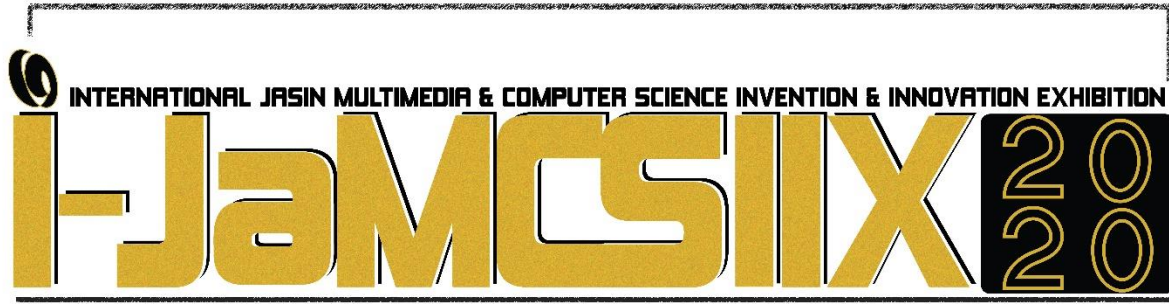
Media Use: Video is the main media. It is specifically designed based on the course content of FIN555 subject. Videos makes learning convenient, fast and interesting. The length of each video is very short ranging from 5 to 7 minutes per video. **Interactivity:** Website and youtube channel provide the interactive element via common features. **Content:** Taking into consideration the introductory level of this course, the storyboard of the videos was designed in 2 parts, (1) theory of the specific topic, for approximately 2 minutes and, (2) practical application of the TA tools using listed companies in Bursa Malaysia, for approximately 4 minutes. The materials were prepared by those who are beginners in this area and suit the tagline ‘learning from peers’. Selection of the best videos in each respective topic are done through a technical analysis video competition done in the university. Upon viewing these videos, the viewers should be able to grab some ideas about the subject. Uniquely, unlike the majority of the TA videos available in the internet, the videos are prepared using ‘Bahasa Malaysia (BM)’ language to cater for those who are comfortable to learn using BM and for those who has difficulties to learn using other languages.

6 CONCLUSION

This paper contributes to the design of eContent for the investment related discipline. ANATEKS fulfil majority of the SCANMIC paradigm features making it a useful learning medium for new investors. Overall, our survey shows that 79% of ANATEKS users agree that ANATEKS eContent materials helps in learning Technical Analysis subject. Future recommendation includes the inclusion of industry experts learning materials in the form of videos and pdf documents, coupled with knowledge sharing interactive features in the website.

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Statement of Problem Template

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ABSTRACT

Writing a clear problem statement in research helps the reader to understand the purpose of the study more clearly. However, writing a clear problem statement still becomes an issue. As a result, the reader unable to understand what is the purpose of the research. Hence, this innovation aims to develop a statement of problem template on how to write a clear problem statement. Through this template, researchers may able to have better guidelines on developing a clearer problem statement.

KEYWORDS: Problem Statement, guideline, clear, research

1 INTRODUCTION

In research, the statement of the problem defines the problem that will be addressed. The main objective of a statement of the problem is to covert the generalised issues into a specific problem so that it can be resolved more objectively in research. A problem statement is supposed to define the purpose of the study clearly. A clear problem statement helps the research proposal to be easily understood by the reader and helps them to identify what is the purpose of the research.

Ideally, a statement of problem statement should able to define the purpose of the research clearly. However, many researchers failed to write a clear problem statement. As a result, the reader unable to identify the purpose of the research. Therefore, in this paper, it will provide a template for writing a clearer problem statement.

2 STATEMENT OF PROBLEM TEMPLATE

This section will explain how to use the statement of the problem statement. Table 1 will illustrate the four main themes that are used to develop a clear problem statement. The four main themes are known as, ideally, reality, consequences, and aim (IRCA). Tables 1, 3 and 4 will give an example of how you can use the theme to develop a more detailed problem statement.

Table 1: Statement of Problem Template

Themes	Description
Ideally	The researcher needs to describe what is considered as an ideal situation in the context of their study/topic
Reality	The researcher needs to demonstrate how the ideal situation contradicts with reality or the real situation
Consequences	The researcher needs to demonstrate the negative consequences of such a contradiction between the ideal situation and the reality
Aim	The researcher needs to show the intention or the aim of the study

Table 2: Weight lose

Themes	Description
Ideally	Ideally, a person who exercises regularly will lose more weight
Reality	The reality, many who exercise regularly still failed to lose their weight
Consequences	Consequently, many give up exercising and become overweight
Aim	Aim of the study to explore why some people who exercise regularly still failed to lose their weight

Table 3: Cholesterol level

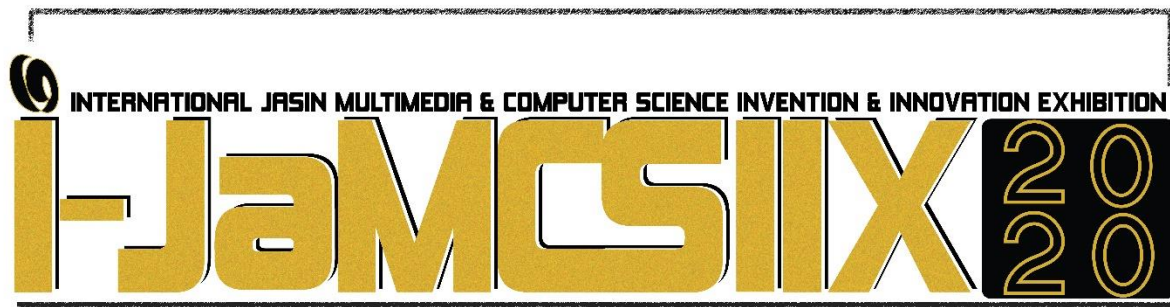
Themes	Description
Ideally	Ideally, a person who is not overweight has a lower cholesterol level.
Reality	The reality, many people who are not overweight are found to have a higher cholesterol level
Consequences	Consequently, many people may not be motivated to monitor their body weight.
Aim	The study aims to explore why people who are not overweight still have high cholesterol levels.

Table 4: Degree holder

Themes	Description
Ideally	Ideally, people who have a degree may have higher chances of getting a job.
Reality	The reality, many people who have a degree are still unemployed.
Consequences	Consequently, many people may not be motivated to further their studies to a degree level.
Aim	The study aims to explore why people who have a degree still unemployed

3 CONCLUSION

In conclusion, by using the statement of the problem template, the researcher able to write a clearer problem statement. This because the statement of problem template helps the researcher to organise problem statements more appropriately. As a result, the reader easily understands the purpose of their research.



Smart Irrigation System Using Raspberry Pi

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ABSTRACT

Commonly known as IoT, Internet of Things is a demanding area in technology that is growing daily. Millions of devices have been created to make humans life easier. IoT has been largely contribute to home automation where every devices and home appliances can be connected to Internet and interact with each other. Suitable for people who are working but currently leaving plants at home with nobody to take of it. Thus, by applying the IoT concept, this paper provides design and implementation of Smart Irrigation System using Raspberry Pi as their main component. Raspberry Pi, which is a palm-size computer is capable of running a machine learning process within it. The irrigation is automated by using machine learning algorithm that has been implemented on the system. This system uses moisture sensor, humidity and temperature sensor, and ultrasonic sensor. The collected sensors data then is transferred through Firebase database, an online database that used to connect with android application. The sensors data can be viewed by the user through android application in real time. This project can go beyond further from what has been implemented by applying this project into a large scale of crops instead of using it at home only.

KEYWORDS: Irrigation, Raspberry Pi, Android, Machine Learning, Internet of Things (IoT)

1 INTRODUCTION

There is no question that technology is playing a huge part in our daily lives today. Back when computers were introduced in Industrial Revolution 3.0, now the world is going to Industry 4.0, the name given to the growing of traditional manufacturing and industrial platforms and practices with the latest smart technology. Industry 4.0 is focusing on the use of large scale M2M (Machine to Machine) communication and Internet of Things (IoT) application that is tend to speed up productivity, increase automation, improving communication between devices and human as well as intelligent devices that can analyse and predict issues without the need for human intervention [4].

While IoT has been applied in many fields of study, home automation is one of it. According to [2], appliances and devices at home can be connected to control everything at our home. For someone who has a few plants to take care of at their house, it might be trouble for

them to monitor the plant while being outstation. Besides, they also do not even know how much amount of water required for the plant or whether the plant needs water or not during the current time. Hence, Smart Irrigation System is proposed to solve this issue where irrigation process is automated without the human intervention.

This paper is organized as follows: Section 1 addresses the introduction or background of the study. Section 2 addresses the objectives of the study. Section 3 addresses the significances of the study. Section 4 tells about the methodology, hardware, software and technique used in this project. While Section 5 shows the result of the developed system. Conclusion will be given in Section 6.

2 OBJECTIVES

There are three main objectives of this system as stated below:

- i. To design an automate irrigation system using Raspberry Pi.
- ii. To develop a prediction system to automate the irrigation process and an Android application for monitoring process by end user.
- iii. To test the functionality of the system.

3 SIGNIFICANCES

The significances of this project are:

- i. The system is easy to configure.
- ii. The system makes the user's job easier to monitor the plant growth.
- iii. The system has user-friendly interface.
- iv. The system is suitable for small scale crops.
- v. The system does not rely on user to predict irrigation time.

4 METHODOLOGY/TECHNIQUE

According to [1], methodology consists of procedures, principles, and practices that organizes research. Its aim to come up with a work plan of research. The methodology is chosen from the software development life cycle (SDLC) models. A model that has been chosen from SDLC is Waterfall model. Waterfall model consist of six phases. The six phases are requirements, system design, implementation, integration and testing, deployment of system and lastly maintenance. This project is focusing from the first phase until the fourth phase only, which is from requirements phase until testing phase.

This project requires three different sensors which consists of soil moisture sensor (YL-60), temperature and humidity sensor (DHT11), and ultrasonic sensor (HC-SR04) to measure water level inside the tank. These sensors are connected to Raspberry Pi for machine learning process and send the data gathered from the sensors to firebase database. Finally, the data from the database will be given to user to monitor the process as shown in Fig. 1.

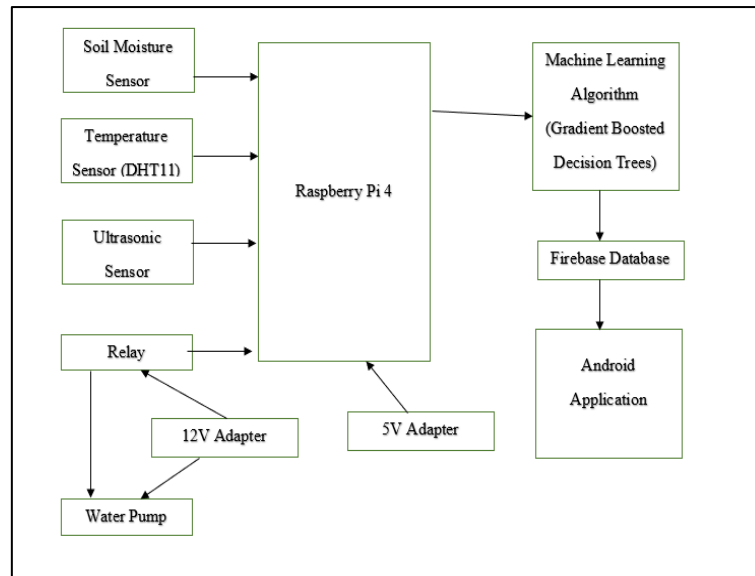


Fig. 1: The block diagram of the proposed project

Since this project requires an automation for the irrigation process, a machine learning algorithm has been applied. Machine learning technique is a computational process that takes input data to do a specific task without being literally programmed to produce an outcome [3]. From many algorithms inside the machine learning, one algorithm has been chosen. The algorithm is called Gradient Boosted Decision Trees. This algorithm uses a particular model ensemble technique called gradient boosting, which iteratively builds a model, while improving the performance of the previous iteration model. By using data gathered from moisture sensor, humidity and temperature sensor, the data is saved into .csv file to be used to train the model.

The implementation of the algorithm is using Python Programming Language because it already has libraries related with Gradient Boosted Decision Trees. While for the Android application, Java programming language is used by using Android Studio software.

5 RESULT

Since the irrigation is an automated process, the user can only view the sensors data, they do not need to determine the time to irrigate the plant. The data is sent to the Firebase database and then through the Android application as shown in Fig. 2 and Fig. 3, respectively.

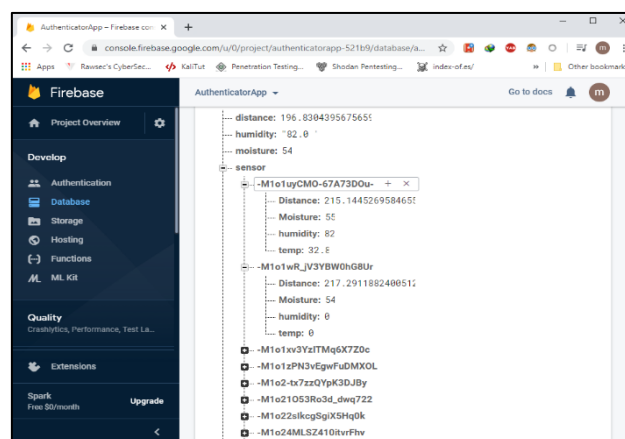


Fig. 2: Sensors data on the firebase database

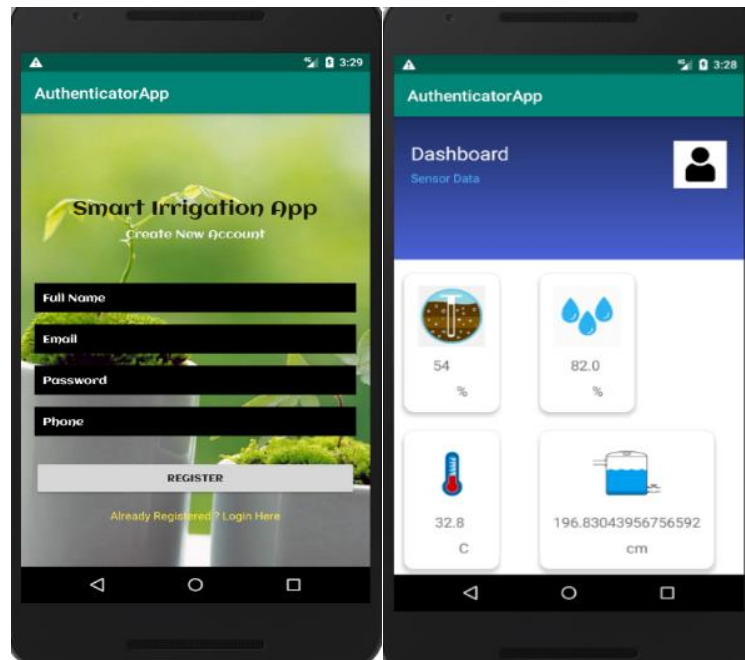


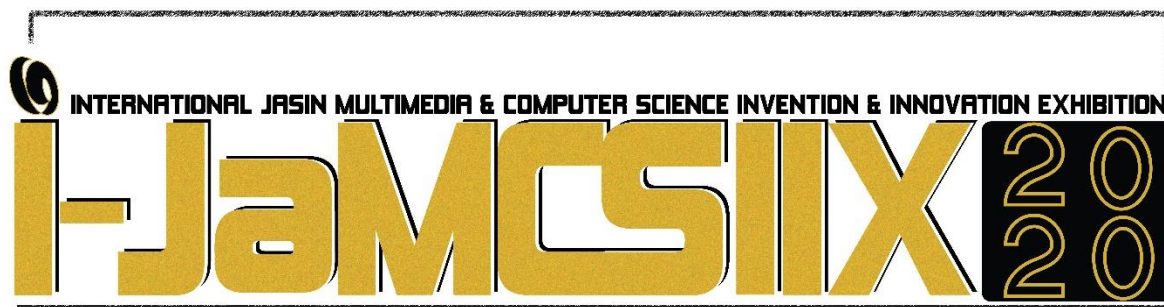
Fig. 3: Android application interface for user to view the sensor data

6 CONCLUSION

A Smart Irrigation System has been proposed to predict the irrigation time in small scale crops. The system mainly consists of three type sensors, which is moisture sensor, temperature sensor and ultrasonic sensor to measure the level of water inside the tank. Firebase databases is used to store all the sensors data and integrate it with mobile application for user to view the real-time data. The data consist of moisture data, humidity data, temperature data and tank water level data. If water level is low, a short message service (SMS) is sent to user to remind them to fill the tank with water in order to complete the irrigation process. For further studies, this project can be used for large scale of crops by configuring new hardware despite using the same code and system. Furthermore, besides displaying real time data through android application, a web app could be developed to visualize historical data of the plant. By using some framework for visualization of data such D3.js or ChartJS, historical data can be visualized for user in an interactive way. Lastly, a platform for user to download historical data can be implement by using email platform to upload the data from the database and send it to the user's email.

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Schiff Base As A Corrosion Inhibitor

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ABSTRACT

Mild steel metal plays an important role as a construction material in many industries due to its low cost and excellent mechanical properties. However, acid solution that is widely used for pickling, descaling and oil-well cleaning contributes to severe corrosion problems, mostly in maintenance cost. Schiff base as a corrosion inhibitor is used to reduce the corrosion rate of the metal in this acidic medium. A thiosemicarbazone ligand, DiMMATSC acts as a corrosion inhibitor due to the presence of nitrogen and oxygen as electronegative atoms, where the interactions form a protective layer on the metal surface and block the active corrosion sites. Different concentrations of the inhibitor at 1, 2, 3, 4, and 5 mM were studied at room temperature in 1M HCl. The results showed that as the inhibitor concentration increased, the corrosion rate decreased but the inhibition efficiency increased. Langmuir isotherm was implemented to determine the type of interaction and adsorption between DiMMATSC as an inhibitor with the mild steel surface. A strong correlation from the Langmuir isotherm graph recommends that the adsorbed inhibitors occupy only one site and there are no interactions between the adsorbed species. The value of standard free energy (ΔG) from the calculation is $-17.96 \text{ kJ mol}^{-1}$, which indicates spontaneous physisorption of inhibitors onto the mild steel surface by forming a protective film through electrostatic interaction between charged metal surface and charged inhibitor molecules.

KEYWORDS: Corrosion Inhibitor, Schiff Base, Mild Steel

1 INTRODUCTION

Corrosion is a process where metal is corroded when exposed to the environment that consists of moisture. It brings many consequences, especially in industrial applications and daily lives, such as plant shutdown, waste of valuable resources, loss or contamination of products, costly maintenance, and expensive overdesign [1]. Corrosion problems that usually happen in many industries contribute to huge financial losses in terms of repairing and replacing. The use of inhibitors is one of the most practical methods for corrosion protection of metallic objects, particularly in acidic media, which act as a protective barrier against corrosive agents [2]. Corrosion inhibitors are effective agents that minimize corrosion as they can protect metal against corrosion by the adsorption of inhibitor on the metal surface through the formation of

a coordinate covalent bond (chemisorption) or the electrostatic interaction between the metallic object and inhibitor (physisorption) [3].

2 OBJECTIVE

There are many studies about thiosemicarbazone applications such as antibacterial, antimalarial, and antitumor but it is very rarely used in anti-corrosion studies. The objective of the study is to determine the anti-corrosion activity of thiosemicarbazone in hydrochloric acid (HCl). The Schiff base (DiMMATSC) can contribute as a new corrosion inhibitor in technological, manufacturing, and industry facilities based on further research with mild steel in acidic conditions.

3 SIGNIFICANCE (S)

The study of corrosion inhibitor is a way to provide knowledge and understanding on how corrosion inhibition operates. The corrosion inhibitor is suggested as the most effective method to inhibit corrosion. Raja (2007) stated that corrosion inhibitors are substances that, when added in small concentrations to the corrosive media, will decrease or prevent the reaction of the metal with the media [4]. Besides, an organic inhibitor is effective and efficient in protecting the metal from corrosion by forming a film on the metal surface which provides a barrier to the metal dissolution. Mostly, organic compounds contain nitrogen, sulfur, oxygen atoms and functional groups such as C=N and conjugated π -bond which will form covalent bonds. These good properties of inhibitor can adsorb well on the surface of mild steel and block the active sites, which reduce the rate of corrosion [5].

4 METHODOLOGY/TECHNIQUE

4.1 Preparation of Solution

The acid used to study the corrosion inhibition of DiMMATSC was HCl. In this study, 1 M HCl was prepared by dilution process using the formula $M_1V_1=M_2V_2$. After that, approximately 8 mL of concentrated HCl was diluted with distilled water in a 100 mL volumetric flask up until the calibration mark. Then, 0.132 g of DiMMATSC was weighed and dissolved in the diluted acidic solution to obtain different solution concentrations. Five different concentrations of inhibitor used were 1, 2, 3, 4, and 5 mM.

4.2 Gravimetric Method

For weight loss study, mild steels were cut to the dimensions of 2 cm \times 2 cm. Then, emery papers were used to polish the surface of metal steels in order to remove all dust and impurities. Next, ethanol was used to rinse mild steels, which were then dried with clean tissue papers. The initial weights of the mild steels were taken using an analytical balance before being immersed in 20 mL of 1 M HCl with different concentrations of inhibitor (1, 2, 3, 4, and 5 mM), including a blank (1 M HCl) at room temperature for 24 h. After 24 h, the mild steels were rinsed with acetone and dried in a desiccator. The final weights of mild steels were measured and recorded.

5 RESULT

5.1 Corrosion Inhibition Study

Fig. 1 shows the effect of different concentrations of inhibitor on corrosion rates and inhibition efficiency in 1 M HCl. This is probably due to the coordination by the donor-acceptor interactions between the lone pair of electrons of donor atoms of the ligand [6]. The ligand contains sulfur and nitrogen that have greater polarizability of electron clouds and the presence of electron pairs [7]. The corrosion rate of mild steels decreased as the concentration of inhibitors increased. The inhibition efficiency was better at higher concentration for the metal complex compared to the ligand. The presence of an inhibitor provided a large surface coverage on the mild steel surface, thus blocking available reaction sites. Metal dissolution was inhibited as well, thus retarding hydrogen evolution. Therefore, the mild steels were protected from corrosion. The adsorption provides a uniform film that prevents the interaction of the metal surface with aggressive medium, thus consequently reduces corrosion [8].

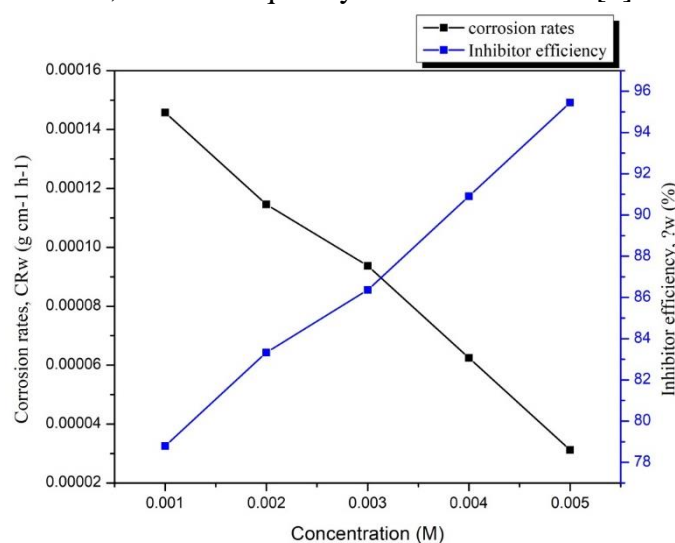


Fig. 1: Corrosion rate and inhibitor efficiency in different concentration of HCl

5.2 Adsorption Isotherm Study

Langmuir adsorption isotherm was implemented to deduce the type of interaction and adsorption between DiMMTSC as an inhibitor with the mild steel surface. Langmuir isotherm calculation was well-suited with the corrosion rate values obtained from the weight loss study. The degree of surface coverage (Θ) attained from the weight loss study was used to classify the best type of adsorption isotherm that fitted into the corrosion rate values obtained. A fitted straight line was obtained with the correlation, $R^2 = 0.9959$. The strong correlation recommends that the adsorbed inhibitors occupied only one site and there were no interactions between the adsorbed species.

5.3 Standard Free Energy (ΔG_{ads})

Standard free energy (ΔG_{ads}) can be calculated using the following equation:

$$\Delta G_{ads} = -RT \ln(K_{ads} \times A)$$

Where R = gas constant ($8.314 \text{ JK}^{-1} \text{ mol}^{-1}$), A = water density (1000 g/L), T = Temperature (K) and K_{ads} = adsorption equilibrium constant. The value of ΔG_{ads} obtained from the calculation

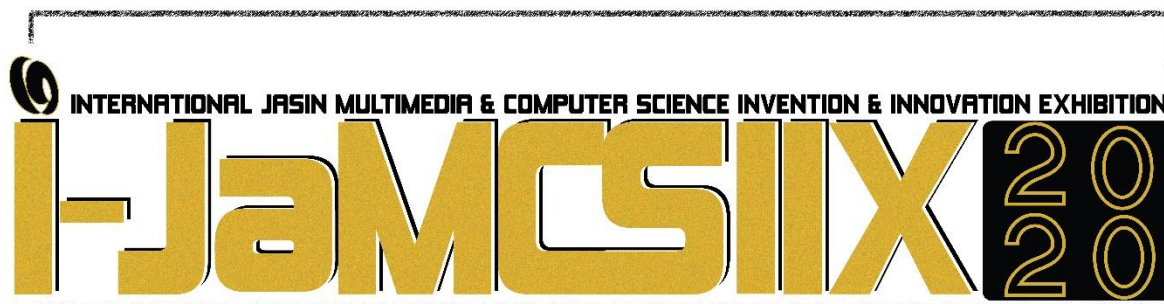
was $-17.96 \text{ kJ mol}^{-1}$. This implies spontaneous physisorption of inhibitors onto the mild steel surface by forming a protective film through electrostatic interaction between charged metal surface and charged inhibitor molecules [9]. The values of ΔG_{ads} lower than -20 kJ mol^{-1} were in line with the electric charges between the inhibitor molecules and the mild steel surface (physisorption) and the values lower than -40 kJ mol^{-1} involved sharing of electrons from the inhibitor to the mild steel surface to form a chemical bonding (chemisorption) [10].

6 CONCLUSION

The Schiff base showed a better inhibition efficiency against corrosion of mild steel when using different concentrations of inhibitor in HCl. This was due to the large surface area of the steel surrounded by higher molecular weight of inhibitor ligand, which caused more inhibitor molecules to adsorb on the metal surface. Since the corrosion process was inhibited by the adsorption of this inhibitor on the mild steel surface, it followed Langmuir's adsorption isotherm. The negative value of ΔG_{ads} obtained indicated that the ligand was spontaneously adsorbed on the mild steel surface.

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Understanding Newspaper Coverage On E-Sports In Malaysia

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ABSTRACT

E-sports, a form of competition using video for multiplayer video games, particularly among professional players as individually as teams is very fast developing in Malaysia. According to British Broadcasting Corporation, e-sport international sales almost triple its global audience to nearly 600 million people by 2020. The study aimed at understanding the newspaper role in creating the awareness of e-sport in Malaysia. In-depth interview was done and recorded digitally with E-Sports Malaysia (ESM) Head of Communication Muhammad Farouq Abdul Patah as the main respondent. The study found out that traditional media has increase their interest on e-sports since year 2018 and many positive coverages has been given to it to improve people initial perception about e-sports which was earlier deemed as wasteful activities. The newspaper has been considered as a medium which provide better facts regarding e-sports and mobile gaming in compared with social media. Today, with the help of newspapers, older and new generation as beginning to accept e-sports as a skill sport with the ability to generate income, strengthening unity and bridging cultural barriers, as well as create new opportunity for business and careers. This study has fully maximised the use of videography and editing to understand this issue and their result is ready to be uploaded as an e-content in the respected digital platform to disseminate awareness on the topic.

KEYWORDS: E-sports, Communication, Video Games, Newspaper reporting, Newspaper Coverage

1 INTRODUCTION

E-sport, a form of sport competition using video games, is relatively new in Malaysia, and it is still considered a niche industry dealing with a very specific fan base. Over the years, games developer beginning to realise the potential of e-sports, among others led to more money, better broadcasts, and higher production values. Question arise on the potential to popularise e-sports in Malaysia, with the focus is to what extend are the Malaysian media, particularly the newspapers', in their supports of the gaming activities in their news coverage.

Malaysia has seen a growing interest on the gaming sport after Media Prima group broadcast a FIFA Online 3 National Championship in Malaysia in late 2017. According to the Edge Malaysia, this broadcasting has received an overwhelming 300,000 viewers, when it was

aired simultaneously on television and livestreamed. [2]. The report cited games which made it into worldwide fame as PUBG Mobile and Fortnite, which Southeast Asia became the fastest-growing region with the number of esports enthusiasts expected to double to 19.8 million this year from 9.5 million in 2016.

Astro chief of sports Lee Choong Kay was reported to say both games mentioned above have grown significantly in just a short time with 30 million active players and 200 million downloads in eight months for PUBG Mobile while Fortnite achieved 200 million registered players with 8.3 million concurrent (the total number of players connected to the game at a given time)[2].

According to The Rakyat Post, professional games has also received worldwide recognition, where they are treated as athletes and celebrities with “lucrative careers and earning as much as more money than their traditional sports counterparts”. It is also new to the public domain that winning at international e-sports tournament can also turn the e-sports player into multimillionaires, and have the ability to promote individual’s thinking intelligence, as gaming requires fast hand movement skills and tactical understanding of a game [5].

2 OBJECTIVES

This paper aimed at understanding the newspaper coverage on the e-sport development in Malaysia. In the past, e-sports has been regarded as time wasting activities [1][7], relating it to addiction and gambling activities [3]. Being sedentary for too long is also associated to numerous health complications such as neck pain, muscle degeneration and effects on mental health [3]. Questions too arise whether e-sports can be really accepted as a form of sport or it is a form of recreational activity [6]. Because of these problems related to gaming, question arise whether the media, particularly the newspapers have been given much overage towards e-sports as a positive activity, which have potential to generate income to its players, and the possibility to foster racial harmony [4]

3 SIGNIFICANCE (S)

The video assignments embrace learning in media news reporting. It involves students with the technology they love, the learning increases manifold and learning beyond the classroom. The study help students to create videos to explain topic understanding, make in-depth visual projects, learning new concepts and ways of thinking, as it is important parts leading to better development of by turning the news reporting more depth than text alone.

4 METHODOLOGY/TECHNIQUE

This study use in-depth qualitative interview with main respondent is E-Sports Malaysia (ESM) Head of Communication Muhammad Farouq Abdul Patah. A semi-structed protocol consist a list of pre-established questions were used in this study to encourage response from the informants and allow more freedom for informants to express his view on the topic.

The study embarked on the use of video recording and editing as a learning tool, and interview were done face to face. Instead of using unrecorded interview method, researcher has accepted videography as an important element in social research. Experimenting on the application of visual demonstration of something new would provide a vivid and entertaining

way to stimulate the learner's interest and convey the desired knowledge, leading to successful results.

5 RESULT

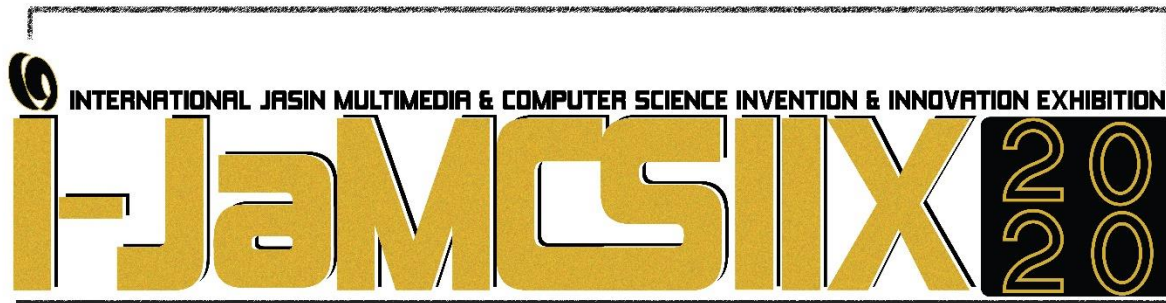
The study found that the main reason behind increased publicity of e-sports in newspapers is the pushing factor from the government, particularly the Ministry of Youth and Sport, and with the support of The National Sports Council. This pushing factor in encouraging e-sports as a form of healthy activity which can be taken by the youth had spur positive newspaper coverage on the topic, thus pushing e-sports to national level. Respondent agreed that there were negative perceptions on gaming and e-sports among the public prior to the newspaper coverage initiated by the government and there was not much public awareness on the advantages of e-sport without the help of newspaper publicity. Respondent too emphasised the importance of newspaper to provide much knowledge and awareness about e-sport to the public, particularly among the adult readers age 30 and above, as these readers, according to the respondent, would be needing more exposure to help improved their perception on the topic. Newspapers too, played an important role to educate the public on how e-sports can be played professionally, thus creating an industry for itself. Respondent also agree that newspaper is the preferred medium, which provides more accurate information and facts. Respondent hoped that better coverage can be done by the newspapers on e-sport to help e-sport become well accepted, and allow party involved, particularly the association to received funding and incentives to proper e-sport.

6 CONCLUSION

Newspaper coverage on e-sport has seen a better trend in compared to the past. News coverage played an important role in reshaping the mind of viewers which has not received much exposure on the topic, and to help foster the acceptance of e-sport as a professional gaming activity to allow it to received funding and incentives leading to better development of e-sport. The videography techniques used in this study too has encouraged active learning and better engagement of viewers, stimulate the learner's interest in the topic. It recommended that videography is used extensively as part of social learning in todays' media environment to increase motivation and enhance learning experience.

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NotisMe!: Crowdsourced Student Tasks Reminder with Gamification

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ABSTRACT

Students, tasks and time is inextricably linked. Each student is required to complete their tasks or assignments within a given period of time. However, for a certain number of students, they do not notice that there is a task that has been assigned to them and they lack motivation to finish the task given by lecturers. Therefore, the aim of the developed application is to increase students' awareness of the task that has been assigned to them and increase the students' motivation in finishing the task given to them. Mobile Application Life Cycle (MADLC) model has been chosen as the methodology for this project because it is frequently used in developing a mobile application. Gamification which consists of several game elements such as challenges, rewards, points, and badges are implemented in the application. The platform chosen for the application is android mobile-based platform. This project is about a mobile application that reminds students about tasks using the techniques of crowdsourcing and gamification. This application is a reminder application that allows users to share assigned tasks with their groups and reward users in term of badges for adding the tasks and completing them. Functionality testing has been carried out for the developed application. The outcome of the test is successful as all the twenty-two test cases is passed. Further improvement can be added to the application, for instance, add features like chat and leader board to the application. In conclusion, the application has been successfully developed and all the objectives have been accomplished.

KEYWORDS: Task, Crowdsourcing, Gamification, Mobile Application Life Cycle (MADLC)

1 INTRODUCTION

As a student, task and time management are vital. It is a responsibility of a student to complete every task within a given period of time. It has been identified that some students lack awareness of tasks given by lecturers that need to be completed in a given time. This behaviour may lead to awful consequences such as affecting their CGPA. On top of that, students lack of motivation in completing the given tasks. In order to overcome these problems, the mobile application is developed. This application is developed as a mobile-based application that uses crowdsourcing technique to gather tasks from lecturers and implement gamification to ensure enjoyable experience while using the application.

By using crowdsourcing, students will be more aware about tasks they are assigned to as they may create and update tasks to share to the others. Study by [5] stated that the goal of crowdsourcing is to provide a platform that includes participants from user devices to solve collaborative problems. For instance, Wikipedia is one of the crowdsourcing platforms [6].

Gamification in this project is used to encourage students' motivation to complete their tasks. According to [3], gamification offers game-like experience to users with the purpose of affecting users' behaviour. It is usually used for educational or non-educational matter.

2 SIGNIFICANCE

The development of this mobile application help students be aware of tasks assigned to them throughout the semester. It makes it easier for students to track their projects and assignments progress and due dates.

Furthermore, this application may increase students' motivation to complete tasks given through gamification. The application provides interesting rewards to students once they complete their tasks.

3 METHODOLOGY / TECHNIQUE

NotisMe!: Crowdsourced Student Tasks Reminder with Gamification applied Mobile Application Development Life Cycle (MADLC) as methodology. MADLC is always used to develop an Android mobile application [7]. However, only four phases from six phases of MADLC are adapted to the development of this mobile application as shown in Fig. 1. The phases involved are Identification, Design, Development and Testing. MADLC is used as mobile application because mobile application is complex and has a lot of functionalities. MADLC enables a systematic approach in developing this mobile application [1]. According to [7], MADLC enables developers to build a robust and fully optimized application. Crowdsourcing can be defined as taking a task that is normally performed by a group and outsourcing it by introducing an open call to an enormous network of people [2]. Furthermore, crowdsourcing technique is used in order to gather tasks from lecturers which is contributed by students. Gamification is also applied in this mobile application and can be defined as implementing game-design elements and game principles in non-game contexts [3]. Gamification is implemented as a reward in the form of badges to students when they have completed given tasks.

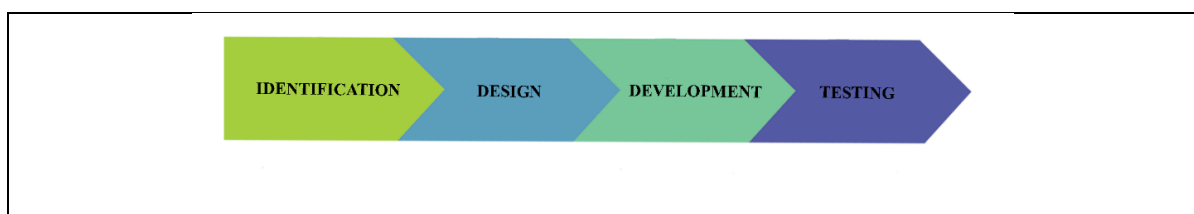


Fig. 2: Mobile Application Development Lifecycle (MADLC) (Adapted from Kaur & Kaur, 2015)

Fig. 2 shows the techniques used by the application. Crowdsourcing is used when users able to work in group to create, update and delete tasks and subtasks for the desired joined group. Badges are given when a user achieved certain achievements.

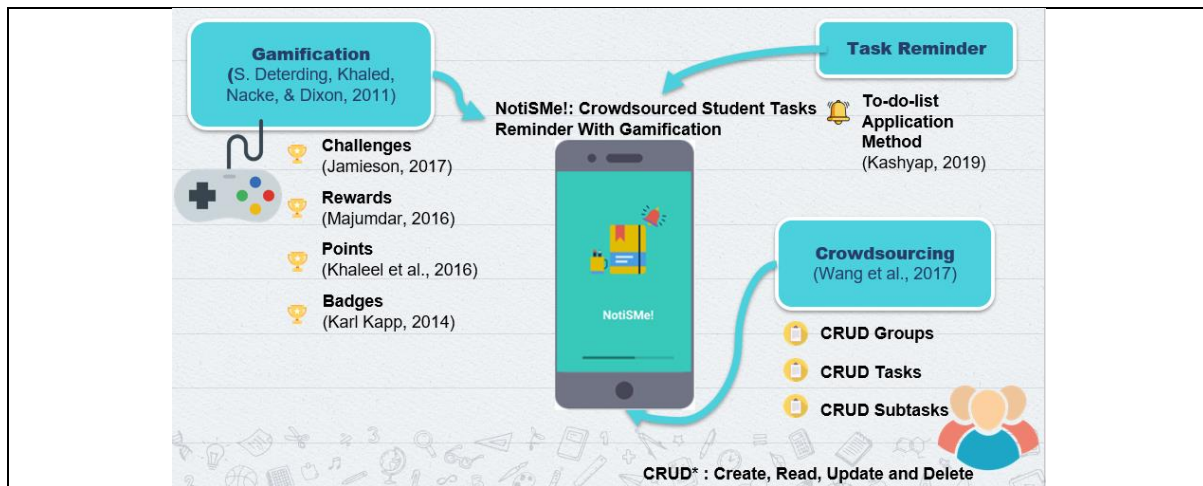


Fig. 2: Descriptions of Techniques Deployed in the application.

4 RESULTS

Functionality testing has been conducted for this application and the application produces the expected output. For all test cases, the outcome of the functionality testing were the expected results. Table 1 shows the summary of the functionality testing of the application.

Table 1 Summary of Functionality Testing

No	Test Cases	Test Objective	Result
1	Sign Up	To store new user data in database.	Achieved the intended outcome.
2	Login	To login to the application.	Achieved the intended outcome.
3	View User Profile	To view user profile.	Achieved the intended outcome.
4	Edit User Profile	To edit user profile and store it in database.	Achieved the intended outcome.
5	Create Group.	To create group.	Achieved the intended outcome.
6	Edit Group	To edit group and store it in the database.	Achieved the intended outcome.
7	Join Group	To successfully join a group.	Achieved the intended outcome.
8	Leave Group	To successfully leave a group.	Achieved the intended outcome.
9	Add Group Member	To successfully share the group key.	Achieved the intended outcome.
10	Delete Group	To successfully delete group.	Achieved the intended outcome.
11	Delete Group Member	To successfully delete group member.	Achieved the intended outcome.
12	Create Task	To successfully create task.	Achieved the intended outcome.
13	Edit Task	To edit task and store it in the database.	Achieved the intended outcome.
14	Delete Task	To successfully delete a task.	Achieved the intended outcome.
15	Set Reminder Task	To successfully set reminder for a task.	Achieved the intended outcome.
16	Receives Notification	To successfully receives reminder notification for the task.	Achieved the intended outcome.
17	Add Sub Task	To add sub task to a task.	Achieved the intended outcome.
18	Edit Sub Task	To edit sub task and store it in the database.	Achieved the intended outcome.
19	Remove Sub Task	To successfully remove a sub task.	Achieved the intended outcome.
20	Marks Task Progress	To successfully mark a sub task.	Achieved the intended outcome.
21	View Task Progress	To successfully view task progress.	Achieved the intended outcome.
22	View Badges	To view badges.	Achieved the intended outcome.

This mobile application enables users to create group, create task, update task, delete task, set reminder to tasks, view task progress and many more. Fig. 3 shows the interface of user menu, group menu and view badges. This shows that NotisMe!: Crowdsourced Student Tasks Reminder with Gamification functioning as it was designed.

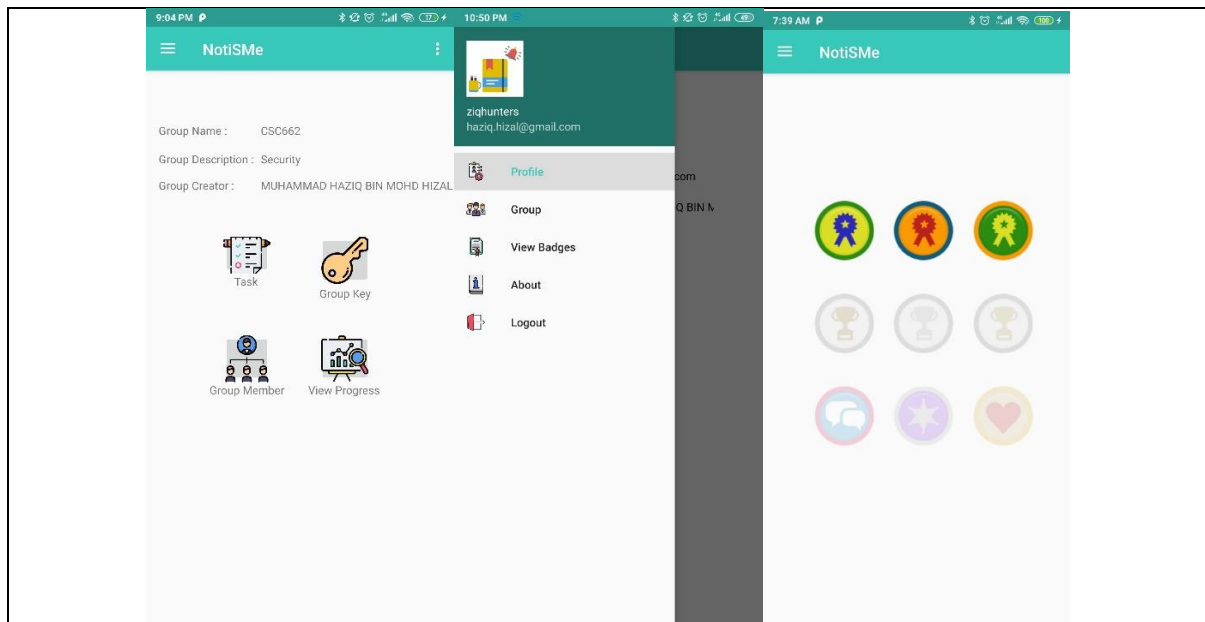


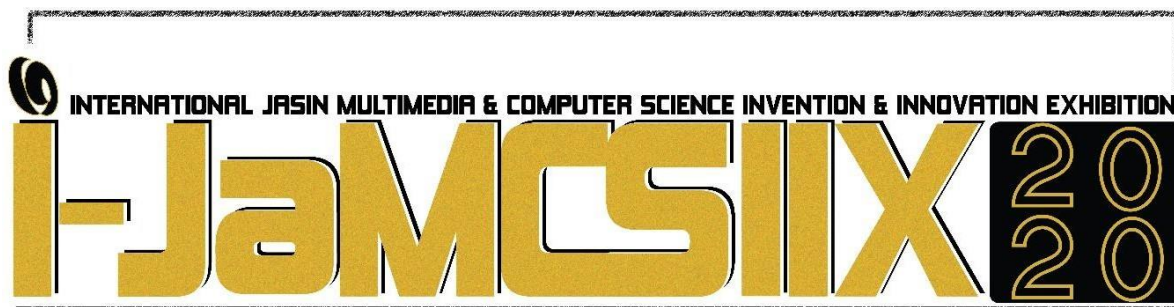
Fig. 3: Interfaces of User Menu, Group Menu and View Badges.

5 CONCLUSION

Initially, problems regarding students' lack awareness of tasks and motivation to complete the tasks are identified. Due to the problem, a mobile-based application to remind students about the tasks is developed. Crowdsourcing technique is used and gamification elements are implemented in the mobile application and is believed to be the most efficient way to overcome the problems. Crowdsourcing is used to gather information to help students to be more aware about tasks they are assigned to while gamification is used to provide rewards, badges and points to increase students' motivation to complete their tasks.

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Finding Selection Sets for LL (1) Grammar with Game-Based Learning

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ABSTRACT

LL1 Grammar is a sub-topic in Topic Four: Syntax & Semantic Analysis based on syllabus CSC569 Principle of Compiler. To find the Selection Sets of LL1 grammar, students need to solve twelve steps of operations. However, some students face difficulties to memorize these twelve steps to find the Selection Sets. Therefore, the goal of the developed game is to help them understand all steps in LL1 Grammar and to increase their enjoyment while learning. ADDIE method has been chosen as the methodology for this project because it is one of the most common models used to create an effective instructional design. Game elements such as challenge, rule, reward, theme, and progress are employed in the game. The platform chosen for the game is a stand-alone on PC. The design of the game is Role Playing Game where each of the steps has been translated into twelve cities and the player needs to travel to all of the cities in the correct order to solve the mission that has been given to them. Usability testing for the developed game involves 22 respondents from CSC569 Principles of Compiler students. The result of the test shows a positive result as most of the respondents enjoy learning using the game. Most of the respondents are satisfied with the content of the game. They enjoy the challenging part of the game. However, the majority of the respondents requested more missions. Further enhancement can be added to the game such as add online features to the game.

KEYWORDS: LL1 Grammar, Compiler, ADDIE, Role Playing Game, Game-based Learning

1 INTRODUCTION

A programming language is a language defined by a formal grammar, a mathematical object, something only brought into existence by a physical implementation [12]. A compiler is a program that translates programs written in a programming language into machine codes that are to be run by the same kind of machine the codes belong to [11].

The most common parsing techniques in contemporary compilers are top-down and bottom-up. The LL (1) parsing is a top-down, non-recursive predictive parsing technique that requires no backtracking and constructed over the class of grammars called LL (1) grammars [7]. The name LL(1) is derived from the fact that the parser finds a left-most derivation when scanning the input from left to right if it can look ahead no more than one

input symbol [3]. The first “L” in LL (1) indicates that input is processed from left to right. The second “L” indicates that it performs the leftmost derivation for the input, and “1” indicates that in each step only one symbol of input is used as a look ahead to predict the parsing action [7].

CSC569 Principles of Compiler is one of the core courses for students of Bachelor of Computer Science (CS230) in the Faculty of Computer & Mathematical Sciences (FSKM) Universiti Teknologi MARA [9]. LL (1) grammar is the sub-topics in Topic Four: Syntax & Semantic Analysis based on syllabus CSC569 Principles of Compiler. To find the selection sets, students need to use the twelve steps in LL (1) grammar. Therefore, LL (1) grammar is very important to find selection sets.

Game-based learning is a type of gameplay with defined learning outcomes. According to Ariffin, Oxley, & Sulaiman [2], game-based learning (GBL) refers to the use of computer games that possess educational value or different kinds of software applications that use games for learning and education purposes. The design process of games for learning involves balancing the need to cover the subject matter with the desire to prioritize gameplay [10]. Game-based learning is not just creating games for students to play, it is designing learning activities that can incrementally introduce concepts, and guide users towards an end goal [8].

2 OBJECTIVES

To overcome students’ difficulties in remembering the steps to find Selection Sets for LL (1) Grammar and their lack of interest in the traditional way of learning it, there are three objectives to be fulfilled in this project.

- To design a game that helps students to find Selection Sets for LL (1) Grammar.
- To develop the designed game using Game-Based Learning.
- To test the usability of the game.

3 SIGNIFICANCES

The learning game can be one of the methods to encourage target users in particular to recall the steps in LL (1) Grammar. This project is designed to help students understand all the steps in LL (1) Grammar and increase their enjoyment when studying something in the form of remembrance.

This project is also an alternative way of learning by game applications, which will help the student find Selection Sets in LL (1) grammar. Therefore, students will be drawn to learn LL (1) Grammar without using notes or books. This application is designed to provide an enjoyable experience for the user when studying LL (1) Grammar.

4 METHODOLOGY/ TECHNIQUES

The research framework chosen for this project is ADDIE which stands for Analysis, Design, Development, Implementation, and Evaluation. This model helps educational designers, developers of any content, or even instructors to produce an efficient and effective teaching design by applying the ADDIE model to any educational product [1]. ADDIE is iterative, involving review and revision throughout the design process. The structure offers designers

the ability to integrate input throughout the whole system. Fig. 1 shows the cycle of the ADDIE model.

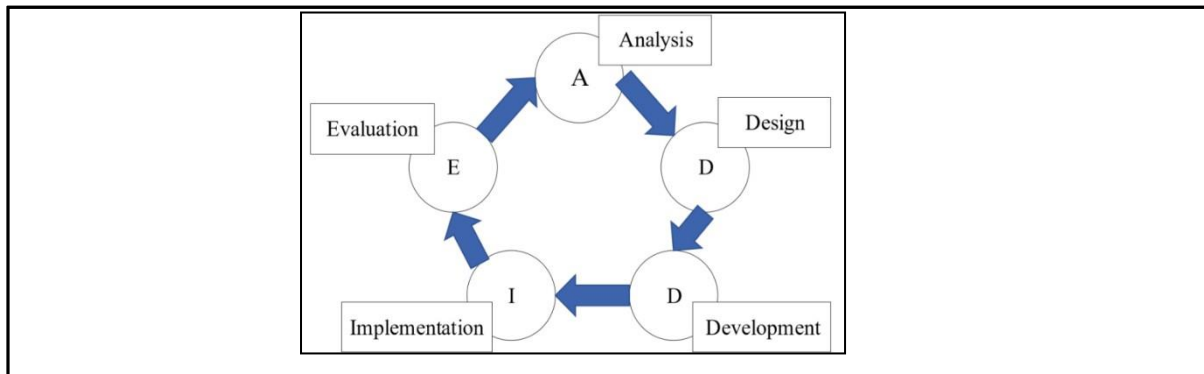


Fig. 1 ADDIE Model
(Source: Peterson, 2003)

The first phase is to identify the target user, problem statements, and the objectives to design the use case, flowchart, and the storyboard of the game. Next, we need to identify the hardware and software to develop the prototype. Testing and prototyping of the game are being conducted in the next phase. After completing all the testing in the previous phase, the result is evaluated in the last phase.

5 RESULTS

Usability testing for the created game takes 22 students CSC569 Compiler Principles respondents. The test result indicates a positive outcome, as most respondents enjoy learning through the game. Many respondents are pleased with the game content. Fig. 2 shows the result regarding LL (1) Grammar comprehension throughout the game.

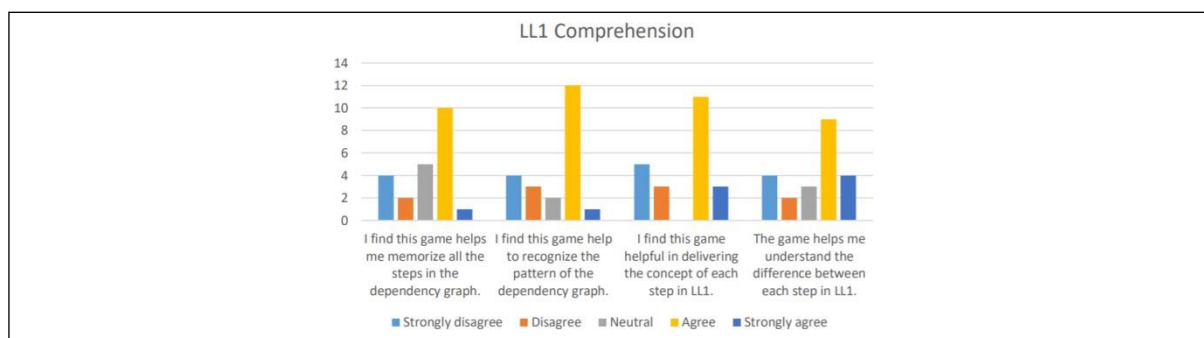


Fig. 2 Result of the LL (1) Comprehension

The opposite happens when expecting negative feedback due to the amount of time the game takes. Respondents enjoy the challenging part of the game. The game itself is long since they must travel to the twelve towns. Some of the respondents however called for more missions. The game can be further improved, such as adding online functionality to the game. Fig. 3 shows the map of the twelve towns.

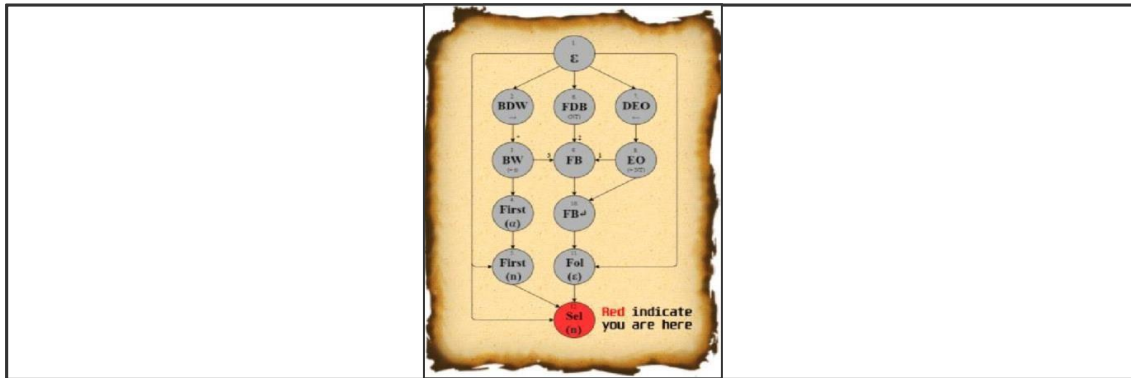


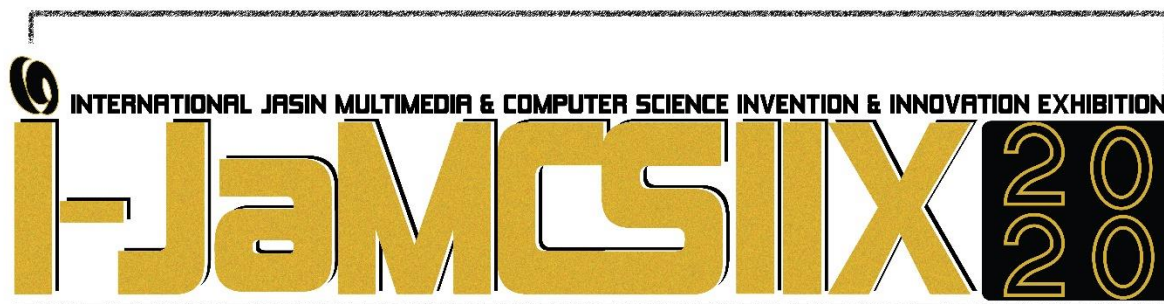
Fig. 3 Map of Towns

6 CONCLUSION

The game has been evaluated through usability testing. Usability testing has been done through observation and questionnaire. Based on the evaluation, usability testing gives positive feedback resulting in 86% of students like the content of the game. Overall, all the objectives of this project have been completely achieved which are to design a game that helps students to find Selection Sets for LL1 Grammar, to develop the designed game using Game-Based Learning, and to test the usability of the game.

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Mobile Application for Learning and Memorizing Japanese Characters using Game-Based Learning

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ABSTRACT

The Japanese language has three writing system which are Hiragana, Katakana, and Kanji. To help with the pronunciation of Hiragana and Katakana characters, they include special accented characters known as '*Dakuten*' and '*Handakuten*'. However, most students have difficulties in remembering and recognizing Hiragana and Katakana characters and how these characters can be pronounced. Therefore, a game was developed to help students in memorizing, recognizing the different symbols of Hiragana and Katakana character, and increase a better understanding of them. This project uses the ADDIE model as a framework in Methodology because the model is commonly used in educational and instructional design development. The game involves two types, the first one is Memory Song Game and the second one is Match Puzzle Game. The game's theme is 'Pirate' where the player needs to find the character that matches the puzzle space while memorizing the characters through Game-Based Learning principle. Thirteen students in UiTM Jasin Melaka who are learning the Japanese language and who are also planning to take Japanese as a third language are involved to test the usability of the game. The majority of the respondents are satisfied the game is beneficial and good in the enhancement of learning in the Japanese language. It was discovered that they enjoyed the challenging part of the game. In conclusion, this project has successfully achieved all three objectives that have been identified at the beginning of the process.

KEYWORDS: Japanese Characters, Hiragana, Katakana, Game-Based Learning, Memorizing

1 INTRODUCTION

The Japanese language is one of the third languages that are available for UiTM Jasin students. For the student to understand Japanese or further their studies in the Japanese language, students are required to fulfil the prerequisite requirement which is to master Hiragana and Katakana characters [1]. To help with the pronunciation of Kana characters, they include special accented characters known as '*Dakuten*' and '*Handakuten*'.

However, it has become a concern when students have a problem remembering and recognizing Hiragana and Katakana characters and how these characters can be pronounced.

Aside from that, students have a lack of interest in learning through the traditional method in the classroom as it causes restrictions in dynamic communication [2]. Therefore, a game-based approach is implemented in this project as it can improve student motivation, engagement, and activity [3]. Other than giving motivation to students, it also helps them to pay attention and stay focused for a long time [4]. On top of that, the game activities involve how to solve problems and challenges that bring users with a sense of achievement [5]. The game developed is then integrated into a mobile application using the Android platform.

2 OBJECTIVES

There are three objectives to overcome the problems that have been identified in this project.

- 1) To design an application for learning Hiragana and Katakana characters with pronunciation.
- 2) To develop the designed game using Game-Based Learning.
- 3) To test the usability of the game.

3 SIGNIFICANCE

It is an interactive game system that provided a better guide compared to the textbook although it still implements traditional methods. User can allocate their own time and have a fun learning environment.

4 METHODOLOGY

This system implements the ADDIE model as a framework that was embedded with 5 main phases which are analysis, design, development, implementation, and evaluation as shown in “Fig. 1” [6]. This model is commonly used in educational and instructional design development with clearly defined steps to conduct instruction effectively. It also imposes a cyclical process that is sufficiently flexible to allow anyone to revisit and refine a step at any time [7]. It eventually helps to deliver the course smoothly and efficiently [8].

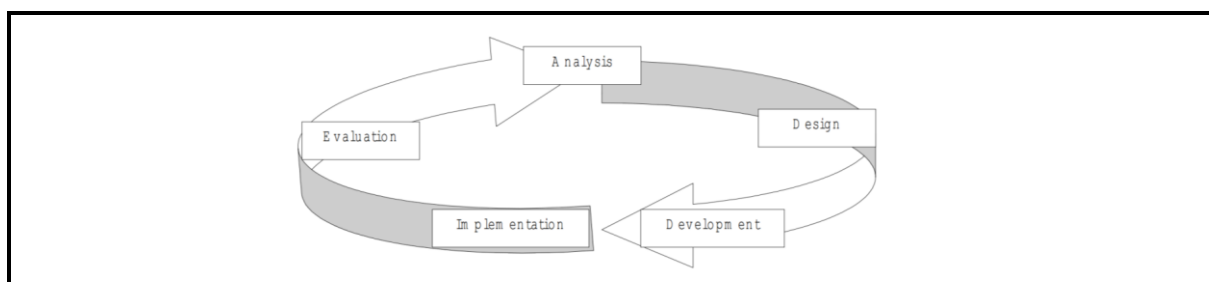


Fig. 1 The ADDIE Framework
(Source: Peterson, 2003)

5 RESULTS

The application system is divided into two types of game namely “Memory Song Game” and “Match Puzzle Game”. Both consisting of Hiragana and Katakana characters. In “Memory Song Game”, the user needs to drag and drop the card that matches with space according to the respective rows. It has three levels which are easy, medium, and hard based on the number of hints given and the timer score deducted for each different level. Each level is then separated

into five parts to include all the 46 characters in Hiragana and Katakana. The final score will be displayed after the user has completed the game. “Fig. 2” shows the screen capture of Medium Level Hiragana and Medium Level Katakana respectively.



Fig. 2 Medium Level Hiragana Screen Capture (Left side) & Medium Level Katakana Screen Capture (Right side)

Meanwhile, in “Match Puzzle Game” it uses the concept of Drag and Drop game as shown in “Fig. 3”. The game will help users in understanding of ‘Dakuten’ and ‘Handakuten’ learning in Japanese. Video teaching is provided to show how to change the pronunciation from a basic Hiragana and Katakana characters. The player needs to put the puzzle in the right space so they can get the right changing characters.

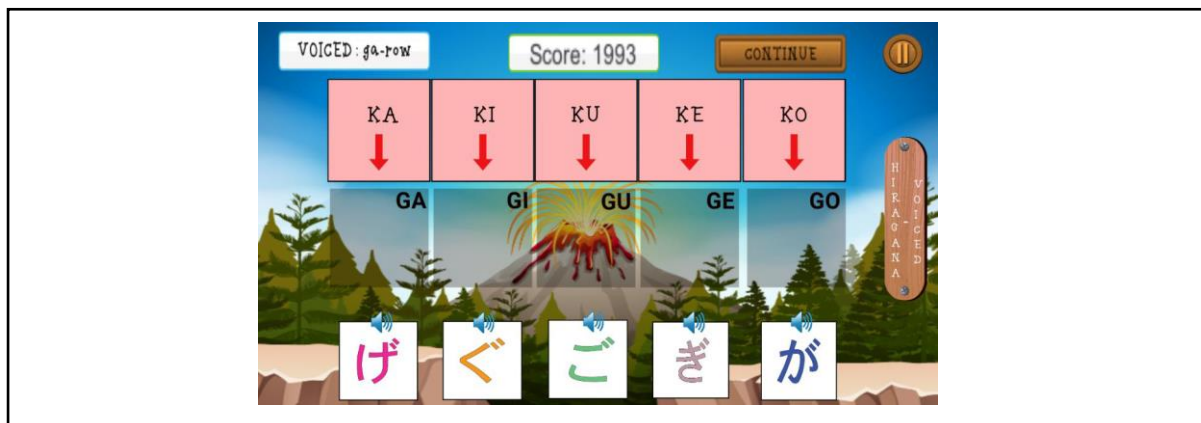


Fig. 3 Match Puzzle Game Interface

Usability testing is conducted to evaluate the usability of the developed game. In this testing process, users' facial expression is used as a technique to evaluate the system ease of use. This technique has been mentioned by three sources [9], [10], [11] that users' facial expression when playing the game is mapped with identified expressions.

Based on the findings result as illustrated in Fig. 4, it can be concluded that most criteria have received positive feedback from the learnability/content aspect. Most of the respondents voted agree and strongly agree despite some of them voted for neutral and disagree. This shows the designed application is helpful and has delivered good content through the game.

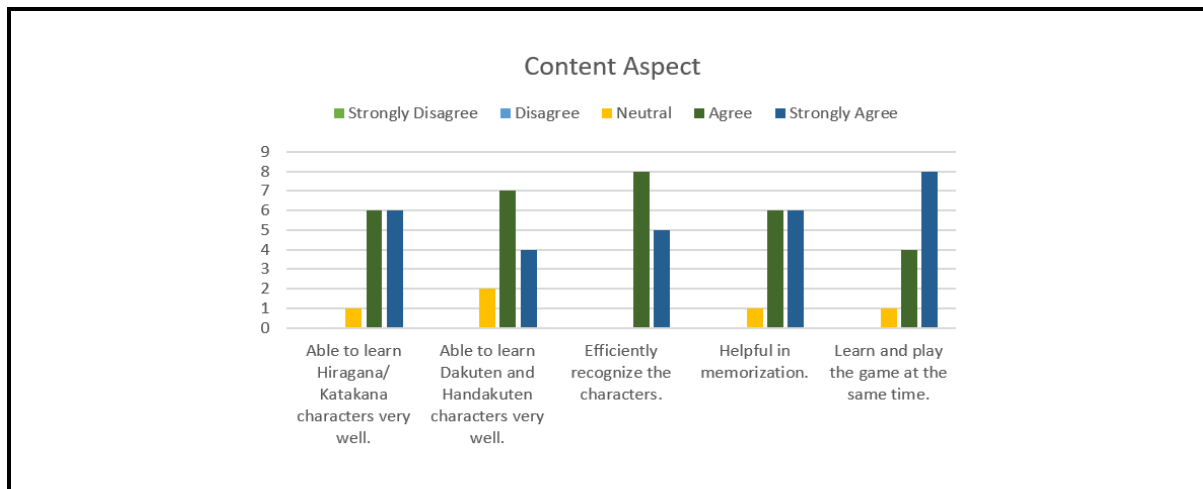


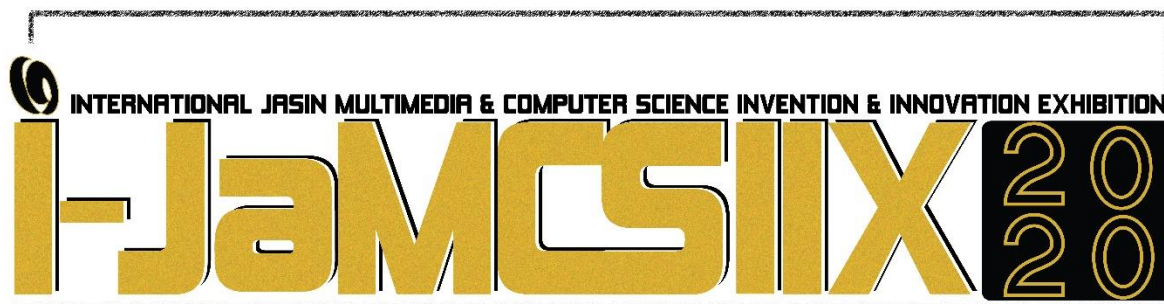
Fig. 4 Aspect of Learnability/ Content

6 CONCLUSIONS

The game has been evaluated through usability testing. Usability testing has been done through observation and questionnaire. Based on the evaluation, the test resulted that the total percentage of overall mean from usability testing is positive results with a score 85.6 % where the students are satisfied with the game designed and the game is beneficial to use for next time. As a conclusion, the three objectives that were first identified in this project is to design an application for learning Hiragana and Katakana characters with pronunciation using Game-Based Learning. Therefore, it is concluded that all three objectives have been successfully achieved.

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Development of Spectrophotometric Method for Aluminium Detection

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ABSTRACT

In this study, a spectrophotometry method for detection of Al^{3+} ion was developed using Alizarin Red S (ARS). ARS in the presence of Al^{3+} ion form brown complex solution. Al^{3+} -ARS complex formation was characterized by using UV-Vis spectrophotometer (UV-Vis). The developed method showed a linear response in the range of 1 ppm to 10 ppm with an isosbestic point of 436 nm. Moreover, photostability study indicates that ARS exhibited a stable reading for a duration of 6 hours. This method displayed high selectivity towards Al^{3+} ion concentration with no interferences from Pb^{2+} , Fe^{2+} , Cu^{2+} and Zn^{2+} ions. The ARS reagent was then immobilized in alginate to form film. Analysis using FTIR spectrophotometer shows that the presence of IR peak for ARS-alginate at 1107.44 cm^{-1} , 1474.09 cm^{-1} , 1637.77 cm^{-1} and 3405.76 cm^{-1} .

KEYWORDS: Spectrophotometry; Aluminium; Alizarin Red S

1 INTRODUCTION

Chemical sensor is a miniature device that can deliver real time information on the presence of specific compounds or ions in a complex sample [1]. In this study, ARS was used as indicator for Al^{3+} determination using UV-Visible spectrophotometer. ARS is an important class of organic compound that absorbs visible light and capable of forming complexes with cations [2]. It is usually used for metal extraction quantification and can form strong coloured complexes. Fig. 1 shows the chemical structure of ARS.

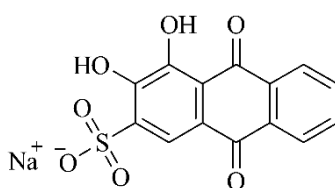


Fig. 1 Chemical structure of ARS

Aluminium (Al) is the third most abundant element in the earth's crust and contributes

about 8% of earth solid surface. It can also be found in most animal and plant tissues and in natural water [3]. There are various methods that have been used to determine Al^{3+} such as Atomic Absorption Spectrometry (AAS) and Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) [4]. These methods involve complicated preparation procedures and long analysis time. Moreover, it uses advanced instrumentation and trained personnel to handle the instrument.

2 OBJECTIVE

The objectives of this study are to optimize the reactions between ARS and Al^{3+} ion in the solution and to immobilize ARS indicator in alginate.

3 SIGNIFICANCE (S)

The spectrophotometric method is relatively simple and do not involve complicated procedure. In addition, low usage of chemical and no advanced instruments involved.

4 METHODOLOGY/TECHNIQUE

All the characterization studies have been carried out using UV-Vis Spectrophotometer and the absorbance was recorded from 300 nm until 700 nm. Effect of Al concentration and interference study were carried out before immobilization of ARS in alginate.

For immobilization of ARS in alginate, 0.25 g sodium alginate (4% (w/w)) was mixed with 6.25 mL distilled water into a 50 mL beaker and was stirred for 3 hours using a magnetic stirrer until homogeneous. Then, 0.01 g of ARS reagent was poured slowly into the alginate solution. The ARS-alginate solution was poured into a customize mould (1.25 cm x 4 cm) that suits the size of cuvette and was dried for 3 to 5 days. Fourier Transform Infrared (FTIR) spectra was recorded using Perkin Elmer Spectrum 100 Optica ATR-IR.

5 RESULT

Figure 2 illustrates the UV-Vis spectrum for ARS, Al and Al-ARS complex solutions. The maximum wavelength of ARS appears at 423 nm while Al-ARS complex appears at 478 nm. The maximum wavelength for free ARS is at 425 nm while Al-ARS complex shows the maximum wavelength at 478 nm [5]. ARS change from yellow to reddish yellow when form complex with Al^{3+} [6].

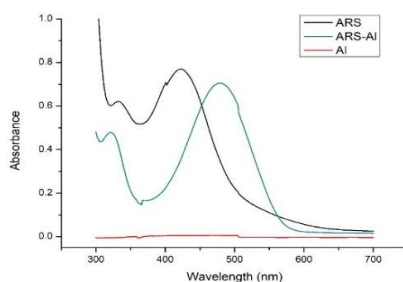


Fig. 2 UV-Visible spectrum of ARS, Al and Al-ARS complex with Al and ARS concentration of 20 ppm and 0.1 mM, respectively.

Figure 3 shows that the higher the concentration of Al, the higher the absorbance of Al-ARS complex. The increase in the concentration of Al had caused bathochromic shift from 423 nm to 467 nm. In addition, the spectrum shows an isosbestic point at 436 nm [7].

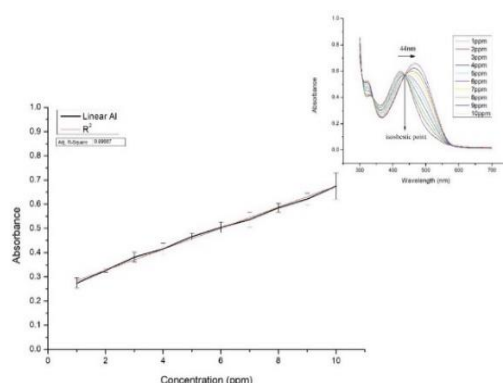


Fig. 3 Effect of Al concentration (1-10 ppm) with ARS concentration of 0.15 mM in acetate buffer solution pH 4.

Selectivity study has been carried out to study the effect of the presence of other interfering species such as Pb^{2+} , Cu^{2+} , Fe^{2+} and Zn^{2+} ions [8]. Interference study was carried out using separate and mix methods. Based on the study, both separate and mix methods show no significant interference from all the ions tested (Figure 4).

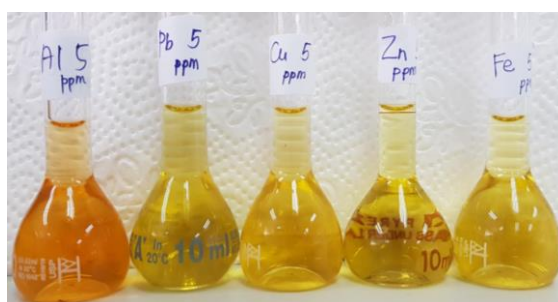


Fig. 4 Interference study (separate method) with concentration of each interfering species was fixed at 5 ppm in acetate buffer solution pH 4.

ARS has been immobilized in alginate to form ARS-alginate film. ARS-alginate solution has been poured into a mould and was dried for 3 to 5 days to form a film. The colour of the ARS-alginate film become darker as compared to the solution form. ARS-alginate film was cut into 1.25 cm x 4 cm before measurement using UV-Vis spectrophotometer (Figure 5). The size of ARS-alginate film is based on the size of cuvette used in the solution work method.

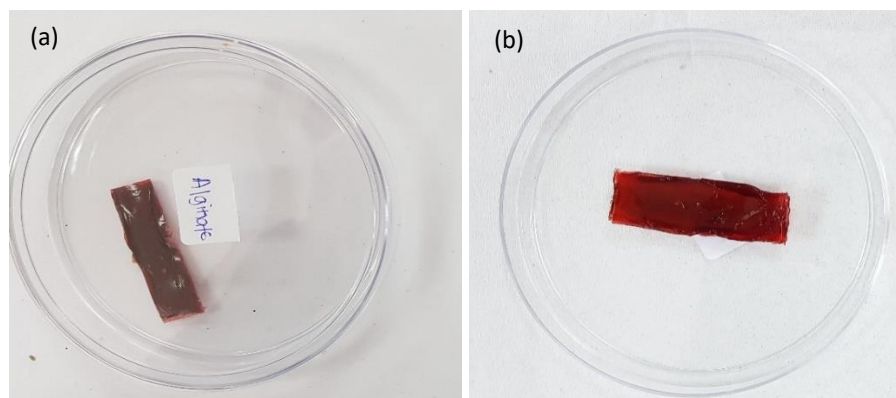


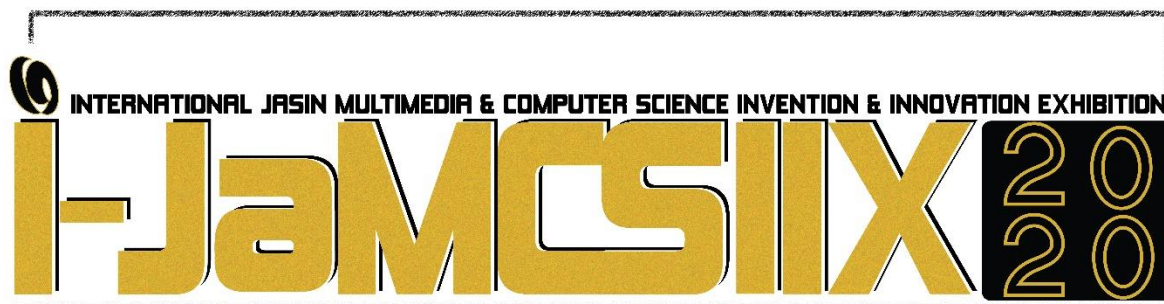
Fig. 5 ARS-alginate film immobilized with 0.01 g ARS (a) before and (b) after has been immersed in Al^{3+} ion solution.

6 CONCLUSION

A simple spectrophotometric method for detection of Al^{3+} ion has been developed. The spectrophotometric method was able to detect the Al^{3+} concentration in the range of 1-10 ppm. This method showed a good selectivity where the possible interfering ions such as Pb^{2+} , Fe^{2+} , Cu^{2+} and Zn^{2+} ions do not show any significant interference toward Al^{3+} determination. ARS indicator has been immobilized inside alginate to form ARS-alginate film.

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Potential Of *Garcia Mangostana* (Mangosteen) Leaves As An Antibacterial Agent

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ABSTRACT

This study was to detect the heavy metal and xanthenes contain in mangosteen leaves. The heavy metal that being detect were lead (Pb), nickel (Ni), iron (Fe) and copper (Cu). The leaves were taken from top, middle and bottom of the tree. For xanthenes, the leaves was extracted using methanol in soxhlet extraction process. For detection of heavy metal, Atomic Absorption Spectroscopy (AAS). Fe was the highest concentration which are $1.153 \text{ mg}\cdot\text{L}^{-1}$ at the top, $1.493 \text{ mg}\cdot\text{L}^{-1}$ at the middle and $1.763 \text{ mg}\cdot\text{L}^{-1}$ at the bottom because Fe was the most abundant metal in earth's crust and the most important heavy metal in plant growth. Pb shows the lowest concentration which are $0.028 \text{ mg}\cdot\text{L}^{-1}$ at the top, $0.040 \text{ mg}\cdot\text{L}^{-1}$ at the middle and $0.078 \text{ mg}\cdot\text{L}^{-1}$ at the bottom which showed that the soil is not contaminated by Pb. For the detection of concentration of xanthenes, Ultraviolet-Visible spectroscopy (UV-Vis) was used. From the UV-Vis results, there were xanthenes peak observed in the range of 306 nm to 310 nm and 229 nm to 240 nm. This confirmed that mangosteen leaves contain xanthenes. The concentration of xanthenes were $0.2267 \text{ mol}\cdot\text{L}^{-1}$, $0.2274 \text{ mol}\cdot\text{L}^{-1}$ and $0.2296 \text{ mol}\cdot\text{L}^{-1}$. The average zones of antibacterial activities for mangosteen leaves extracted were 0.944 mm for bacteria *E. coli*, *B. subtilis*, *S. aureus* and *P. aeruginosa*. From the analysis result showed that *Garcia Mangostana* leaves have a potential act as an anti-bacterial agent.

KEYWORDS: *Garcia Mangostana* leaves, heavy metal, xanthenes, anti-bacterial

1 INTRODUCTION

Heavy metal is a group of inorganic chemical, such as Pb, Cr, As, Zn, Cd, Cu, Hg, Fe and Ni. These heavy metal are contain in the soil [1]. The presence of heavy metal in the soil can severely inhibit the biodegradation of organic contamination. Heavy metal may give a risk and hazards to human and other ecosystem. The ecosystem can make a contact with heavy metal through drinking water, direct contact with contaminate soil and ground water. Heavy metal also gave an effect on plant growth, ground cover and have a negative impact on soil. It can be only physically removed or be transformed into nontoxic compounds. Some of these metals are necessary for plant growth, such as Zn, Cu, Mn, Ni, and Co, while others have unknown biological function, such as Cd, Pb, and Hg[2].

Xanthenes is believed to have anti-cancer effects, anti-inflammatory, anti-viral and cardiovascular protection with the antioxidant effects [3]. Xanthenes could be found on the skin of fruit, fruit, bark and leaves of mangosteen. Xanthenes have a unique chemical structure composed of a tricyclic aromatic system ($\text{C}_6\text{--C}_3\text{--C}_6$). Isoprene, methoxyl and hydroxyl groups located at various locations on the A and B rings, resulting in a diverse array of xanthenes compounds. Xanthone most researched are alpha, beta and gamma mangostin, garcinone E, 8-deoksiganthin and gartanin. Fig. 1 shows the most abundant structure of α mangostin, β mangostin and γ mangostin in mangosteen leaves [4].

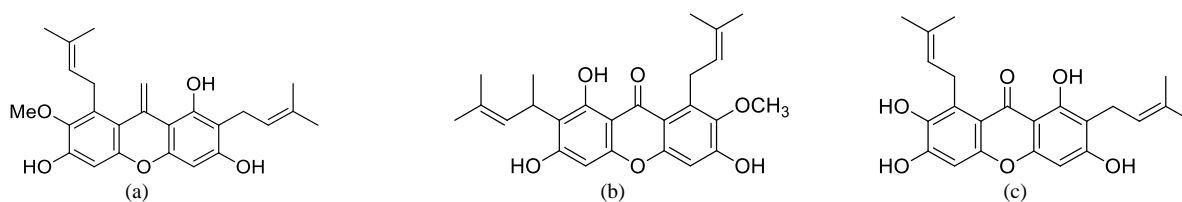


Fig. 1 Chemical structure of (a) α -mangostin; (b) β -mangostin and (c) γ -mangostin

Previous studies reported α -mangostin isolated from the extract of dried *G. mangostana* rind showed antioxidant, anticancer, and cytotoxicity activities [5]. α -mangostin is one of the earliest naturally occurring xanthone isolated from mangosteen. α -mangostin also has potential for anti-obesity and treatment for Alzheimer's disease. α -mangostin, 1-isomangostin and mangostin triacetate exhibited anti-inflammatory activity in a rat model. Besides, the γ -mangostin is widely studied in pharmaceutical property [6].

2 OBJECTIVE

The purpose of this study is to detect heavy metal and xanthenes in *Garcia Mangostana* leaves. The objectives of this study are; to extract *Garcinia Mangostana* leaves using soxhlet extraction; to determine the amount of heavy metal in *Garcinia Mangostana* leaves using atomic absorption spectroscopy; to determine the concentration of xanthenes in mangosteen leaves using UV-Visible spectroscopy; to study the antibacterial activities agent of the xanthenes toward bacteria.

3 SIGNIFICANCE (S)

In mangosteen leaves there is a presence of heavy metals. The heavy metal that consists in the mangosteen are Pb, Cr, As, Zn, Cd, Cu, Hg, Fe and Ni [7]. Atomic Absorption Spectroscopy (AAS) was used to detect the amount of heavy metal. Therefore, AAS lamp of Fe, Cu, Ni, Pb was used to analyse the heavy metals such as Fe, Cu, Ni, Pb in mangosteen leaves. Xanthenes were found in mangosteen leaves [3] and has a properties of atomic electron transition where it can be detect by UV-Vis. Xanthenes will show two peak at the range of 223 nm to 244 nm and 280 nm to 316 nm [8]. By using Beer's Law formula $A = \epsilon bc$, the concentration of the xanthenes was determined.

4 METHODOLOGY/ TECHNIQUE (S)

4.1 Raw materials, Chemicals and Instruments

Mangosteen leaves was taken from Bandar Seri Jempol, Jempol, Negeri Sembilan. Hydrochloric acid 98% and metanol 80% were used. Instruments used were PG instrument limited, T80/80+ double beam Ultraviolet-Visible (UV-Vis) spectrophotometer and Perkin Elmer A Analyst 700 Flame Atomic Absorption Spectroscopy (FAAS) with WinLab 32 AA software.

4.2 Method

Sample preparation: The mangosteen leaves was cleaned and washed from any residual compost. It was cut into a small pieces ($0.5 \times 1.0 \text{ cm}^2$) and dried overnight in a tray dryer at 45°C . After that, the leaves was grinded using grinder (around 18 meshes) [9]. 15 g of the samples was put into the soxhlet extractor. 150 ml of 98 % (v/v) methanol was added into the round bottom flask and then it was heated for 7 hours. The extract is stored in desiccator for 24 hours [10].

Determination of Heavy Metal in leaves by using AAS: 98 % of hydrochloric acid was diluted to 10 % (v/v) and 15 % (v/v). 8 g of the samples was put in a crucible and partially cover then put in the furnace at 450°C for 12 hours. The sample was dissolved in 10 % (v/v) hydrochloric acid and then put 1 % (v/v) hydrochloric acid. Analysis of heavy metal such as Fe, Cu, Pb and Ni was done by using AAS [11].

Detection of xanthenes in the mangosteen leaves using UV-Vis: 80 % methanol was added to the sample. A solvent mixture-to crude extracted mass ratio (10, 30 and 50) and methanol mass ratio was used. The absorbance of the sample was explored using UV-Vis spectroscopy [10].

Antibacterial activity agent of xanthenes

Preparation of nutrient agar (NA): 23 g of NA powder was dissolved in 1 L of distilled water. The mixture was heated and stirred until it was boil and the NA powder was completely dissolved. Then the mixture was autoclave for 15 minutes at 121°C . The mixture was cooled in a laminar flow and then poured into sterile petri dishes. The

sample crude was dissolved with dimethyl sulfoxide (DMSO). The concentration of the sample used was $100 \text{ mg}\cdot\text{L}^{-1}$.

Disc diffusion method: The sub cultured were spread into NA petri dishes by using sterile cotton swab. The sub cultured that was used were *E. coli*, *B. subtilis*, *A. aureus* and *P. aeruginosa*. 6 mm diameter of Whatmann filter paper was soaked into the sample. The filter paper was then placed on the agar surface [12]. Sample was added into 1 petri dishes. The petri dishes were put into an incubator for 24 hours at 37°C . The clear inhibition zone around the filter paper was the presence of the antibacterial activity. The zone of the antibacterial activities was measured. The activity were performed in triplicate [12].

5 RESULT

5.1 Concentration of heavy metal in mangosteen leaves.

The highest concentration of the heavy metal was for all part of mangosteen tree was Fe as shown in Table 2. The average concentration of Fe is $1.153\pm 0.003 \text{ mg}\cdot\text{L}^{-1}$ at top, at the middle part is $1.493\pm 0.003 \text{ mg}\cdot\text{L}^{-1}$ and for the bottom part is $1.763\pm 0.008 \text{ mg}\cdot\text{L}^{-1}$. The amount of Fe uptake by the mangosteen is the highest because Fe is the most abundant metal in earth's crust [13] and most important heavy metal in plant growth [14].

The lowest heavy metal content in the mangosteen leaves is Pb which $0.028 \text{ mg}\cdot\text{L}^{-1}$ at top, $0.040 \text{ mg}\cdot\text{L}^{-1}$ at middle and $0.078 \text{ mg}\cdot\text{L}^{-1}$ at the bottom part of the mangosteen tree. This is because, the soil is not contaminated. Amount of Pb increased when the amount of contamination in soil is increase [15]. Traunfeld and Clement [16] stated that industrial sites are high in Pb. The contaminated area contain Pb at least $400 \text{ mg}\cdot\text{L}^{-1}$ in the soil and $22 \text{ mg}\cdot\text{L}^{-1}$ in the plants [17].

Table 2 The average concentration of heavy metal in the mangosteen

Sample	Heavy metal ($\text{mg}\cdot\text{L}^{-1}$)			
	Cu	Fe	Pb	Ni
Top	0.166 ± 0.001	1.153 ± 0.003	0.028 ± 0.057	0.132 ± 0.006
Middle	0.217 ± 0.000	1.493 ± 0.003	0.040 ± 0.070	0.160 ± 0.003
Bottom	0.228 ± 0.002	1.763 ± 0.008	0.078 ± 0.032	0.166 ± 0.008

5.2 UV-Visible spectroscopy

All the sample have shown the present of two peak at range 306 nm to 310 nm and at range 229 nm to 240 nm. Xanthenes will show two peak at range 223 nm to 244 nm and at range 280 nm to 316 nm [8]. As comparison, the UV-Vis spectrum shows almost same as peak range from others researcher [8]. This was confirmed that mangosteen leaves contain xanthenes.

5.3 Concentration of Xanthenes

The concentration of xanthenes can be determine by using Beer's Law formula $A=\epsilon bc$ where A is absorbance, ϵ is molar absorptivity, b is path length and c is concentration. Fig. 4.12 shows the absorbance of xanthenes in mangosteen leaves. The concentration of xanthenes that have been calculated is shown in the Table 3. The molar absorptivity used in the calculation of xanthone was $13.5 \times 10^3 \text{ L}\cdot\text{mol}^{-1}\cdot\text{cm}^{-1}$ and the path length is 1 cm [18].

Table 3 The concentration of xanthone from the concentration of mangosteen leaves.

Concentration of mangosteen leaves ($\text{mg}\cdot\text{L}^{-1}$)	Concentration of xanthone ($\text{mol}\cdot\text{L}^{-1}$)
10	0.02267
30	0.02274
50	0.02296

5.4 Xanthenes as antibacterial agent.

Based on the Table 4, the extracted sample had shown antibacterial activities toward the bacteria of *E. coli*, *B. subtilis*, *P. aeruginosa*, and *S. aureus*. The average inhibition zones of antibacterial activities of sample is 0.944 mm. At molarity of $0.0002548 \text{ mol}\cdot\text{L}^{-1}$ sample shows positive antibacterial activity towards *E. coli*, *B. subtilis*, *S. aureus* and *P. aeruginosa* [19]. Based on this result and the statement, it can be concluded that the concentration of xanthenes in the mangosteen leaves can act as antibacterial for *E. coli*, *B. subtilis*, *S. aureus* and *P. aeruginosa*.

Table 4 The concentration of xanthone from the concentration of mangosteen leaves.

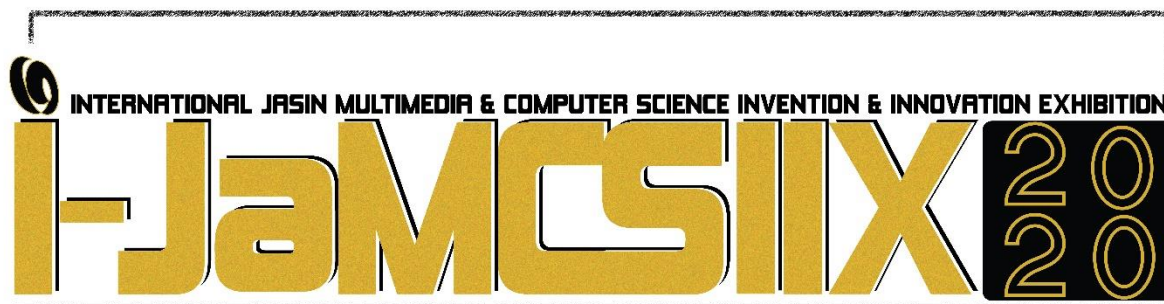
Type of Bacteria	<i>E. coli</i>	<i>B. subtilis</i>	<i>S. aureus</i>	<i>P. aeruginosa</i>
Zones of xanthenes antibacterial activity (mm)	0.860	1.033	1.033	0.850

6 CONCLUSION

The concentration of Fe in the leaves is the highest at the top part of the tree is $1.153 \text{ mg}\cdot\text{L}^{-1}$, at the middle part is $1.493 \text{ mg}\cdot\text{L}^{-1}$ and bottom part is $1.763 \text{ mg}\cdot\text{L}^{-1}$. In the UV-Vis spectroscopy, the two peak of xanthone was obtained at the range of 306 nm to 310 nm and at range 229 nm to 240 nm. Xanthenes was obtained almost same for all concentration which are $0.02267 \text{ mg}\cdot\text{L}^{-1}$ at concentration $10 \text{ mg}\cdot\text{L}^{-1}$ of sample, $0.02274 \text{ mg}\cdot\text{L}^{-1}$ at concentration $30 \text{ mg}\cdot\text{L}^{-1}$ of sample and lastly $0.02296 \text{ mg}\cdot\text{L}^{-1}$ at the $30 \text{ mg}\cdot\text{L}^{-1}$ of sample. The zones of antibacterial activities for mangosteen leaves extract was 0.860 mm for *E. coli*, 1.033 mm for *B. subtilis*, 1.033 mm for *P. aeruginosa* and 0.850 mm for *S. aureus*. This conclude that the concentration of xanthenes in the mangosteen leaves can act as antibacterial

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Factors Affecting Parents' Inclination Towards Private or Public Primary School

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ABSTRACT

Education for children is one of the most concerning issues in the society especially among the parents. Recently, the numbers of private school in Malaysia are increasing rapidly. Despite the abundant of public school, demand for private school are still increasing. Therefore, this study aims to determine the most significant factors that affecting parents' decision in selecting private primary school for their children. Multistage sampling technique was used to determine the sample of 342 respondents. The factors included in this study were parent's income, parents' education level, teaching quality, school facilities and quality of education. Logistic regression analysis was used to determine the most significant factor since the dependent variable in this study was a binary categorical variable. It was found that parents with a diploma holder (p -value=0.004), parents with a degree holder (p -value=0.002), parents' income (p -value=0.001), and school facilities (p -value=0.000) were significant factors that influence parents' decision. In addition, results also found that the most significant factor that affecting parents' decision towards private primary school was parents with degree holder. It is hoped that this study will guide parents in selecting the best primary school for their children. Moreover, this study also benefits to the government in preparing strategy to develop defensive environment in public schools and to improve parents' satisfaction towards public primary school.

KEYWORDS: Primary School, Public School, Private School, Decision, Parents

1 INTRODUCTION

Nowadays, education for children is one of the most concerning issues in the society especially among the parents. In Malaysia, Education Act 1996 claimed that children at the age of 7 until 12 are necessary to be registered in school by the parents. In this regard, the person who is unable to do so will be fined for RM5000 or one year prisoned or both. Furthermore, there are two types of primary schools in Malaysia which are public and private. The decision to choose the best schools for the children had creates an atmosphere of competition among both category of the schools.

Despite the fact that there are many contributions offered by the government towards the public school such as infrastructure budgets which affects major financial spending, the Ministry of Education had confirmed that the number of private schools were boosting from 66 schools in 2010 to 126 schools in 2017. Unfortunately, those contributions are useless if the demands for the private school are stepping ahead them. This means that there will be least student registering in public school as well as assigning a bad impression from the society since the number of students enrolling in private school were rising. Nevertheless, the parents' satisfaction for public schools still one step behind the private schools even though the cost of the fee is affordable. Due to that, it can be seen that the society concern more on the quality offered by the schools compared to the cost.

According to Nasreen [1] the preference in enrolling children in private school was due to the parents' opinion for better education in private schools rather than public schools. Hartsell [2] also claimed that parents were satisfied with their children's current educational experience in private schools. Therefore, this research aims to identify the most significant factors that affecting parents' decision to enrol their children in private primary school. Hence, the outcome of this study will be advantageous for the government in taking attention towards the lack of the public school's performance and also worthy for private school to maintain the good quality and performance of the schools.

2 OBJECTIVE

This study aimed to determine the most significant factor that affecting parents' decision in selecting private primary school for their children.

3 SIGNIFICANCE (S)

This research gives a positive contribution to the society especially parents since it can guide parents in selecting the best primary school that suits their children. Besides, this study aspires the government to become more conscious about the rapid growth and high demand of private school. In view of this, the government can strengthen the improvement of the public school's performance to avoid facing a bad reputation. Moreover, this research will give an advantage to the government in preparing and applying strategy to develop defensive environment in public schools. Subsequently, this research is also useful to the private schools in maintaining the good quality and performance of the school by knowing the significant factors that affect the parents' decision to register their children in the private schools.

4 METHODOLOGY/TECHNIQUE

This research was conducted in Seremban, Negeri Sembilan. Therefore, the target population for this study was all parents that enrolled their children to public and private primary school in Seremban. In addition, this study used a primary data. Self-administered questionnaire adapted from the study of Nasreen [1] were used in this study. Hence, 342 respondents were selected as samples for this research by using a probability sampling technique called as multistage sampling. The description of each variables involved in this study was given in Table 1. Logistic regression analysis was used to determine the most significant factor that influences parents' decision in choosing private primary school since the dependent variable in this study was a binary categorical variable.

Table 1: Description of the Variables

Variables	Type of Variables	Level of Measurement	Description
Parents preference	Binary	Nominal	1=Private School 0=Public School
Income	Numerical	Ratio	Income of parents monthly
Teaching quality	Numerical	Interval	Teaching quality
School Facilities	Numerical	Interval	School Facilities
Education Level	Categorical	Ordinal	Education Level: SPM, STPM, Diploma, Degree, Master, PhD
Quality of Education	Numerical	Interval	Quality of Education
School Performance	Numerical	Interval	School Performance

5 RESULT

The performance of the model was determined by Omnibus Test of Model Coefficient shown in Table 2. The p-value (0.000) of chi-square ($\chi^2_{10}=92.144$) was less than significance value ($\alpha = 0.05$). This result indicated that the new model outperforms the baseline model very well.

Table 2: Omnibus Test of Model Coefficient

	Chi-square	Degrees of Freedom	p-value
Step	92.144	10	.000
Block	92.144	10	.000
Model	92.144	10	.000

Table 3: Hosmer and Lemeshow Test

Chi-Square	Degrees of Freedom	p-value
11.846	8	.158

Table 3 shows the Hosmer and Lemeshow Test in measuring the model fitness. Since the p-value (0.158) was larger than 0.05, it was concluded that the model fits data very well.

Table 4 gives the value of Cox & Snell R square and Nagelkerke R square which are 0.236 and 0.315 respectively. It can be concluded that 31.5% of total variation in parents' preferences was explained by parent's income, parents' education level, teaching quality, school facilities and quality of education while another 68.5% can be explained by other factors.

Table 4: Cox & Snell R square and Nagelkerke R square

Cox & Snell R	Nagelkerke R square
0.236	0.315

Table 5 represents the variables involved in the model of this study. As the result, it

revealed that there were three significant variables that influence parents to choose primary private school for their children namely as parents with diploma and degree holder (p-value=0.004 and p-value=0.002 respectively), income of the parents (p-value=0.001) and school facilities (p-value=0.000). Moreover, it can be seen that parents' education with degree contribute the most significant factor as it gave the highest value of Exp(B) which is 3.165. Thus, it indicated that, those parents who had Degree for their education level were 3.165 times more likely to choose private primary school compared to parents with SPM.

Table 5: Variables in The Equation

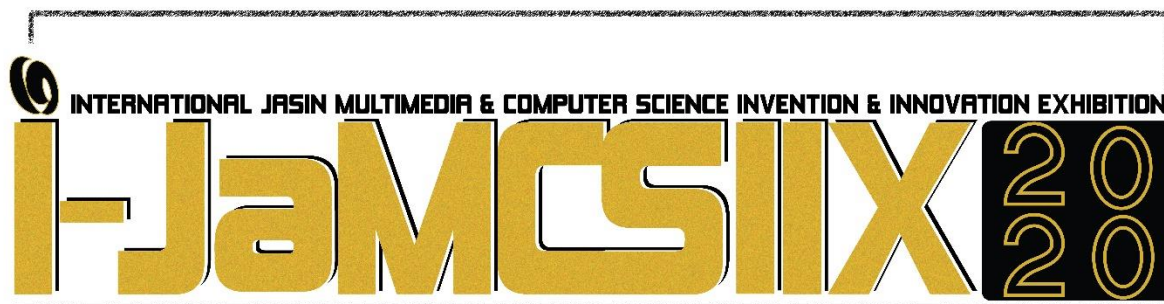
Factor	B	S.E	Wald	Df	Sig.	Exp(B)
STPM	1.273	0.6854	3.457	1	0.063	3.572
Diploma	1.019	0.353	8.359	1	0.004	2.771
Degree	1.152	0.364	10.024	1	0.002	3.165
Master	1.070	0.622	2.960	1	0.085	2.914
PhD	0.274	1.474	0.035	1	0.852	1.315
Income	0.00011	0.000	10.552	1	0.001	1.00011
Teaching Quality	-0.026	0.034	0.584	1	0.445	0.975
School Facilities	0.142	0.026	28.998	1	0.000	1.153
Education Quality	-0.056	0.053	1.108	1	0.293	0.946
School Performance	-0.026	0.037	0.507	1	0.476	0.974
Constant	-2.847	0.729	15.242	1	0.000	0.058

6 CONCLUSION

Education plays a significant role in flourishing Malaysia to become a developed country. There are two types of schools that can be chosen by the parents to enrol their children, which are public and private primary schools. Therefore, the factors affecting parents' inclination towards private or public primary school need to be investigated. Thus, the logistic regression technique was used to seek the most significant factor that contributed to the parents' preference for private primary schools. It found that most of the parents who had degree for their education level tend to send their children to private primary school. This result is supported by Noor Alyani [3] whereby income level and parents' level of education were the significant factors contributing towards the interest in choosing private schools for the children. As conclusion, this research gives a positive contribution to the society especially parents regarding factors that need to consider before selecting the primary school for their children. In a nutshell, this research is worthwhile as a guidance for the government in planning and implementing effort to form environment competitively in public schools.

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***Ficus deltoidea* var. *deltoidea* (Mas Cotek): A Promising Natural Antioxidant Agent**

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ABSTRACT

Ficus deltoidea var. *deltoidea* or locally known as ‘Mas cotek’ is a medicinal plant which have been used traditionally to treat toothache, wound, rheumatism, sores as well as to improve blood circulation. This present study was conducted to determine phytochemicals and antioxidant activity of the *n*-hexane, ethyl acetate and methanol extracts of the leaves of *F. deltoidea* var. *deltoidea*. Total phenolic content (TPC) was determined according to the Folin-Ciocalteu colorimetric method, while the antioxidant activity was carried out using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. Phytochemical screening on the *n*-hexane extract revealed that this extract consisted of terpenes and steroids, while the ethyl acetate extract contained phenolics, saponins, tannins, terpenes and steroids. Flavonoids, phenolics, tannins and glycosides were found to be present in the methanol extract. Among the three extracts, the methanol extract gave the highest total phenolic content (323.74 mg GAE/g extract) and also exhibited the strongest DPPH radical scavenging activity (IC₅₀ 129.27 µg/mL). This study suggested that the leaves of *F. deltoidea* var. *deltoidea* might be useful as a promising natural antioxidant for pharmaceutical purpose.

KEYWORDS: *Ficus deltoidea* var. *deltoidea*, phytochemical screening, total phenolic content, antioxidant.

1 INTRODUCTION

Ficus deltoidea is a member of a mulberry family or fig family (Moraceae) [1]. This plant which known in Malaysia as “Mas cotek” or “Serapat angin” is a native plant of Peninsular Malaysia [2] and widely grown in Thailand, Sumatra, Java, Kalimantan, Sulawesi and Moluccas [3]. To date, a total of 16 varieties of *F. deltoidea* including var. *deltoidea* have been reported. These varieties are classified based on morphological of their leaves and figs [1, 2]. *F. deltoidea* have been extensively used to treat countless ailments such as toothache, cold, headache, wound, rheumatism and sores. In addition, this medicinal plant had been also utilized by women as health tonic as well to improve blood circulation [2, 3]. Pharmacologically, *F. deltoidea* is recognized for its number of important bioactivities such as antioxidant, antidiabetic, anti-

inflammation, antinociceptive, wound healing, antiulcerogenic, antibacterial, anticancer and antimelanogenic [1, 2]. Previous phytochemical studies disclosed that this plant composed of a variety of secondary metabolites, for examples, saponins, flavonoids, tannins, polyphenols, triterpenoids and proanthocyanins [4]. In addition, the earlier researchers also managed to isolate two marker compounds identified as vitexin and isovitexin from the leaves of *F. deltoidea* [5, 6].

2 OBJECTIVES

The aims of this study were to extract and screen the phytochemicals from the leaves of *F. deltoidea* var. *deltoidea*. Apart from that, this study was also conducted to determine total phenolic content and antioxidant activity of the leaves extracts.

3 SIGNIFICANCE (S)

This study proposed that the leaves of *F. deltoidea* var. *deltoidea* might be utilized as a source of natural antioxidant for pharmaceutical and nutraceutical purposes. On the other hands, by discovering an alternative antioxidant, the consumption of synthetic antioxidants which cause side-effects can be minimized.

4 METHODOLOGY/TECHNIQUE

Plant material and preparation of extracts

The leaves of *F. deltoidea* var. *deltoidea* was collected in August 2019 from Batu Pahat, Johor. The leaves were dried at 45°C in an oven for six days and ground into fine powder [7]. Then, the powdered leaves (165.6 g) was soaked sequentially in *n*-hexane, ethyl acetate and methanol (1620 mL each) for three days at room temperature in an orbital shaker (rpm=200). The maceration process was repeated for three times each [8].

Phytochemical screening on the crude extracts

The phytochemical screening tests for alkaloids, flavonoids, phenols, terpenoids, steroids, tannins, quinones, glycosides and saponins were carried out by using the standard methods [9-16].

Determination of total phenolic contents

The total phenolic content was determined by Follin-Ciocalteu method with minor modification [17, 18]. The absorbance was measured at 765 nm using UV/Vis spectrophotometer. The calibration curve was plotted by preparing standard gallic acid solution in methanol. Total phenolic content of the extract was expressed as mg Gallic acid equivalent (GAE)/g of the extract. The analysis was done in triplicate and the TPC value was reported as means \pm standard deviation of triplicates.

Determination of antioxidant activity

Antioxidant activity was performed using DPPH radical scavenging assay with some adjustment [19]. The samples in MeOH (0.2 mL) with concentrations ranging from 1000 to 7.81 μ g/mL obtained by twofold dilution were mixed with the DPPH solution (3.8 mL, 50 μ M). The mixtures were kept for 30 minutes at room temperature in the dark. After incubation time, the absorbance of reaction mixtures were recorded at 517 nm. Ascorbic acid was applied as a standard antioxidant, while DPPH solution was used as DPPH blank. The percentage inhibition

(%) was calculated using the following formula:

$$\% \text{ Inhibition} = [(A_{\text{DPPH blank}} - [A_{\text{sample}} - A_{\text{blank sample}}]) / A_{\text{DPPH blank}}] \times 100\%$$

The IC₅₀ value was calculated using GraphPad Prism 6. The assay was carried out in triplicates and the result was recorded as means \pm standard deviation.

5 RESULT

Extraction yield, total phenolic content and DPPH radical scavenging activity of *n*-hexane, ethyl acetate and methanol extracts of the leaves of *F. deltoidea* var. *deltoidea* are presented in Table 1. Among the extracts, the methanol extract (4.37%) resulted the highest extraction yield, followed by *n*-hexane (3.56%) and ethyl acetate extract (2.17%). Furthermore, the methanol extract also displayed the highest total phenolic content (323.74 mg GAE/g) and the lowest IC₅₀ value (129.27 μ g/mL) as compared to the ethyl acetate extract.

Table 1 Yield, total phenolic content and DPPH radical scavenging activity of *F. deltoidea* var. *deltoidea* leaves extracts

Extracts	Yield (%)	TPC (mg GAE/g extract) ^a	DPPH (IC ₅₀ , μ g/mL) ^a
<i>n</i> -Hexane	3.56	ND	ND
Ethyl acetate	2.17	293.78 \pm 0.13	143.33 \pm 0.02
Methanol	4.37	323.74 \pm 0.61	129.27 \pm 0.25
Ascorbic acid ^b	-	-	25.61 \pm 0.21

^aData represent mean \pm standard deviation of three replicate experiments; ^bPositive control; ND=not determined.

The results of phytochemical screening for the *n*-hexane, ethyl acetate and methanol extracts of the leaves of *F. deltoidea* var. *deltoidea* are presented in Table 2. From the findings, it was found that terpenes and steroids were present in the *n*-hexane extract, while phenolics, saponins, tannins, terpenes and steroids were existed in the ethyl acetate extract. The methanol extract contained flavonoids, phenolics, tannins and glycosides. Saponins was only detected in the ethyl acetate extract, while flavonoids and glycosides were only found in the methanol extract. In contrast, alkaloids and quinones were found to be absent in all leaves extracts.

Table 2 Phytochemical screening of *F. deltoidea* var. *deltoidea* leaves extracts

Phytochemicals	Extracts		
	<i>n</i> -Hexane	Ethyl acetate	Methanol
Alkaloids	-	-	-
Flavonoids	-	-	+
Phenolics	-	+	+
Saponins	-	+	-
Tannins	-	+	+
Terpenes	+	+	-
Quinones	-	-	-
Glycosides	-	-	+
Steroids	+	+	-

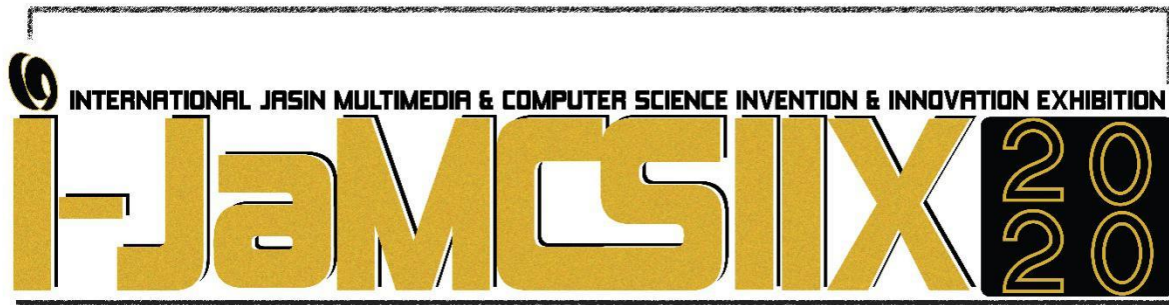
+ = present; - = absent.

6 CONCLUSION

The phytochemical analysis showed that the leaves extracts of *F. deltoidea* var. *deltoidea* consist of a mixture of bioactive phytochemicals. The significance TPC value and the potent DPPH radical scavenging activity of the leaves methanol extract indicates that this plant could be beneficial as a source of natural antioxidant to reduce illnesses. From these findings, it is suggested that the methanol extract can be further subjected for the isolation and characterization of phytochemicals that have antioxidant effect.

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E-Fitness Buddy

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ABSTRACT

Many people are concerned with their bodies nowadays but struggled to visit the gym regularly due to their hectic daily schedules. In the era of technology, fitness application is getting more approval and praise for assisting the user in performing their workout routine independently. Unfortunately, workout without expert guidance can caused injuries since users who are lacking knowledge, unable to identify the most suitable routine to perform based on their body mass and goals. E-Fitness Buddy is a prototype of a mobile application that will recommend a suitable workout routine which reflects the user's preference and need. E-Fitness Buddy is designed to keep track the user's progress and henceforth users will be motivated by knowing their performance based on the recommended workout routine. However, it is recommended to consider on more related criteria to recommend on the workout routine to the user.

KEYWORDS: Fitness, mobile application, workout routine, recommendation, progress tracker

1 INTRODUCTION

In the era of technology, smartphone can be a good platform to be use by user which maintaining exercise requires daily routines and changes in lifestyle with a few nudges in the right direction from the mobile phone. Mobile application (app) is a software programs designed to run on smartphones and other mobile devices [1]. Mobile app offers similar services to those available on PCs for users in which it provides a solution for users in acquiring information from the internet [2, 3]. The demands and expectations of society for health enhancement and the promotion of healthy lifestyles make exercise a key element around which everything revolves [4]. Fitness is the desire to live in a balanced life. Overall fitness means the capacity of an individual to work more efficiently with their capabilities, and developed based on physical, mental, emotional, social and religious components [5].

Fitness application (app) are getting more approval and praise for assisting the user in performing their workout independently. It is used as a tool to monitor, control and track users' intake of calories [6]. Users are free to workout whenever they want due to several factors such as time, location and money based on their preference and need. There are more than 32,700

of health and fitness applications (apps) that has been released and available for free and purchase [7]. A research found that out of five smartphone users, one of them have at least one health app [8]. This shows the significant impact of the fitness app to the society in this era of modern world. However, there is uncertainty if these applications can help an individual to achieve or maintain their personal fitness. In this project, the mobile app is used as a platform to deliver the system. The existing fitness apps have its own limitation. Users who are lack of knowledge, unable to identify the most suitable routine to perform based on their body mass, goals and level of workout intensity. Moreover, several workout app does not have the capability to track the user's workout progress.

2 OBJECTIVE

The app's main objective is to provide a fitness mobile application called E-Fitness Buddy that will recommend a specific exercise along with a suitable workout routine based on gender, age, BMI, workout goal and workout location. This application also will keep track the user's workout performance along their work out journey.

3 SIGNIFICANCE (S)

This app is designed as a guidance for user to achieve their workout goal such as for fat loss, muscle gain or sport performance as it will prepare the most suitable exercise routine for user. It is efficient as this is a 3-in-1 workout app that provide three different workout environments, which are gym, home and park which is calisthenics workout to be specific. This apps will suggest a suitable workout routine to be done by the user whilst allow user to track their progress and keep them motivated throughout the journey of workout.

4 METHODOLOGY/TECHNIQUE

A set of questionnaire consists of eight questions was prepared. An online survey was conducted to gather and analyse the requirements on the fitness-related mobile app. The outcome from the survey was extracted and gathered to design and develop the system. Next, the result from the survey was used as the main reference to determine the main features of the system. The two important features of the app are recommendation on workout routine based on information filled by the user and progress tracker to show user's performance along their work out journey. The storyboard was used to visualize and arrange the contents and layouts of the app. Hence, the interface of the system has been designed.

The app is designed based on the requirements gathered by using rule-based technique where user needs to choose the place of working out session will be done such as gym, home or outdoor gym. Thus, choosing their level of intensity whether it is beginner, intermediate or advanced. Then the apps will generate workout routine that is suitable for the user. One of the functions is that it will be able to track progress of the user. The process of tracking progress will be done by notifying the user to enter their latest or current weight, by using the data of the user's height and weight. This will construct their new Body Mass Index (BMI), which shows a progress has been made by the user. E-Fitness Buddy was developed using Android Studio and Firebase as database. The android studio is used during the implementation of E-Fitness Buddy system. It is a platform that standard application for the Java coding. Firebase is a database used to store and sync data in milliseconds. This database is an online database which is Realtime Database.

5 RESULT

There are nine use cases are identified for the mobile application with the involvement of one actor, which is the user of the app. The user has the capability to register and update their profile. They need to enter their personal information such as name, email, age, weight and height. Next, the user will choose the workout type whether at the gym, home or outdoor gym which also known as calisthenics workout. Then, the user needs to choose their level of workout intensity which is beginner, intermediate and advance.

Fig. 1 shows the user interface of E-Fitness Buddy. The apps will generate workout routine that is suitable for the user based on their BMI, workout location and workout level. Each type of workout routine will cover the part of the human body such as back, chest, biceps, triceps, shoulders, legs, and abs. Different set of routine is generated for different type of user by using the rule-based technique.

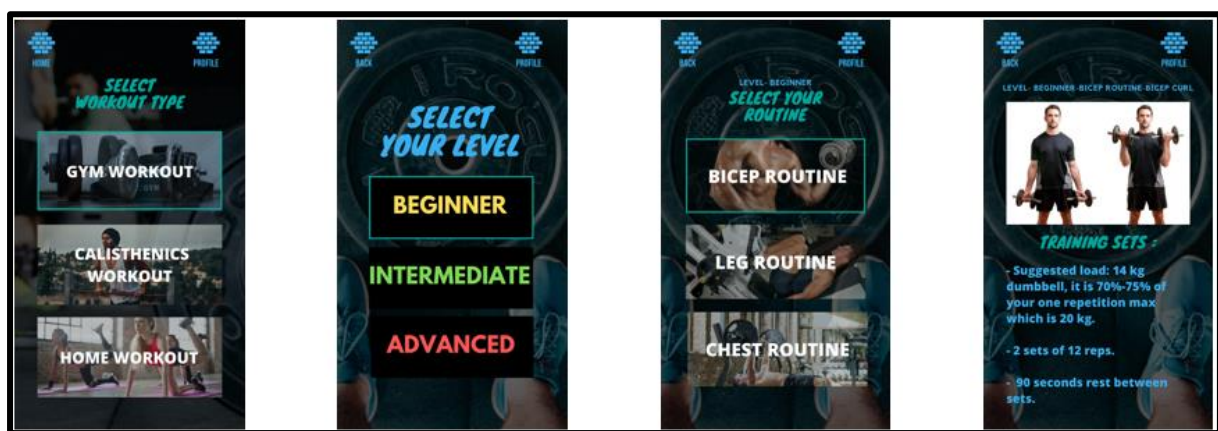


Fig. 1 The user interface of E-Fitness Buddy

The app is able to track the progress of the user based on their current BMI. The app will notify the user to enter their current weight and use the data of the user's height. Fig. 2 shows the user interface of the progress tracking process. User progress will be track by using their BMI as to detect either there are any changes in their body mass.

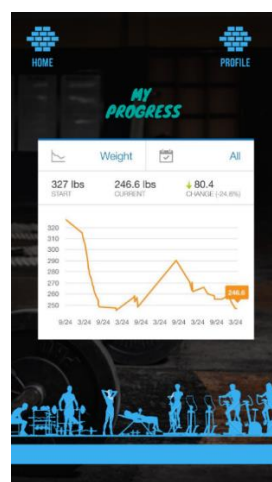


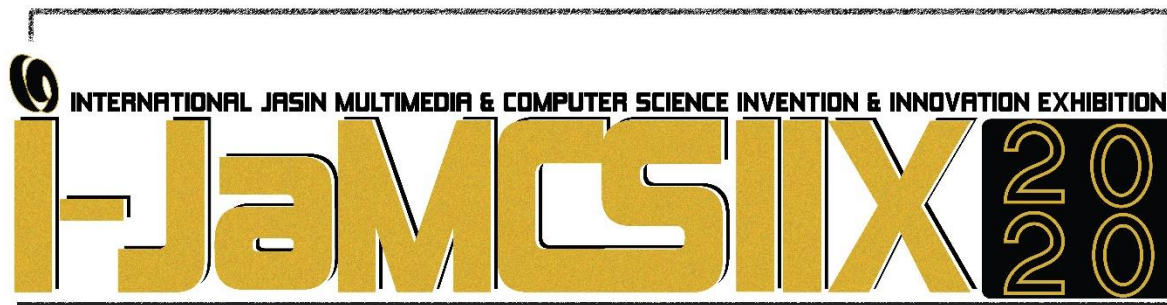
Fig. 2 The user interface on progress tracker

6 CONCLUSION

In conclusion, requirements that has been gathered and analyzed will be used to develop E-Fitness Buddy which will recommend a specific exercise along with a correct workout routine for the user based on information of them which is gender, age, BMI and also workout location either at gym or not. Thus, the developed mobile application will ease the user and provides different routine of different workout location for the user. The application also able to track the progress of the user throughout their journey of working out. There are few enhancements that can be made by other researchers who have an intention to continue this research or developing a similar type of apps. The application can be improved by considering different type of users with different capability to workout with different level of health condition. For future enhancement, it is recommended to conduct the usability and functionality testing on the developed mobile application.

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IoT Air Pollution Monitoring System

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ABSTRACT

Air quality must be monitored and kept under control for a better future and a healthy life. Here we propose an air quality as well as an air pollution monitoring system enable us to monitor and control the quality of live air through IoT in specific areas. This system used sensor to constantly detect harmful gases in the air. System also maintains the air level measurement and reports it via IoT to the Blynk application. The sensor interacts with the microcontroller to process the data and transmit through the internet. This allows authorities to monitor and take action against air pollution in various areas. Authorities can also monitor air pollution in the vicinity of school, and hospital. Where the system detects the air quality problem, the authorities are alerted so they can take control measure. The main component of IoT air pollution monitoring system is Arduino Mega 2560 as a microcontroller. The input used is MQ135 sensor and MQ-7 to detect contaminated air. This sensor will place at a higher place to easily detect the pollution air. There are 3 output are LEDs, Wi-Fi module, and LCD display. This probably uses a LED and buzzer as an indicator on this system to show the system is running. The LCD is used to show the air concentration either the safe air or not. If the air is polluted, the system will bring alerts to nearby areas. This Wi-Fi module helps a nearby people to know information about air concentration. This surely can make they feel safe because they can know about current air concentration.

KEYWORDS: Air pollution, Internet of Thing (IoT), Arduino Mega, air quality

1 INTRODUCTION

Today, air pollution monitoring system is one of the most important things around the world where people can monitor by themselves at anywhere and anytime. The systems are very useful especially at public area to prevent unhealthy life. Each industry area must have an air pollution system to keep on monitor about their air quality at their area. As results, many people show a lot of interest on this system from engineering level itself.

The Changing Paradigm of Air Pollution Monitoring team from Environmental Science & Technology has been implemented this system to collects data by using air pollution sensors [1]. This project can measure concentration of gas phase species and kept the data. The

prototype was successfully developed with low cost maintenance and in a good condition at all the time.

Secondly, Kavi K. Khedo and their team has designed a wireless sensor network air pollution monitoring system [2] for Mauritius. They also monitor the quality of air when the numbers of vehicles increase. Next, their team also make a node at certain area based on Air Quality index (AQI) at 6 areas by using their system to make a data and level air quality.

A team from Department of Electrical and Information Engineering, Covenant University, Ogun State, Nigeria has been design a smart air pollution monitoring system. Air is one of the essential elements of human's surroundings. The earth's atmosphere is full of air which contains gases such as Nitrogen, Oxygen, Carbon Monoxide and traces of some rare elements. Humans need an atmosphere of air that is free from contaminants [3]. This project is using Arduino Uno as a microcontroller, ESP8266 Wi-Fi Module and also MQ-135 as their gas sensor that can detect quality air at surrounding. The data has been record and by daily and show by using graph on part per million (PPM) value.

2 OBJECTIVE

This work embarks on the following objectives:

- i. To design an IoT air pollution monitoring system by using Arduino Mega 2560 microcontroller.
- ii. To develop a system that can detect air pollution

3 SIGNIFICANCE (S)

This project will help to detect harmful gas and give an information to nearby area. With this project, people can avoid from food poisoning. Other than that, the authority can take first action to control the gasses from spread out to another place. Next, the budget to make this project is low and this system can be apply at all places especially at the factory site. Last but not least, this project is also environmentally friendly that people can use it to monitor the air quality at surrounding

4 METHODOLOGY/TECHNIQUE

The block diagram of the IoT Air Pollution Monitoring System is shown in Fig. 1. The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. This microcontroller has been connecting to MQ-7, MQ-135, ESP8266 Wi-Fi module, LED, LCD and buzzer on this project. Sensitive material of MQ135 gas sensor is SnO₂, which with lower conductivity in clean air. The LCD will display the reading from MQ-135 and also MQ-7 based on ppm value.

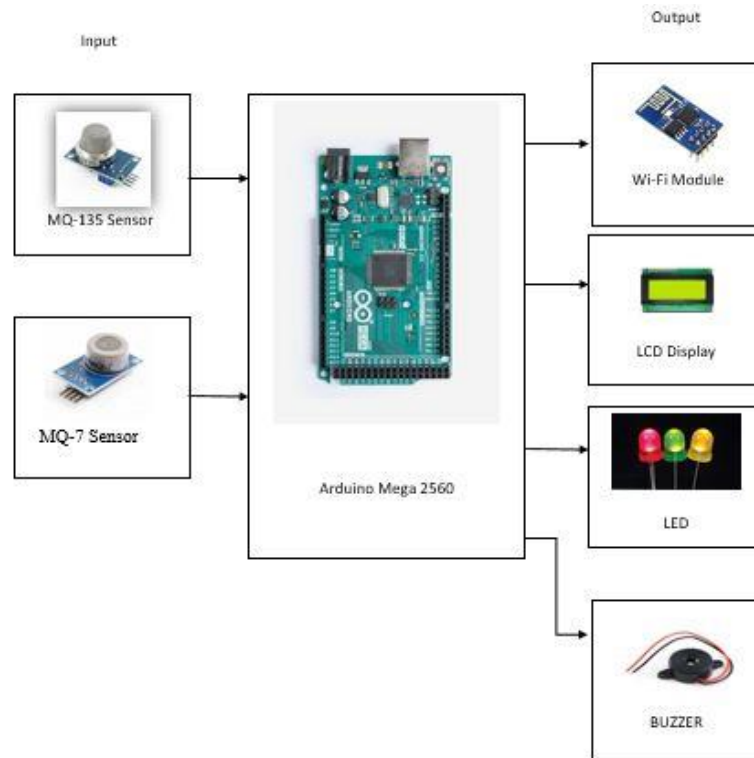


Fig. 1: IoT Air Pollution Monitoring System

5 RESULT



Fig. 2: LCD Reading

The Fig. showed the value of gas that have been detected by sensor and has been displayed on LCD. The LCD shows the concentration of gas in good condition. So people can breathe air safely.

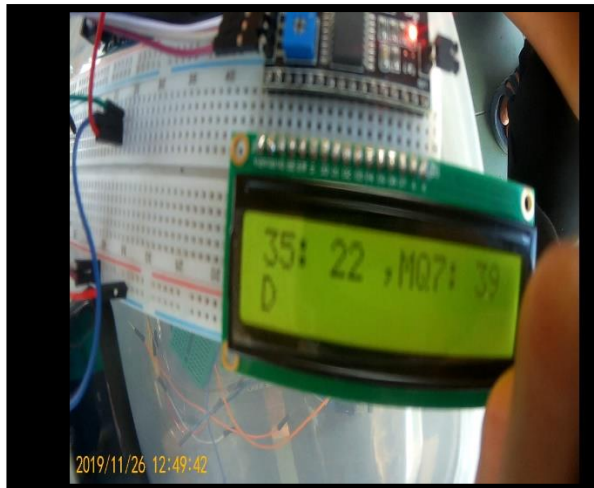


Fig. 3: Testing Air Concentration at Terminal Bus Pasir Gudang



Fig. 4: Terminal Bus Pasir Gudang

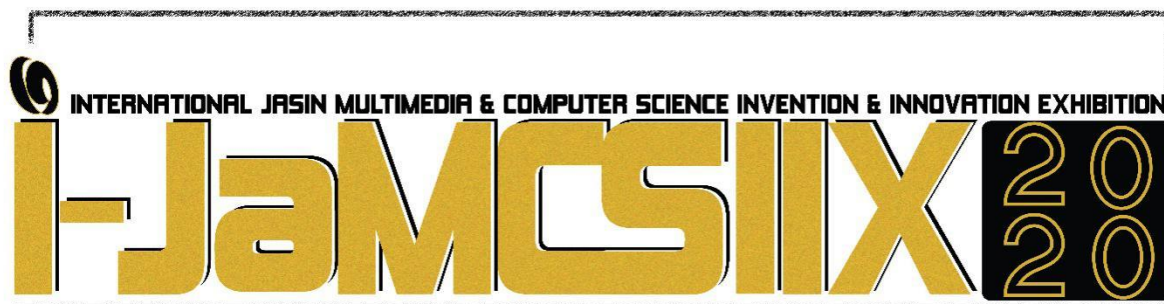
Based on Fig. 3 and Fig. 4, the value of gas was detected at bus area. The value was increased because of the sensor detect gases from vehicles around the bus station. Based on results, the reading of Carbon Monoxide (CO) is 39 PPM and this reading can be monitored by using Blynk application.

6 CONCLUSION

This project can be used to give a warning about the air pollution to make sure people from the surrounding does not affect with harmful gas. This can avoid from poisonous food and water that make the people sick and vomit. With this system, human live can be safe from a harmful gas.

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Mobile Trainer Organizer Application

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ABSTRACT

Due to the exponential growth in mobile application (app) development, many fitness programs have been conducted through this platform. Anyhow, the difficulties of tracking trainees' progress and monitoring trainee food intake and activities are faced by trainers. Currently, most of the fitness programs are conducted in a chatting group. However, the information shared by the trainer can be abandoned by trainees as a lot of information was shared in the group. The goal of this project is to develop a mobile app that can assist the trainer of a fitness program in organizing their trainees' information and provide a communication platform for trainers and trainees. Mobile Trainer Organizer is a prototype of an android-based mobile app that consists of several features: (a) organize and store information, (b) monitoring platform of food intake and activities, and (c) information sharing interface that allows trainers to convey important information to their trainees. The app can be implemented in various fields of work other than a fitness program such as education, medical, and others.

KEYWORDS: Fitness, Mobile application, Trainer, Android-based, Organizer

1 INTRODUCTION

As stated by the World Health Organization (WHO) health is not only the absence of illness or disease, it also relies on a person's physical, emotional, and social health [1]. People simply regarded health as the absence of illness. Illness is a sensation, a feeling of unhealthy that is completely personal, interior to the patient's individual while the disease is a condition apply to a variety of signs and symptoms, anomalies associated with a feature or structure disorder and condition associated with a cause [2, 3]. People need to learn how many macronutrients they consume in food since a proper diet help to improve health conditions [4, 5]. A new iteration of the Food Guide Pyramid, known as MyPyramid, was introduced by USDA in 2015 as individual dietary guidance [6].

Society's demands and desires to improve health and promote positive lifestyles make fitness a crucial factor around which everything revolves [7]. Fitness is the ability to lead a life that is complete and healthy. General fitness means a person's ability to act more successfully with his or her abilities, which relies on the strongly interrelated physical, mental, emotional, social, and religious components of fitness [8].

As such technology begin to develop incredibly fast day by day, it also affects the demand for fitness mobile application (app) into the industry. Approximately, one out of five smartphone owners have at least one health-related app proved that the significant impact of the app to the society in this era of the modern world [9]. According to this trend, the chance to perform online training through mobile apps has been grabbed by health trainers. It is used as a communication platform where it eases the trainer to monitor, manage trainees' activities, and track their calorie intake [10].

As people tend to stick with their smartphones, this project approaches the mobile app as a platform to deliver the system. The current business process of the stakeholder faced several difficulties while conducting online coaching through the current platforms; Instagram and WhatsApp. The important information on trainees may lose due to poor data record management. Difficulty in tracking trainees' progress and ineffective training program faced by the trainer as some information was abandoned by their trainees because the fitness program mostly was conducted in a chatting group.

2 OBJECTIVE

The main goal of the system is to provide a platform that can help trainers to organize, monitor, and deliver information with their trainees. Thus, some related information was gathered and analyzed to develop and design the Mobile Trainer Organizer app via Android Studio.

3 SIGNIFICANCE (S)

The application eases the trainer to organize, monitor, and convey information with their trainees. Trainees were grouped in a section which eases the trainer to track trainees' important details such as their weight loss and daily routines. Information such as events, health, eat and exercise tips provided by trainers will be shared in a section and it is accessible by trainees on the application. Lastly, a section that eases trainees to update their daily routines regarding the options provided. Hence, their trainer will monitor through the application developed. Online chatting is provided as a communication platform between trainees and trainers.

4 METHODOLOGY/TECHNIQUE

Mobile Trainer Organizer Application was designed to assist the trainer in managing their trainees' online training. It was developed by an adapted waterfall methodology phases; requirement gathering and analysis, design, and implementation. As the first step in developing the system, a trainer was approached through her Instagram. An interview session had been conducted to understand the current process of the fitness program. As a result, the stakeholder's problems were extracted and gathered to design and develop the system. In the second step, the gathered data was used as the main reference to determine the main features of the system. Three important features were identified from the data collected to fulfil all the requirements from the stakeholder; organize and store information, monitoring the platform of

food intake and activities, and information sharing interface that allows trainers to convey important information such as events, health, and eating tips to their trainees.

Next, the interface of the system was designed by using the storyboard to visualize and arrange the layouts and contents of the app. The main features of the app consist of organizing, monitoring, and delivering information features that were designed using a suitable layout. As the last step, the smartphone application's whole plot was translated into code. In this venture, the Android Studio will be used as a code. The functionality required to develop the mobile app is supported by using this program. At the end of this phase, the third objective will be achieved which is to develop a mobile app based on the analysed information.

5 RESULT

As a result of conducting this project, the app was completed and ready to be used by the user. There are 20 use cases are identified for the mobile application with the involvement of two actors; the trainer and the trainee. The trainer is able to manage their profile, view, and comment on their trainees' activities, post events, and tips. The trainee is able to manage their profile, update their activities in which it can be seen by their trainer, view event, and tips that have been posted by their trainer.

At first, the user of this mobile app needs to create an account before they are able to access the system. By having access, the trainer and trainees have the system functionalities that can be accessed respectively. Most of the use cases can be access by the trainer while the trainees have limited access. Fig. 1 shows the user interfaces and their component within the app. The main page was divided into four sections; activity, group, tips, and events.

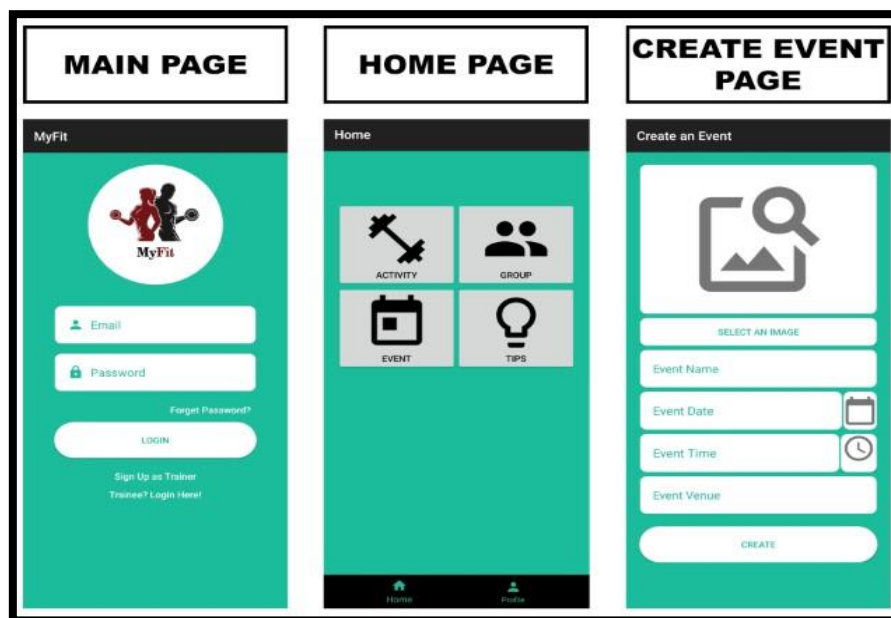


Fig. 1 The user interface of Mobile Trainer Organizer Application

The activity section is the main section of this app. In the trainee's view, this section records their daily activities such as food intake and light workout. They can view, delete, and edit activities that had been created. For trainers, this section enables them to view, comment, and suggest on their trainees' activities. This will help the trainer and trainee to organize their works and at the same time eases trainers to monitor their trainees. The group section will link

the mobile app with the other online platforms that are WhatsApp and Telegram. Linking with WhatsApp and Telegram is necessary as both apps are mostly used by the user.

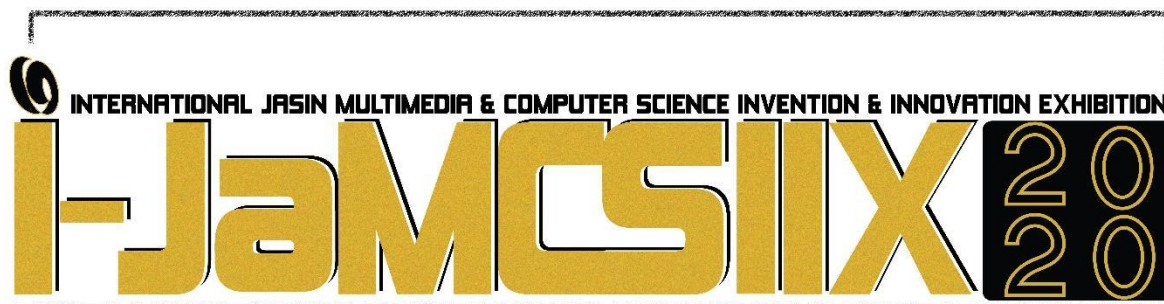
Tips section has been created to achieve the objective of conveying information. Tips will be created and shared by the trainer in this section. The trainer is able to view, modify, update, and delete the tips that had been created. As for the trainees, only viewing the tip is permitted. The event section consists of the information of all events such as the title of the event, date, time, and location. The event can only be created by the trainer and it can be viewed by all users of the mobile trainer organizer application.

6 CONCLUSION

Mobile Trainer Organizer app provides essential support to the trainer in managing their training and activities as well as support for the trainees. The components of the app can be suitably assisting the trainer and trainees as it has a common icon and the flow of the app smooth which ease them to use it. In the future, this app will be able to assist various types of users that exist in the world and could become a necessary app to be used. For future enhancement, it is suggested that all events that have been created can be sorted by criteria such as date or alphabet to make it easy for searching purposes. It is also recommended to conduct the usability and functionality testing on the developed mobile application.

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Modelling of Malaysia House Price Index

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ABSTRACT

In Malaysia, house price is considered high at a certain part of the country causing the lower and middle groups unable to purchase a house. The aim of this study is to study the trend of the House Price Index and to identify the suitable model of the Malaysia House Price Index. The data was obtained from the Valuation and Property Services department (JPPH), Department of Statistics Malaysia and Bank Negara. The data was collected over 10 years from 2010 to the first quarter of 2019. Box-Jenkins methodology is applied in determining the best Autoregressive Integrated Moving Average (ARIMA) model of the House Price Index (HPI) in Malaysia. The general finding of this study is that the HPI shows an upward trend for the past nine years but slightly drops in the first quarter of 2019. This study has found out that ARIMA (1,2,1) is the best model for the HPI since it has the smallest value of AIC, BIC and Hannan-Quinn.

KEYWORDS: House Price Index, Stationary, Box-Jenkins, ARIMA

1 INTRODUCTION

House is one of the important elements in basic human needs. However, one will consider the price of a house before purchasing it. This scenario happens because the offered price of a house is too expensive to be afforded by an average person. For that reason, some individuals and families choose to rent a house instead of buying a house since it will cost less. Consequently, many ready-made houses are not sold. According to [1], the price of residential properties is expected to continue to deteriorate over the next one to two years following the dumping of the unsold house in Malaysia which now stands at RM29.47 billion. As a result, the developer will suffer a loss since there are no home buyers. In a study done by [3], stated that the Malaysian housing market is overpriced as a result of fragmented and inefficient construction business systems. The government has taken an initiative by lowering the house price to reduce the number of unsold houses but the house price is still above the affordability of the low class and the middle class of household income level in some states such as Kuala Lumpur, Selangor, Sabah, Sarawak, and Penang. In order to help Malaysians to own a house, the sixth Prime Minister Datuk Seri Najib Tun Razak launched housing programs to help Malaysians solve this crisis as stated in the journal "Exploring the Elements of Housing Price in Malaysia", [2].

Moreover, the rapid development of Malaysia also contributes to the house price. Thus, the supply for the construction will also rise proportionately to the development of Malaysia. Forecasting price index would enable users to make important and appropriate decision to reduce the risk of loss. Therefore, the purpose of this study is to determine the best model of HPI in Malaysia.

2 OBJECTIVE

The objectives of this study are to study the trend of the House Price Index in Malaysia and to determine the best ARIMA model of HPI in Malaysia.

3 SIGNIFICANCE (S)

This study will give beneficial information for investors, home buyers and housing developers. As for the investors, a better investment plan that involves fluctuations of the Malaysian house pricing index can be done. The home buyers will make the right decision to reduce the risk of loss contributing to house prices. Thus a future planning can be made on the budget so that the buyer can afford to buy a house. As for the housing developers, the price of a house by considering a few factors that have a significant cost can be set.

4 METHODOLOGY/TECHNIQUE

4.1 Box-Jenkins Methodology

Box-Jenkins method is a widely-used process to find out the best model for a time series data. The Box-Jenkins approach is identical to the general ARIMA modeling. This method is used to fulfil the second objective which is to determine the best ARIMA model of HPI in Malaysia. The term ARIMA is in the short stands for the combination that comprises the Autoregressive Integrated Moving Average, model. The Box-Jenkins method is referred to as a stochastic and iterative process to select a standard statistical model. The three main stages of Box-Jenkins modelling are model identification, model estimation and diagnostic testing, and model application.

5 RESULT

5.1 The Overall Trend of House Price Index in Malaysia

This section presents the overall trend of Malaysia HPI from the first quarter of 2010 to the first quarter of 2019.

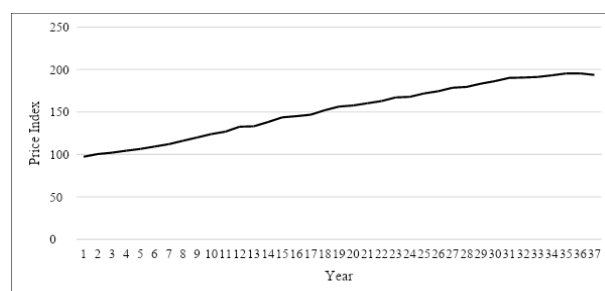


Fig. 1 Graph of Malaysia House Price Index (HPI)

Based on Fig. 1, the HPI shows an upward trend with a significant increase in HPI between 2010 and 2018. However, the HPI fell slightly in the first quarter of 2019. This also has been stated in The Star (2019) where HPI for the first quarter of 2019 dropped by 0.9 percent on a quarter-on-quarter (q-o-q) basis.

5.2 The Box-Jenkins Methodology

Before acquiring ARIMA (p, d, q) model, the p of AR, d (number of differencing) and also q of MA needs to be deduced. The 'd' in the ARIMA model can be obtained by performing the Unit Root Test (Table 1). Meanwhile, the p and q value can be obtained from the correlogram by identifying the AR in the partial correlation column and MA in the autocorrelation column.

Table 1: Unit Root Test after second differencing

Null Hypothesis: D(HOUSE_PRICE_INDEX,2) has a unit root Exogenous: Constant Lag Length: 2 (Automatic - based on SIC, maxlag=9)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.359388	0.0000
Test critical values:		
1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	
*Mackinnon (1996) one-sided p-values.		

Firstly, the unit root test at level is conducted but HPI is not stationary. The application of the Box-Jenkins methodology lies in the assumption that the data series is stationary. To be specific, stationarity means no growth or decline over time. As a result, the HPI variable is integrated into the first differencing and unit root test is applied. However, HPI still not stationary. Table 1 shows that the HPI is stationary at second differencing. As the probability shows that 0.0000 is less than level of significance which is 5%, this explained the data is stationary and there is no unit root detected in the data.

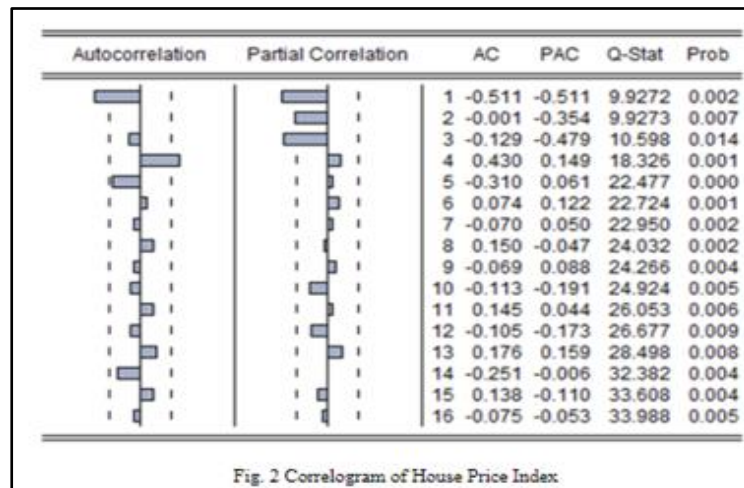


Fig. 2 shows the correlogram of the HPI variable up to 16 lags. The data is not stationary at level phase and also after the first differencing phase. Therefore, the data is then proceeding to second differencing. From Fig. 2, ACF and PACF refer to the column label autocorrelation and partial correlation respectively. It shows that ACF and PACF have significant spikes. Based on the PACF column, three significant spikes are seen at lag 1, 2 and 3. Therefore, AR is 3. For the ACF column, two significant spikes present at lag 1 and 4 hence it can be concluded

that MA is 2. There are five ARIMA models that are obtained from the correlogram which are ARIMA (3,2,2), ARIMA (2,2,2), ARIMA (1,2,1), ARIMA (2,2,1), and ARIMA (1,2,2).

Based on Table 2, the results show a summary of the five ARIMA models. A process to choose which model is the best need to be conducted. The process is done by comparing the AIC (Akaike's Information Criteria), BIC (Bayesian Information Criterion) and Hannan-Quinn Criterion. AIC, BIC and Hannan-Quinn criterion are important elements in choosing the best value of p and q where all the criterion's value needs to be the smallest out of all the models shown in Table 2. From the table, the smallest AIC is ARIMA (1,2,1) where the value is 4.0353. For BIC and Hannan-Quinn, the smallest value is 4.1686 and 4.0813 respectively. Both values are from the ARIMA (1,2,1) model.

Table 2 Summary of ARIMA model

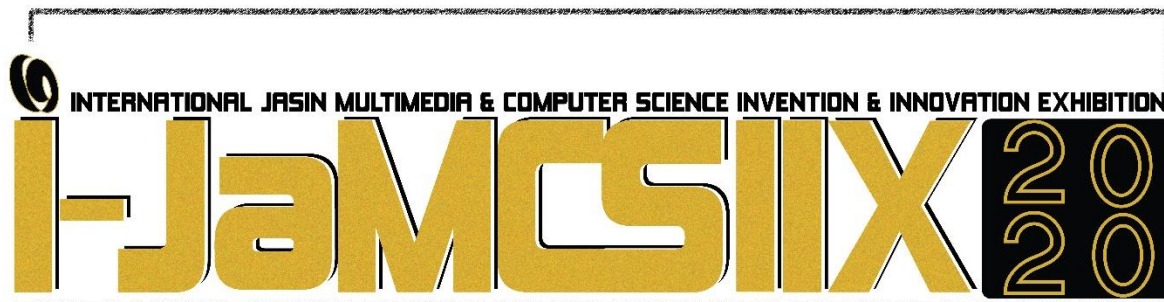
Model	AIC	BIC	Hannan-Quinn
ARIMA (3,2,2)	4.5952	4.7285	4.6412
ARIMA (2,2,2)	4.5674	4.7007	4.6134
ARIMA (1,2,1)	4.0353	4.1686	4.0813
ARIMA (2,2,1)	4.0570	4.1903	4.1030
ARIMA (1,2,2)	4.0428	4.1761	4.0888

6 CONCLUSION

This study employed Box-Jenkins method to produce housing price prediction model in Malaysia. The analysis has shown that ARIMA (1,2,1) is chosen as the best model to predict Malaysia HPI since the values of AIC, BIC and Hannan-Quinn is the smallest among all five models. For further research, it is recommended to include independent variables such as household income, consumer price index and type of house to produce highly accurate results.

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Phytochemical Screening, Total Phenolic Content and Antioxidant Activity of Leaves Extracts from *Mangifera indica* L. cv. Apple

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ABSTRACT

Mangifera indica L. cv. Apple (apple mango) is considered one of most important and economic crops of tropical fruits, it belongs to Anacardiaceae family which is cultivated worldwide as edible seeds and fruits, compound in medical, valuable timber and landscape interest. The purpose of this research was carried out to investigate the presence of phytochemical groups and antioxidant activity of the leaves of *Mangifera indica* L. cv. Apple. The extracts were found using maceration result and the phytochemicals were screened using various of chemicals tests. Total phenolic content (TPC) are important to measure the phenolic compounds in leaves extract as a potential of antioxidant activity. TPC was determined according to the Folin-Ciocalteu colorimetric method. The antioxidant activity was applied the 2,2-diphenyl-1-picrylhydrazyl radical scavenging capacity (DPPH) assay. Phytochemical screening on leaves of methanol extract revealed the presence of flavonoids, phenols, tannins, terpenoids, alkaloids, steroids, saponins, glycosides, coumarin and quinone. The methanol extracts of *M. indica* L. cv. Apple for leaves (4.427 mg GAE/g) were showed the highest TPC. The methanol extract of *M. indica* L. cv. Apple for leaves (64.80 µg/mL) significantly lower of DPPH radical scavenging activity IC₅₀. The result showed that *M. indica* L. cv. Apple for leaves plant is potent antioxidant property so they could be the rich source of natural antioxidants. This leaf of plant could be assigned as natural antioxidant and its be helpful to explore the biochemical profile and active compound identification in the field of pharmaceutical research.

KEYWORDS: *M.indica*, Anacardiaceae, phytochemical screening, antioxidant activity

1 INTRODUCTION

Apple mango is cultivar from *Mangifera indica* species that are originally located from coastline in Kenya and mostly in area of Malindi [1]. These fruits have greatly demand in export and import market especially in Kenya [2]. The entire fruit weight is about 397 g, diameter of length and width of fruit is 9.7 cm and 11 cm. Generally, the skin is smooth and thin, juicy yellow or white of flesh have excellent taste and texture where almost free from fiber. Also, Apple mango consists small or medium seed. The trees have simple leaves up to 0.3 m to 0.5 m length, leathery, glossy and colour turn to deep [3]. The fruit of Apple mango are composed essential sources which are vitamin A, C and folate, antioxidants, calcium, magnesium, phosphorus and potassium [4]. Plant parts have been used extensively to treat various ailment and has been proved to possess many biological activities such as antidiabetic, antioxidant, antimicrobial, radical scavenging and anti-inflammatory. *Mangifera* species are one of an abundant source of phenolics and flavanoids constituents. Therefore, the leaves of *M. indica* consists various classes of phytochemical constituents such as flavanoids, tannins, alkaloids, terpenoids, anthraquinones, saponins, cardiac glycosides and steroids [5]. The chemical compounds which are flavonoids and phenolic compounds that have a various of benefits as an antioxidant, hypo-allergenic, antidiabetic and anti-inflammatory [6]. The chemical compounds that act as antioxidant are phenolic compounds. That group of compounds are widely abundant in nature, especially in fruits and herbs that have ability to scavenging free radicals. DPPH method is a conventional method in testing the antioxidant. This method is a conventional method and has been used for determination of the activity of antioxidant compounds. With this background, present study was aimed to determine the phytochemicals and to evaluate the antioxidant activity is present from various extracts of *M. indica* L. cv leaves.

2 OBJECTIVES

The aim of this study was carried out to investigate the potential application of *M. indica* L. cv. Apple of leaves extracts by conducting the analysis on the phytochemical screening, total phenolic content (TPC) and the antioxidant properties of various solvent extracts (n-hexane, ethyl acetate and methanol).

3 SIGNIFICANCE(S)

This study can provide more information about phytochemical screening and antioxidant activity for cultivation of *Mangifera* species. Besides that, the result from antioxidant assay may be taken as an initial step to search for specific all agents for further applications. Many researchers are discovering new application and interested of beneficial by-product and contribute a positive environmental impact.

4 METHODOLOGY/TECHNIQUE

Plant collection and extractions

The leaves of *Mangifera indica* L. cv. Apple were collected in May, 2019 from Section 9, Bandar Baru Bangi, Selangor, Malaysia. The leaves of the plant were cleaned and washed. Then, the leaves were air-dried at a room temperature for seven days and cut into smaller pieces to make it easier for it to be grinded to produce fine powder sample. The grinded leaves (320 g) was successively extracted with n-hexane, ethyl acetate and methanol (1500 mL for each) for 3 days at room temperature in an orbital shaker [7]. The extracts were filtered and

concentrated under reduced pressure using rotary evaporator. The dried extracts were stored in a refrigerator until use [8].

Phytochemical screening

The leaves extracts were subjected to phytochemical screening for the detection of alkaloids, flavonoids, phenols, steroids, tannins, terpenoids, saponins, reducing sugars, coumarins and quinones using the standard qualitative procedures [9, 10, 11, 12].

Total Phenolic Content

The TPC were determined by Follin-Ciocalteu method with minor modification [13]. The absorbance was be measured at 765 nm using UV/Vis spectrophotometer against blank sample (methanol). The calibration curve was be plotted by preparing gallic acid and it was expressed as mg Gallic acid equivalent (GAE)/g of the extract. The analysis was done in triplicate and TPC value was reported as means \pm SD of triplicates.

Antioxidant activity

DPPH radical scavenging activity of leaves extracts was estimated as method described [14] with slightly modifications. A 3.8 mL of 50 μ M DPPH methanol solution (2.4 mg/120 mL) was added in 0.2 mL of sample solution in different concentrations and left in dark room for 30 minutes. The reaction mixture was measured at 517 nm by using UV-Visible Spectrophotometer and methanol was used as blank. The ascorbic acid was used as positive standard. The percentage of scavenging was calculated as follows:

$$\% \text{ Inhibition DPPH} = \left[\frac{A_{\text{DPPH blank}} - (A_{\text{sample}} - A_{\text{blank sample}})}{A_{\text{DPPH blank}}} \right] \times 100$$

All tests were performed in triplicate. Mean \pm SD of triplicates was reported as IC₅₀ values. Concentration of samples resulting in 50% inhibition on DPPH (IC₅₀ value) was determined by using Graphpad prism 6 software [15].

5 RESULT

The result obtained for the qualitative screening of phytochemical of crude extracts in the leaves of *M. indica* L. cv. Apple were depicted in Table 5.1. This study also confirms the use of organic polar solvent (methanol) in the preparation of leaves extract to yield better results as compared to n-hexane and ethyl acetate extracts. It revealed the methanol extracts in leaves of *M. indica* L. cv. Apple are presence the higher group of phytochemical compounds.

Table 5.1: Phytochemical screening of various extracts leaves of *M. indica* L. cv. Apple

Phytochemicals	Extracts		
	n-hexane	Ethyl acetate	Methanol
Flavanoids	-	-	+
Phenols	-	+	+
Tannins	-	+	+
Terpenoids	+	+	+
Alkaloids	+	+	+
Reducing sugar	-	+	+
Steroids	+	+	+
Saponnins	-	-	+
Coumarin	+	-	+
Quinones	-	-	+

+: present; -: absent

Based on Table 5.2 the methanol leaves extract was showed significantly high value of TPC (4.427 ± 0.019 mg GAE/g) and lower DPPH radical scavenging with IC_{50} value $64.89 \mu\text{g/ml}$. The extract of methanol showed higher scavenger activity of solvent used. In contrast, *n*-hexane was showed weak antioxidant capacity because does not show scavenger activity due to no phenolic content.

Table 5.2: Total phenolic content and IC_{50} values of DPPH radical on crude extracts of *M. indica* L. cv. Apple for leaves

Solvents	TPC (mg GAE/g extract)	IC_{50} ($\mu\text{g/mL}$)
<i>n</i> -hexane	1.531 ± 0.003	ND
Ethyl acetate	3.216 ± 0.022	174.90 ± 0.754
Methanol	4.427 ± 0.019	64.89 ± 0.930
Ascorbic acid	-	20.09 ± 0.508

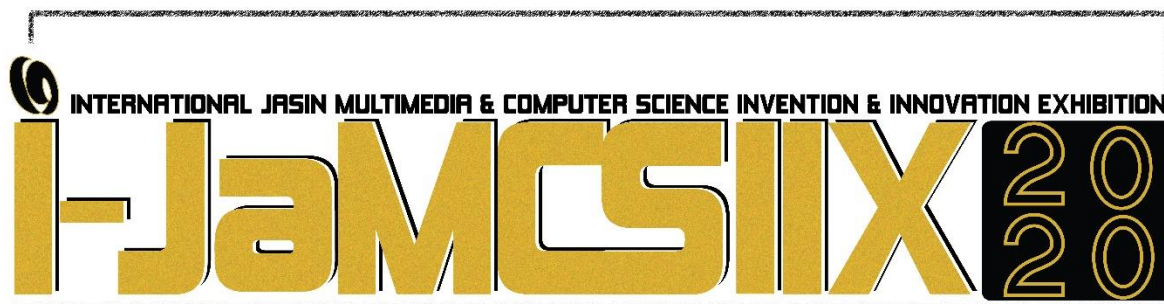
ND = not determined.

6 CONCLUSIONS

In this study, the assessment obtained was showed that the leaves methanolic extracts of *Mangifera indica* L. cv. Apple contains various classes of phytochemical constituents and a significant source of natural antioxidants. However, further investigations are required to isolate and identify the unknown compounds responsible for their antioxidant activities and their mechanism of action is necessary to better understand their ability to control diseases that have a significant impact on quality of life.

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Concrete Sludge of Batching Plant (CSBP) As Recycled Material in Concrete

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ABSTRACT

Key players of construction industries prefer to use ready-mix concrete as one of the supplied materials for their projects. In conjunction with this, production of fresh concrete from batching plants is increasing consistently as the development of construction industries. Unfortunately, more than 8 tons of fresh concrete waste can be produced and return to the batching plants. In addition, most of the batching plants dispose the concrete waste on the ground or discharging them at the landfill. Thus, this research aims in correlating the strength response to the contribution of Concrete Sludge of Batching Plant (CSBP) as recycled materials and additives in the manufacturing of concrete. In this study, the different replacement levels in percentage of CSBP which are 0%, 10% and 20% to cement weight were adopted. The compressive strength of concrete specimens was performed in accordance with the BS EN 12390: 2009. The result revealed that the compressive strength of the CSBP concrete with 20% cement replacement is observed to gain the strength comparable than those of control specimens by the value of 41.6 N/mm² at 28 days of age. It can be confirmed that CSBP concrete can be used as the potential of recycled material in the conventional concrete to support the green and sustainable approach in construction industries and to solve the issues of overloaded concrete sludge produce by batching plant.

KEYWORDS: Batching Plant, Concrete Sludge, Construction Waste, Recycled Material, Strength Performance

1 INTRODUCTION

In Malaysia, fresh concrete from batching plants commonly used for most construction projects. The production of fresh concrete from batching plants is in line with the increasing of construction development activities in this country. The increasing production of fresh concrete at batching plant, will keep increasing the amount of fresh concrete waste or as it is called concrete sludge. As the concrete sludge has a high potential to damage the environment, a method for the utilization of the returned ready-mixed concrete were presented throughout this study [1].

Toward this aim, an in-depth literature review was performed as a methodological approach. Thus, the main target during this research study is to create a new mix design concrete with Concrete Sludge of Batching Plant (CSBP). The CSBP will replace certain percentage amount of fine materials in common concrete mix design. The Uniaxial Compressive Strength Machine (UCS) will be used to measure and compare the compressive strength value of normal concrete with new concrete with CSBP. According to the compressive strength result, the potential application of concrete with CSBP will be recognized for civil engineering purpose. Then, the issues of overloaded sludge at the landfill will be reduced.

2 OBJECTIVE

The objective of the research is to determine the compressive strength value of concrete that contains CSBP. Hence, to identify its potential to be used in civil engineering industries.

3 SIGNIFICANCE (S)

The concrete mix is designed as a conventional concrete because through the comparison that have been made, it shows the potential of the recycled concrete to be use in any of the civil engineering construction industries as a green and sustainable approach [2]. Furthermore, this study will help the batching plant to reduce or to prevent the discharge of concrete sludge to the landfill and yet to expand the management of construction waste environmentally.

4 METHODOLOGY/TECHNIQUE

Study in 2015 shows that concrete that contain 15-30% of recycled fresh concrete waste is ideal for producing normal strength concrete [3]. Thus, in this study, 10-20% of fine aggregates was replaced as the recycle aggregates and the strength was compared with the normal concrete [4]. The concrete mix also is designed as a conventional concrete which to be achieved 30 N/mm² of compressive strength at the age of 28 days because through the comparison that will be made, it can show the potential of the recycled concrete to be use in any of the civil engineering construction industries as a green and sustainable concept.

5 RESULT

The development of the compressive strength of concrete mixtures containing different replacement level of CSBP is illustrated in Fig. 1. On the day 1, the 10% CSBP concrete shows a growth of compressive strength compare to the 20% CSBP concrete. However, through days 7 until days 28, the compressive strength of 20% CSBP produces similar value compare to the control sample. On the other hand, 20% CSBP concrete has achieved its design compressive strength as early as days 7. The compressive strength at days 28 for 10% CSBP concrete was 37.3 N/mm² compare to the 20% CSBP concrete which was 41.6 N/mm². The presence of 10% - 20% CSBP produces a significant development of strength and 20% CSBP achieves the highest rate of compressive strength and comparable with control mix up to 28 days of curing by the value of 41.6 N/mm². This result shows good performance for the incorporation of CSBP in concrete mixes that might be attributed to the high value of pozzolanic reactivity of CSBP.

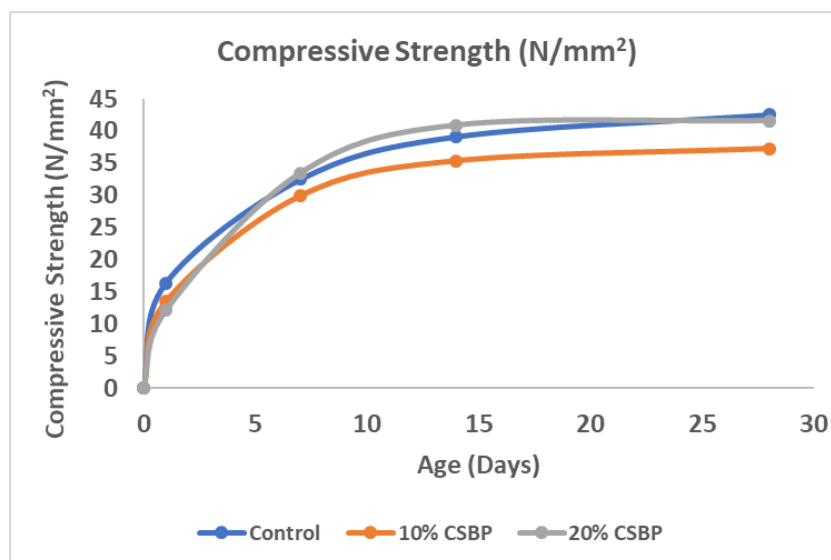


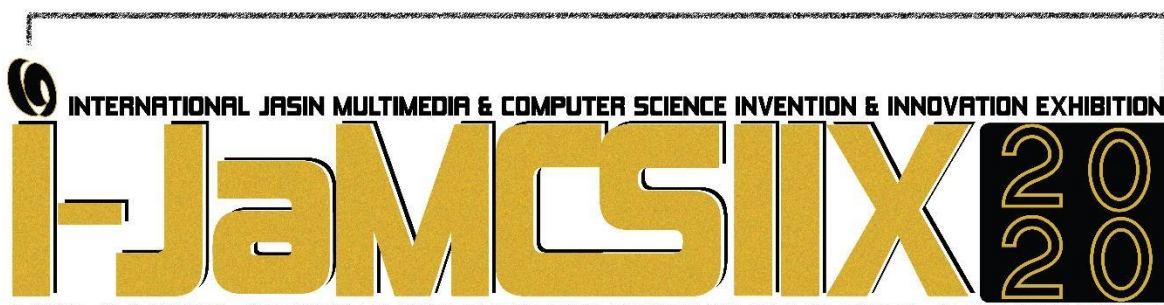
Fig. 1: The Compressive Strength Development of Concrete with CSBP Content.

6 CONCLUSION

In conclusion, the replacing proportion of cement with CSBP up to 20% is found to be a factor towards compressive strength. By blending of CSBP, concrete mix exhibited favourable and equivalent compressive strength than those of control specimens. In addition, the CSBP can be use as the potential of recycled material in the conventional concrete to support the green and sustainable approach in construction industries. Therefore, the selection of suitable methods of recycling the waste concrete sludge from batching plant can save and enhance the sustainability of the overall environment and affect society in a good way.

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Bijak Peribahasa : An Adventure Game In Learning Malay Proverb

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ABSTRACT

Bahasa Melayu is one of the core subjects that students need to pass in Ujian Penilaian Sekolah Rendah (UPSR). From the preliminary study, the findings showed that students find it hard to memorize the Malay proverb and its meaning. Moreover, students only learn Malay proverbs during class sessions and only memorize for exams without understanding the meaning. The purpose of this project is to design and develop game-based learning applications for UPSR students in learning Malay Proverb. The project was implemented as a Game-based Learning Model as a guideline to develop the application, which involves nine factors including game goal, game fantasy, challenge, game mechanism, sensation, interaction, freedom, game value and mystery. The Game Development Life Cycle Model (GDLC) was implemented as a methodology in this project. Findings of evaluation shows that the game receives 96% level of agreeability as response by the users of the game. Future work for this game is to develop this game on mobile platform, improve by adding multi-player, provide high score for players and enhance the contents of the game.

KEYWORDS : Game-based learning, Malay proverb, adventure game, Bahasa Melayu, primary school student.

1 INTRODUCTION

In Bahasa Melayu, Dewan Bahasa & Pustaka (2017) defines proverb (peribahasa) as bidalan, pepatah, verses or group of fixed words and have a particular significance. Proverbs in Bahasa Melayu are wonderful components to convey advice, Malay teaching and moral qualities. Proverb is a basic component in the Bahasa Melayu that turn out to be progressively productive and viable.

Based on the Kurikulum Standard Sekolah Rendah (2012), proverbs include simpulan bahasa, perumpamaan, bidalan and pepatah that are need to be taught in Bahasa Melayu (Mohd Mahzan Awang, Noor Azam Abdul Rahman, Noraziah Mohd Amin, & Abdul Razaq Ahmad, 2015). This is because the proverb is a contributor to good writing. Students who are less interested by the instruction of proverbs will experience issues tending to the subject and after that giving "bad result" which is low marks and weak in writing (Arni Johan, 2012).

Numerous past investigations have shown that learning inspiration and efficiency can be improved through game-based learning (Liu & Chen, 2013). Video games can give students a chance to experience ways for discovering that stress immersion in a training, supported by structures that lead to mastery, professional skills, and innovative thinking (Admiraal, Huizenga, & Akkerman, 2011). Research published by University of Rochester neuroscientists C. Shawn Green and Daphne Bavelier, (2003) suggests that playing video games has the beneficial outcome of improving student visual specific consideration. Computer games are not the foe, yet the best open door that need to connect with student in genuine learning (Admiraal et al., 2011). The consolidation of game into learning process is frequently more viable than customary showing techniques in upgrading learning inspiration, dynamic interest, and focus among understudies likewise diversions can improve the social aptitudes of understudies just as improve their abilities in comprehension and tackling issues (Liu & Chen, 2013).

From a preliminary study, the findings showed that students find it hard to memorize the Malay proverb and its meaning. Students mostly memorize the Malay proverb without understanding the meaning which is hard for them to keep memorize the Malay proverb. Students have difficulty to understand the proverbs well because for the students the proverb contains abstract meanings also phrase that have never been heard today that are hard to memorize (Arni Johan, 2012). Statistic results found that 12.5% of the participant strongly stated that they have never used proverb in their essay and 93.8% have mixed feelings on whether they should use proverb in their essay or not.

Based on the problem discussed, there is a necessity to improve the Malay proverb learning. This project is to design and develop game-based learning applications for UPSR students in learning Malay Proverb with the aim of learning Malay proverb not only during school hours but also continued beyond school hours as well. Students can play the games and practice the Malay proverb at the same time.

2 OBJECTIVE

The project has three main objectives. The first objective is to design a game concept of game-based learning applications for UPSR students in learning Malay Proverb. Next is to develop a game-based learning application on learning Malay proverb for UPSR students. Lastly, to evaluate the usability of learning Malay proverb via desktop game application.

3 SIGNIFICANCE

The significance of this project is to help the UPSR students to learn Malay proverbs by increasing their understanding about the meaning of the Malay proverb. Students can fill their free time by playing game that test the player's knowledge of the Malay proverb. In this way, indirectly students can learn the Malay proverb outside school hours. The content of the game will focus on learning proverb and their meanings based on the textbook syllabus. This project will include image, animation, sound and text which can make the game more interesting and players will be excited to learn Malay proverb.

4 METHODOLOGY

Game development life cycle (GDLC) is a guideline which encompasses the game development process (Ramadan & Widyani, 2013). The proposed GDLC consists of six

phases: initiation, pre-production, production, testing, beta, and release. The proposed GDLC takes the iterative approach to allow for a greater degree of flexibility in the development process towards changes. The GDLC product is evaluated by 5 usability quality criteria that are fun, functional, balanced, internally complete and accessible to deliver a good quality game (Ramadan & Widyani, 2013).

A. Initiation

The first phase in the Game Development Life Cycle is Initiation. Initiation is the first step to create a rough concept of what kind of game to be created. There are important sub processes involved in this phase which are building a story and script, and feasibility study.

A preliminary study has been conducted to obtain more information and data about this project. The survey manages to gather the data of 30 respondents through distributing a questionnaire and obtain 1 data from respondents through interviewing.

B. Pre-production

Pre-production involves the making and updating game design and creating game prototypes. Game design focuses on defining storyline, mission, challenge and reward.

C. Production

In the production phase both the actual back-end and front-end programming is done, game assets are created and merged together. To create a game, the function is supported using software and hardware requirements. After deciding the type of game to develop, software and hardware requirements need to be considered.

D. Beta

Based on the GBL design model, there are 9 elements to be evaluated which are game goals, game fantasy, challenge, game mechanism, sensation, interaction, freedom, game value and mystery (Y.-R. Shi & Shih, 2015). The target participants involved for the testing are standard 3 until standard 5 of Sekolah Kebangsaan Jasin, Jasin, Melaka.

Each question will be scored from 1 to 5, a scale between strongly disagree to strongly agree about the game. The result from the questionnaire will be summed up to the score received. Then, the score would be averaged according to the amount of questions for each factor.

5 RESULT

Table 5 Mean of each dimension

Factor	Total Mean
Game goals	4.84
Game Mechanism	4.80
Interaction	4.89
Narrative	4.78
Sensation	4.73
Game Value	4.63
Challenge	4.89
Game Fantasy	4.73
Flow	4.97
OVERALL MEAN	4.81
Percentage of overall Mean	96%

Table 5 shows the result of the total mean of each factor that is calculated from the averaged value of items from each respective factor. The result was obtained from the survey conducted by students in standard 3 to 5 of SK Jasin. The overall total mean value is used to determine the result of the usability evaluation based on game-based learning. The overall average from the total mean is 96%, which shows the level of agreeability as response by the user of the game. From the result, the project's objective is to evaluate the usability of learning Malay proverb via desktop game application.

6 CONCLUSION

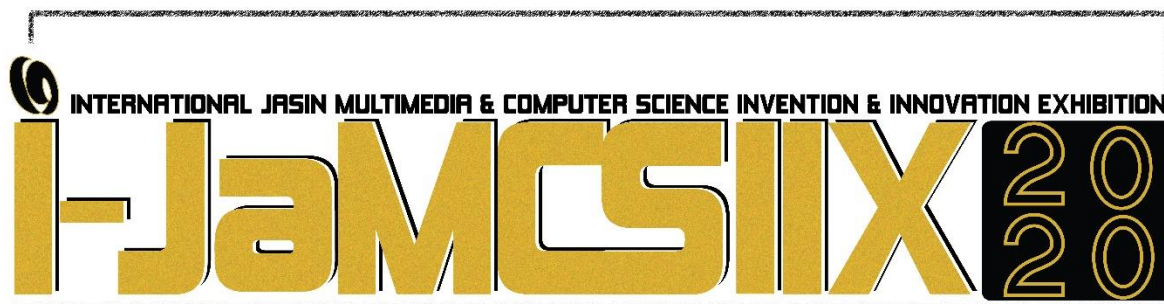
Game-based learning is a very effective tool that is yet to be utilized to its full extent. Education today works in a way that the knowledge is forced onto the learners instead of creating a learning experience that they would enjoy and remember better. By creating this game-based learning, players will be more excited to learn more.

Bijak Peribahasa game also successfully developed for students to learn Malay proverb and proven by the evaluation result that players are able to control, learn and understand the goal of the game. Player also can easy to memorize the Malay proverb by animation to illustrate the Malay proverb, example sentences for each Malay proverb and game quiz which make them want to learn more where is include 9 element (game goals, game mechanism, interaction, narrative, sensation, game value, challenge, game fantasy and flow) to make the game more interesting.

Bijak Peribahasa is an adventure game-based learning program focused on learning Malay proverbs which evaluate the usability of this game via personal computer. The limitation of this game been found out in order to make improvement to this project to be more functional than before such as by developing on mobile platform, adding multi-player, providing a high score and enhancing the content of the game.

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Automatic Gas Detection System (AGD System)

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ABSTRACT

As we can see from social media and news, there are many accidents happened due to Liquefied Petroleum Gas. There are also too many losses from these accidents in term of damages, injuries, and even death. Thus, a system that prevent these dangerous gases from leaking has been innovated in order to improve the safely of people and environment. This system is called Automatic Gas Detection Equipment System (AGD System) that functions to alert by producing a sound and a red light to warn if there is any leakage of dangerous gases. It also notified the owner through their smartphone by sending a push notification. This system can detect these gases and prevent from any critical accidents from happening. Besides, this system used lowers power and easy to use. The main targets are those people in a residential area, restaurant, laboratory and factory. AGD system should be commercialized because it can bring a lot of benefits in general.

Keywords: gas leakage, AGD system, Liquefied Petroleum Gas

1 INTRODUCTION

Gas is one of the most important things especially in daily works in houses, industries, education and tourism. The common gas that people used is called LPG (Liquefied Petroleum Gas) because it is cheap. However, it can bring negative impact to environment and people's health. It can also lead to extreme damages. This leakage happens due to the fact it is a flammable material if exposed to air and it can increase the thickness from 2% to 10% [1]. The gas that leaking is heavier in term of its thickness and it is harder for it to go through walls of a building [2]. Therefore, it is important to prevent it in early stage by using this system [3,4]. This research is to discuss about a system that can detect gas leak which is known as Automatic Gas Detection Equipment System (AGD System). There are many benefits of using this system. For example, it is eco-friendly and suitable to be used in a kitchen, lab, and factory. Lastly, it is simple to use and affordable for consumers.

2 MAIN COMPONENT

Arduino UNO functions as a signal receiver and it sends information to the alarm and LED. Sensor Gas MQ2 is a tool that can detect any gases such as LPG, butane, methane, alcohol and hydrogen. It can alert people if there is a gas leak in a building. The buzzer is a transitional item that makes the warning sound. This system also functions based on the Arduino board. LED will produce a monochromatic light from green which means safe, to red which means unsafe.



Fig. 1 Arduino UNO



Fig. 2.Alarm



Fig.. 3 LED light



Fig.. 4 Sensor Gas MQ2

3 HOW IT WORKS

Based on the chart below, AGD System functions when the sensor gas MQ2 detects any gases in a building. Then, it will send a signal to the Arduino board. A red light and an alert that sounds like a moving fan will indicate that there is a gas leak. All these processes happen automatically from the output program from the Arduino system. If the detected level of gas is low, the alarm will not go off. It is also can communicate wirelessly through phone. In case of there is no one around, it can send a push notification through phone.

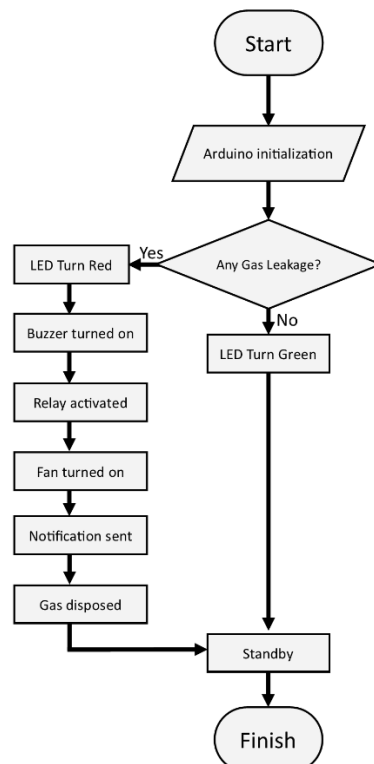


Fig. 5 Flowchart to detect the presence of gas

4 RESULTS

After testing using sensor gas MQ2 in a gas leaking environment, the measurement results are obtained as shown in Table 1.

Table 1: Results for sensor gas MQ2

No.	Condition	Data
1.	No gas exists	0
2.	Gas exists	30-1022

From Table 1 it shows the data reading gap between the presence of gas released through the Arduino board. Zero-value data readings indicate that there was no gas present in the area while readings obtained in gaps 30-1022 indicate that gas was present in the area.

When the components are connected and sensor gas MQ2 is being activated, the computer will display the output program from Arduino IDE application to monitor the gas leakage situation and it is shown in Fig. 6.

The screenshot shows the Arduino IDE serial monitor window for a COM4 (Arduino/Genuino Uno) connection. The window displays a series of sensor readings. The first two lines show 'digital value = 0' and 'analog voltage = 0.00'. Subsequent lines show 'digital value' increasing from 30 to 1022, with 'analog voltage' increasing from 0.15 to 5.00. The window includes a 'Send' button, an 'Autoscroll' checkbox (checked), and dropdown menus for 'No line ending' and '9600 baud'.

```

digital value = 0  analog voltage = 0.00
digital value = 0  analog voltage = 0.00
digital value = 30  analog voltage = 0.15
digital value = 66  analog voltage = 0.32
digital value = 171  analog voltage = 0.84
digital value = 275  analog voltage = 1.34
digital value = 331  analog voltage = 1.62
digital value = 400  analog voltage = 1.96
digital value = 459  analog voltage = 2.24
digital value = 475  analog voltage = 2.32
digital value = 482  analog voltage = 2.36
digital value = 502  analog voltage = 2.45
digital value = 517  analog voltage = 2.53
digital value = 543  analog voltage = 2.65
digital value = 588  analog voltage = 2.87
digital value = 595  analog voltage = 2.91
digital value = 598  analog voltage = 2.92
digital value = 736  analog voltage = 3.60
digital value = 939  analog voltage = 4.59
digital value = 974  analog voltage = 4.76
digital value = 998  analog voltage = 4.88
digital value = 1014  analog voltage = 4.96
digital value = 1019  analog voltage = 4.98
digital value = 1022  analog voltage = 5.00
  
```

Fig. 6 Programming results from the Arduino IDE application

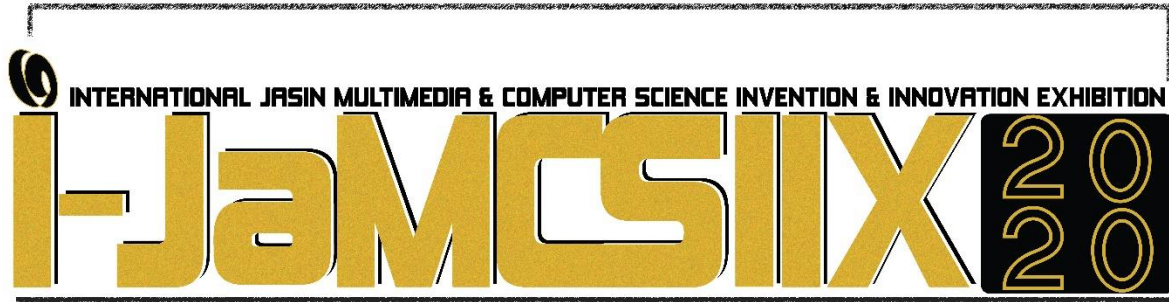
Digital value as shown in Fig. 6 above shows the concentration of gas when it is detected by the sensor gas MQ2. When the Digital Value get bigger it shows the gas concentration is higher. Digital reading value in the ranges from zero to 400 is considered within the normal level due to the situation in the surrounding air where it has a gas but in a small quantity, while the number of value 400 up to 1022 indicate the gas concentration is at dangerous level.

5 DISCUSSION AND CONCLUSION

In general, this AGD system can detect a gas leak efficiently. It also gives a lot of benefits and positive impacts to consumers because it can be used to detect any leaking of dangerous gases [5].

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Detection and Recognition of Broken Character in Car Plate Image

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ABSTRACT

In Malaysia, there are many cars that have a broken character on their car plates. This case affects the process of recognition of the car plate especially when any unexpected and dangerous situation such as accident and car robbery. In literature, there are some researches on broken character reconstruction and reconnection on a different kind of application which are vital for character recognition system. Therefore, this study is concerned to develop a tool with recognition algorithm that able to detect the broken character on car plate by using Template Matching. Two type of approaches which are correlation and similarity measure are measured in Template Matching. In this study, a car plate image with broken character is segmented using Connected Component Labelling. Then, the process of character relocation is completed before the detection and recognition process using Template Matching. Results for both approaches are shown for measurement purposes. As conclusion, the tool using the recognition algorithm is suggested to be an alternative in the area of character recognition in car plate to assist in the recognition of the broken character. This study is significant due to its importance in various real world applications such as Road enforcement system, police traffic control, parking ticketing system, or hometown security management.

KEYWORDS: Template Matching, Connected Component Labelling, Correlation, Structural Similarity Measure

1 INTRODUCTION

System of car plate detection and recognition system can be called as automatic license plate Number Recognition (ALPNR), Car Plate Number Recognition (CPNR) and Automatic Vehicles License Plate Recognition (AVLPR). In Malaysia, CPNR is being used widely in order to monitor a lot of traffic problems. As mentioned in [1], there is a lot of areas that CPNR can be applied, for example, security control of restricted areas, traffic law enforcement, congestion pricing, and automatic toll collection. These kinds of problems would be easier with the presence of the CPNR system so that it can reduce the intervention of the human factor and able to condensing the processing time to solve the problem as well. Reference [2] had developed an interesting system by using the concept of CPNR for the parking system.

However, by referring to [3], they identified that there are possibly some challenges to proceed with the CPNR process. For example, the plates may be covered by dust, shaking images, low density of light, tilted character, and broken character. All of these problems may defect the process of CPNR because of the unsuitable procedure that cannot adapt to the problems used in the recognition system. Therefore, this study interested to do research more about one of the challenging factors which is broken character on the car plate to ensure the problem can be solve using CPNR.

In addition, the research about types of broken character such as this study is very limited. However, there exists some study for a broken character in different areas such as on documentation [4], ingots [5], and handwritten [6]. Yet, it seems like it has a common problem where the study is more on the method of re-join the broken character to form the original character. It differs from the focus of this study, where it concentrates on the broken car plate that difficult to predict the original character by human vision and cannot be reconnected.

2 OBJECTIVE

The objective of this study is to develop a graphical user interface (GUI) to recognise a broken character on the car plate image. The GUI able to detect the existence of broken character and produce a list of possible character for the broken one.

3 SIGNIFICANCE

This study has many significance in many applications due to the development of technology. General problems relating to car plate for system recognition can be minimized. Moreover, real world applications such as Road enforcement system, police traffic control, parking ticketing system and hometown security management also sometimes need to deal with the problem of broken character on the car plate.

4 METHODOLOGY

The interface of GUI is developed using MATLAB. Fig. 1 shows the interface of detection and recognition of broken character plate number. There are three main axes in this GUI, the left axis is used to display the original image, the middle axis is to display the number plate area and the right axis is to display the detection of broken number plate.

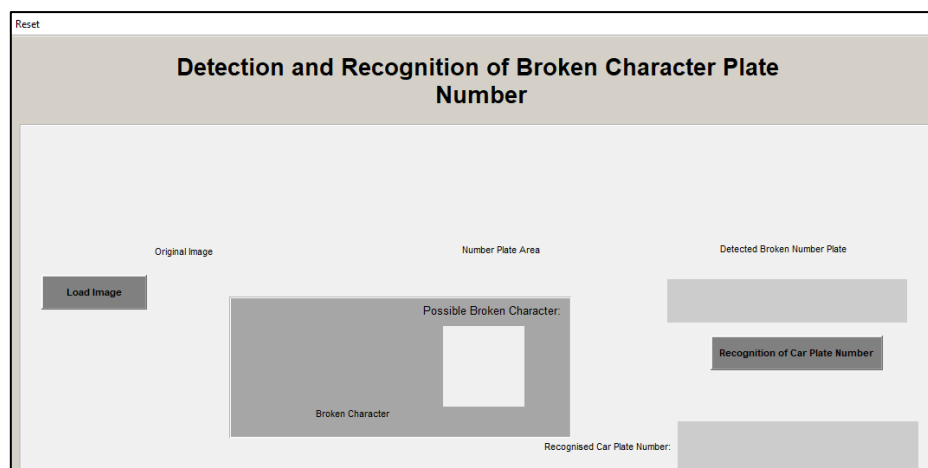


Fig. 1 Interface of System

There are two buttons that are to load image and recognise of car plate number. The first button is to load original image before further process and the second button is to pre-process the image, detect the broken character and produce message whether the image consists of broken or non-broken character. Then, a list of possible broken character is produced.

5 RESULT

A set of simulated data of broken and non-broken car plate image has been tested on the GUI. Fig. 2 shows the result of detection and recognition for a car plate with broken character. It can be observed that a green box appear to indicate the broken character and a message of “There exist a broken character” is appear in the GUI with a list of possible broken character.

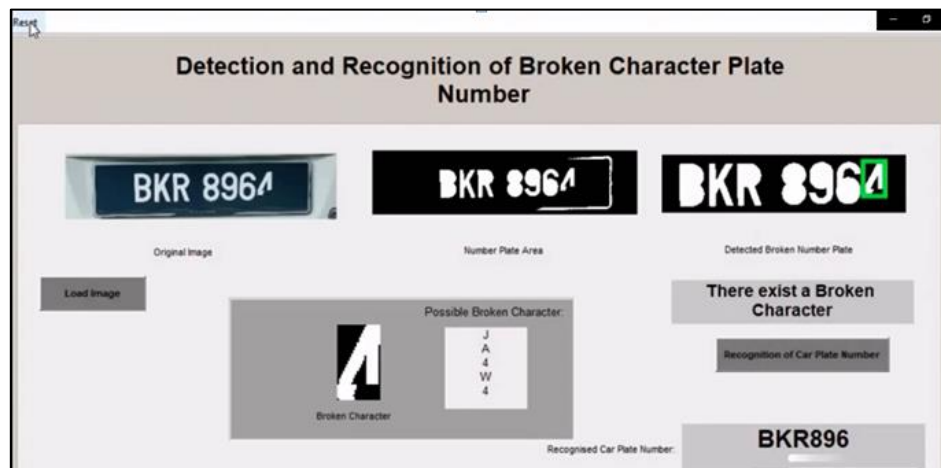


Fig. 2 Result of Car Plate Image with Broken Character

Fig. 3 shows the result of detection and recognition for a car plate with no broken character. It can be observed that a message of “There is no broken character” is appear in the GUI and a correct plate number is appearing.

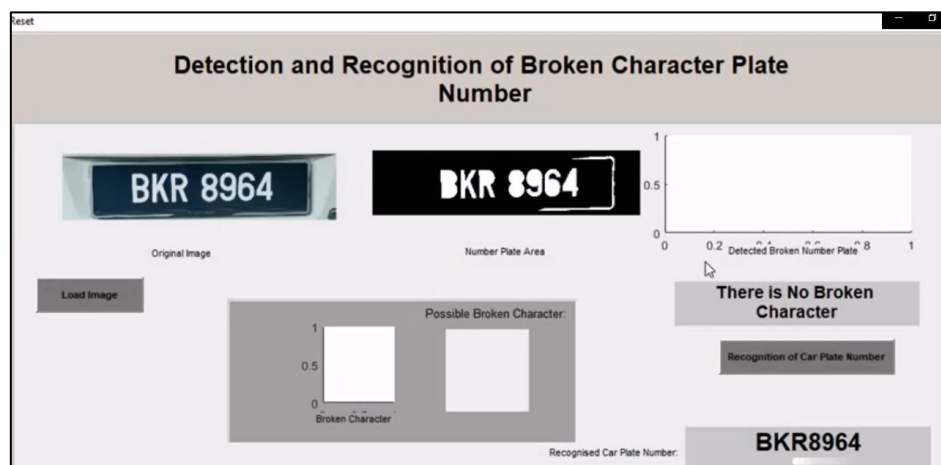


Fig. 3 Result of Car Plate Image with Non-Broken Character

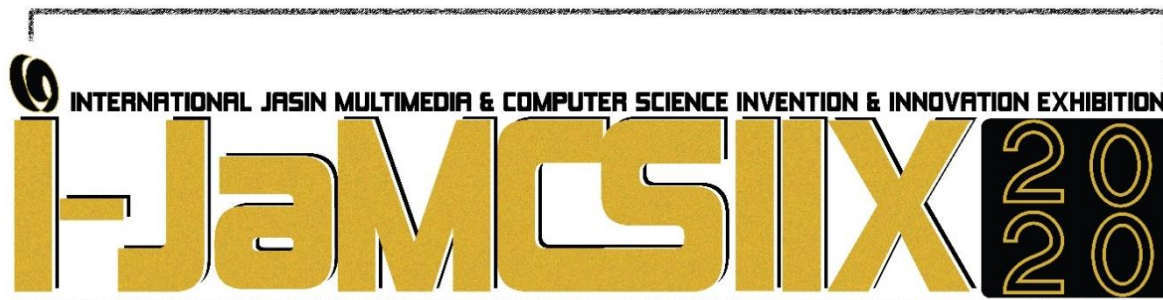
The GUI has been successfully observed and demonstrated in a simulated environment however it has not been tested in real environment with real dataset.

6 CONCLUSION

As conclusion, the paper contributes on the area of law enforcement by transportation authorities, AES, smart parking and tool collection system that able to detect and recognise the broken character in car plate for security purposes. For future, it is recommended that the methods of neural network and deep learning can be used to produce better results in terms of accuracy.

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Video Assignment: Integration of technology embrace learning in media news reporting

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ABSTRACT

Compare to conventional learning chalk and talk in classroom, it is adequately to expose the students with comprehensive and innovative learning tool. Although students guided by the lecturer during the class, extra, through video assignment students perceived greater creativity in conducting their own research about news reporting. This study aims to understand the role of technology embrace learning in media news reporting through video assignments. In-depth interview was done and recorded digitally with Ryan Chua, Programme Coordinator at Pusat Komunikasi Masyarakat (KOMAS) with regards to the issue related to newspaper coverage and its role in maintaining racial harmony in Malaysia. Students adopting video recording and editing as a versatile learning tool. Further, results demonstrated that students were clearly preferred to engage more with video assignment because its more convenience for them compare to writing traditional papers. Other than that, video recorded convey the visual, style and delivery where it can help the students to produce interesting outputs. Lastly, it is recommended that video assignment is used extensively inside and outside the classroom where it adequately to expose the students with comprehensive and innovative learning tool.

KEYWORDS: Innovative Learning, Video Assignment, News Writing, and Communication

1 INTRODUCTION

Other than using conventional learning chalk and talk in the classroom, integrating video assignments into courses is adequately in exposing the students with a comprehensive and innovative learning tool. Although students were guided by the lecturer during the class, through video assignment students become more creative in conducting their own research in learning, which in this study, related to news reporting.

With the extensive growth of media and technology in news, students too need to adapt to the latest technology when communicating information in learning platforms, so video assignment is seen as an effective tool to achieve this. Hence, it will give them more freedom to record anytime, anywhere and enable the students compelling and report the news to a visually oriented diverse audience [2]. New methods in creating and distributing content have come not only to affect news reporting methodologies, but also to define both form and structure of news stories [3].

On the other hand, adopting video recording and editing as a learning tool, we can see this method as one of the most important facets in research-based learning because it encourages student engagement to be more creative in producing their assessment. The creative task of using moving images and sound to present a topic is indeed engaging and insightful but with adding these techniques allows students to get a range of transferable skills in addition to filmmaking itself. These include research skills, collaborative working, problem solving, technology, and organisational skills [1].

2 OBJECTIVE

The purpose of this study is to understand how technology embraces learning in media news reporting through video assignments.

In compared with conventional learning, video assignment also consists of learning purpose, objective and problem solving which provide students with a specific question. Whether they are working in the context of teamwork or individual assignments, students are required to demonstrate academic knowledge and abilities, and to connect course materials, readings, and independent research to address a concrete problem by critically engaging, reflecting, evaluating, and presenting their own analysis and view on the subject matter [5][7].

This method will help students to learn more competently. Armed with a goal to turn information into audio-visual materials by highlighting important content, this video assignment served as a flexible delivery to make the finding of news reporting more interesting.

The key difference is that video assignments allow a visual dimension of presenting ideas, concepts, and connecting thoughts and materials in different ways, allow students to extend their comfort zone and thereby learn more effectively [6].

3 SIGNIFICANCE (S)

The video assignments embrace learning in media news reporting. It engages students in new and innovative ways, with the technology they love, the learning increases manifold and learning beyond the classroom. Creating videos to explain topic understanding, make in-depth visual projects, learning new concepts and ways of thinking are important parts leading to better development by turning the news reporting more depth than text alone.

4 METHODOLOGY/TECHNIQUE

The study required students to conduct the interview session using a list of pre-established questions to probe responses from the informant in expressing his view and uncover rich details regarding the topic.

Using in-depth qualitative interview with main respondent, Ryan Chua, Programme Coordinator at Pusat Komunikasi Masyarakat (KOMAS) with regards to the issue related to newspaper coverage and its role in maintaining racial harmony in Malaysia. Students adopting video recording and editing as a versatile learning tool. The interview session was done face to face with students applying videography as the main tool in conducting the study.

Experimenting on the application of video recording too offered new space for creativity and empowering the student's interest to move outside their comfort zone. They can then look at the challenge rather than the expectations to convey the desired knowledge, leading to successful results.

5 RESULT

The study found that the technology embraced learning in media news reporting through video assignments in various ways. It was found out that students engage more when they embark with video assignment. Students are found to be more attracted to conducting research on news reporting when adopting video recording as a tool in news gathering, editing and presenting their information. It is more convenient for the students as the video recording device allows capturing, editing, producing and presenting facts in an interesting, digital form as an alternative to writing traditional papers.

Other than that, video recorded conveyed the visual, style and delivery to meet the objective of the study, which allowed to capture body language such as voice tone, and gestures such as body movement, facial expression and other nonverbal cues which help the students to produce interesting storytelling outputs while keeping an accurate report.

Even though students do face some problems due to lack of experience with movie-making skills, the students are being positive and excited to produce video assignments as this enables them to compile their own materials, blend it with audio-visual materials and add pictures, animation, music as well as sound effects.

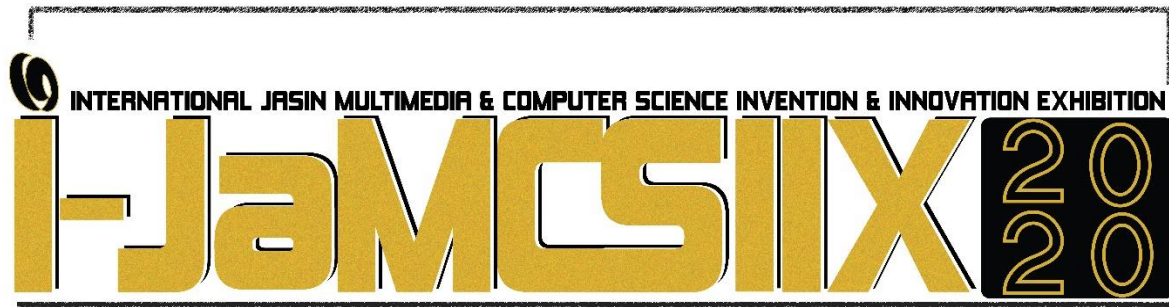
Video based materials boost student creativity and cooperation. Access to video can help motivate students and create a distinctive context for their learning experience. Combination of video and text makes sense, as it was believed that video is effective for more than simply showing dynamic processes. Video itself is a tool for learning that when properly applied obtains extensive benefits. It's also a medium for collaboration, and a language unto itself that is of universal appeal [4].

6 CONCLUSION

In conclusion, video assignment apparently supports students in a holistic learning approach and it can be much more interesting when it be introduced to the subjects, issues and materials outside the formal readings. A video is more than presenting or explaining the content but it's also stimulate student interaction with a concept. The variety of how video assignments are outlined in a program of study can promote the development of individual skills and marketability. Lastly, it is recommended that video assignment is used extensively inside and outside the classroom where it adequately to expose the students with comprehensive and innovative learning tool.

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Zakat.X.kit

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ABSTRACT

Zakat.X.Kit is a mobile application (apps) that provides a platform for users to explore basic and extended zakat knowledge. This apps was initiated due to lack of awareness of zakat knowledge among youngsters, especially students in higher learning institution. Thus, the objective of this zakat kit is to enhance the level of zakat knowledge through attractive virtual interactive teaching method by providing notes, tutorial, educational games and online quizzes. It is a pioneer of its kind in zakat education for teaching and learning purposes. Users of the zakat kit will learn about various types of zakat wealth which includes traditional and modern wealth as well as principles and conditions of zakat obligation. ***Zakat.X.Kit*** able to attract potential users in exploring the zakat information and in turn will contribute to an increase in the number of zakat payers. Further, this apps can benefit various level of users, not only to the youngsters but also to public as a whole.

KEYWORDS: Zakat, Wealth, Interactive Teaching, Virtual

1 INTRODUCTION

Education today is very challenging especially among young generation. Various teaching tools and materials required to be designed in an effort to deliver the knowledge and facilitate students in understanding a learning subject. The introduction of Zakat education using virtual interactive teaching method seem to be attractive among students in the higher learning institutions today to achieve the learning goal as a whole. The development of ***Zakat.X.Kit*** as a mobile application to provide Zakat knowledge to the users is considered as one of the strategy in modern education that focusses on student's independent learning. Using the application as an alternative to traditional method, this tool is beneficial to the users (i.e. students) as it is convenience to be used with digital technology, can be accessed anywhere and anytime, promote proactive learning in order to enhance the student's understanding who learn this course [1].

The usage of mobile application in seeking more knowledge on Zakat information could increase its awareness among millennial too. This is supported by a study conducted on the analysis and issues of Islamic apps [2] whereby Islamic apps were found to have the largest downloads and frequent use among modern Muslim groups as they find it more feasible and enables them to acquire Islamic information faster than any other source. Since millennial today have grown up with technology as a central part of their lives, thus this approach is found to be more interactive and stimulating for the millennial generation to use as a learning tool either to replace or as a complementary to the traditional lectures [3]. Hence, the development of *Zakat.X.Kit* apps able to fulfil this requirement to cater the current digital needs in Muslim society. This paper is organized as follows whereby Section 1 addresses the introduction or background of the study. Section 2 addresses the objective of the study. Section 3 emphasizes the significance of the study. Section 4 will explain on the methodology of apps development and data collection and the main result of this apps will be discussed in Section 5. The last section concludes this paper.

2 OBJECTIVES

The objective of this paper is to enhance the level of zakat knowledge via attractive virtual interactive teaching method by providing notes, tutorial, educational games and online quizzes. *Zakat.X.Kit* is known as a pioneer method used in zakat education for teaching and learning purposes. The users of *Zakat.X.Kit* particularly students will learn about various types of zakat wealth which includes traditional and modern wealth as well as principles and conditions of zakat obligation. *Zakat.X.Kit* also able to attract new potential users among modern Muslim community in exploring more zakat information which could increase their current knowledge and contribution for zakat payment.

3 SIGNIFICANCE

This research will demonstrate that developing Islamic apps on Zakat will become a ground-breaking approach in changing the way we go about educating society about Zakat. The idea of developing *Zakat.X.Kit* is to provide a platform to ease access to religious information at the end of our fingertip. Utilizing technology through the apps offers a way to enhance awareness and understanding on the obligation of Zakat so as to improve the collection. The fact that the awareness should be practiced as early as in schools and the challenges in educating the millennial generation that do not highly value listening to lectures justifies the need for a more engaging method of learning. Thus, educators that apply *Zakat.X.Kit* will be able to educate students better since the learning activities have become more assisted and the apps is giving a new insight towards educating Zakat.

4 METHODOLOGY/TECHNIQUE

There are increasing use of personally mobile devices viewed as being generally using smaller screen sizes, touch interfaces and more lightweight operating systems [4]. Such learning experience is designed to be a learner-centred learning tool that encourages experiential learning process. Most of the existing apps on zakat are focusing mainly on the zakat calculator for different assets and liabilities which target on the user for zakat payment [2]. However, least zakat apps had been found for educational purposes, be it specifically for certain subject offered by institutions or simply to nurture the zakat awareness among the public. The development of *Zakat.X.Kit* adds values to the educational mobile app by reviewing the recent literature on learning method, especially towards the newly introduced online distance learning

among university students, whereby students are encourage to be independent in their learning process.

The mobile apps design features of *Zakat.X.Kit* includes notes, tutorial, educational games, online quizzes as well as website link to zakat authority in Malaysia. In helping the lower ability of students for high-speed internet connection, it is in the mind of developer to build the app with less internet consumption for downloading purposes without leaving behind the attractive visual display. This demonstrates a usable one-stop learning centre of a handy interactive enjoyable way of flexible learning experience.

5 RESULT

Zakat.X.Kit is a newly developed apps that incorporates some features to assist users particularly students taking Zakat course in their learning activities. It is an apps that integrate functions which includes zakat wealth, trivia, videos, Quran, quizzes, zakat outreach and forum. Each function provides stimulating and exciting activities and goings-on that may enhance users' zakat knowledge.

Zakat wealth function describes the concept of zakat and it centres on traditional and modern zakat wealth which covers the further clarification on both zakat types. Trivia function acts as a flashcard for interactive learning. It offers interesting and amusing facts about zakat that can stimulate new knowledge. Video function provides links to various educational sources related to zakat matter. Here, users can have more knowledge from various resources. Quran function links users to whole verse of Quran but the unique part of this verse is it can bring users directly to verses that relate to zakat. Zakat is one of the five pillars in Islam. Thus users might want to relate this obligation with the verse in Quran and wisdom behind this Quranic law. Quiz function serves as a platform to test the user's knowledge on zakat. It offers online multiple choice quizzes and immediate outcomes of the quizzes can be retrieved after submission. In education sector, this function can be adapted and extended by instructors to meet the assessment requirement for students. Zakat outreach provides direct links to some of the zakat institutions in Malaysia. This page prompts users for updates on zakat institutions activities, announcement and rulings which may differ from one state to another. Forum functions provides arena for two way communication and hold conversations between users and instructors or apps developer. Here, participants can exchange ideas and discuss issues related to zakat. It will create thread that invites users to participate in the discussion.

Zakat.X.Kit is developed to meet the needs of various stakeholders. With its modest design and ease of use, this apps can be best companion to help users especially students to have a glance recap on their syllabus.

6 CONCLUSION

The emergence of rapid technology in the millennial era open up opportunity for academicians to contribute innovative teaching method in Islamic study focussing in zakat education [1][3]. This inventive medium of teaching could become a source of obtaining comprehensive zakat knowledge links to the Quran and Hadiths.

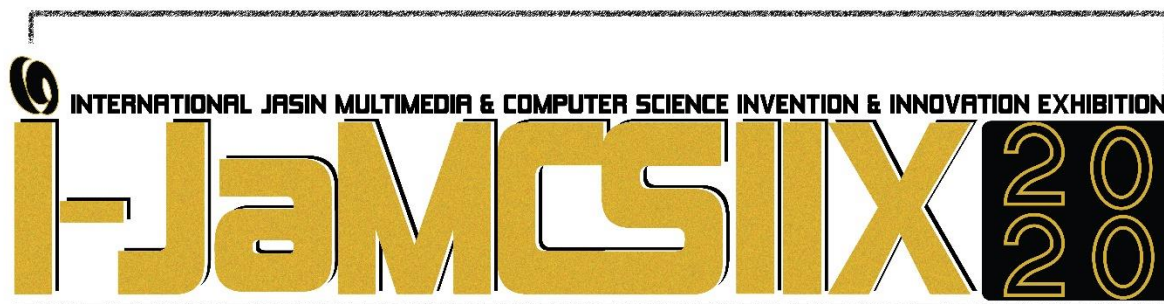
Zakat.X.Kit could be a stage and compelling learning device in an exertion to improve the understanding and mindfulness of the community on zakat education. This approach to persuade students to remain dynamic on the go whilst making a difference in learning process.

Zakat.X.Kit makes a medium of appreciation for self-motivated and self-dependable students to draw their consideration for being more focussed and advanced in obtaining zakat knowledge. This strategy is additionally able to appear them that learning is something which is dynamic and reviving.

Accordingly in the future work, the focus will be on implementing and testing the ***Zakat.X.Kit*** apps for the university students in Malaysia. It is aimed to see that the integration of technology in the form of apps could bring positive academic performance of the students *as opposed by* various studies conducted earlier [1][3]. With all the enhancement of modern advances, learning is reaching to be broadly fun and ready to see that ***Zakat.X.Kit*** is here to remain for a longer period of time to reshape the future of education of zakat in Malaysia.

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Merdeka! Learn the History of Malaysia via 2D Interactive Game

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ABSTRACT

As the time goes by, the history of Malaysia tends to be forgotten each day among Malaysian. History is one of the important things that need to be known by the whole civilization in order to foster a spirit of patriotism. Students were also having difficulties in studying the history subject because of its long, boring and repeatable content. According to the preliminary study, majority of the students agreed that the used of text book or other printed material are less attractive compare to using technology that consist of colourful images and sound. Most of students only study in order to get good mark in an examination. As a result, they do not properly understand the knowledge and message that are given from the subject. The purpose of this study to design an interactive platform where student will be able to learn about the history of Malaysia, develop an enjoyable experience of learning Malaysia's history via gaming, and to evaluate the enjoyment of the historic-themed 2D game. This project used Game Development Life Cycle methodology for the development of the project to smoothen the process and flow toward the construction of the project. To evaluate the user's enjoyment, this project applied E- Game Flow questionnaire. The result of the evaluation shows the game received 72% level of agreeability. Future work of this game is to improve the overall graphic of the game and add more engagement of the character such as fighting and climbing to provide a better playing experience.

KEYWORDS: History, Malaysian, game, enjoyment, learning

1 INTRODUCTION

31st August 1957 is a sacred date to all Malaysians where it is the Independence Day of the country. Many sacrifices, as well as the spirit of the precursors, was one of the main reasons that made this country to look of how it is today. In 2019, it will mark the 62nd anniversary since Malaysia achieved its independence. For many years, multiple external forces have set foot in our country to acquire the same one goal which is to take care of their own interest. Various uniqueness in our country is among the factors that drive the invaders towards colonization. This factor includes the position and wealth of the country [1].

History is one of the important things that needs to be studied not only by individuals

but as the whole civilization as well. It helps us to understand why and how we lived the way we are living today. This is why starting in 2013; History subject has been set as one of the mandatory subjects in Sijil Pelajaran Malaysia (SPM) [2]. The main reasons are to foster the spirit of patriotism among students as they will be representing the future generation.

However, there are several problems regarding the acceptance of students towards the learning of Malaysia's history that needed to be emphasized. Previous studies indicated that the students show less interest in the subject of History mainly because of the traditional and old fashioned ways of presenting and also does not attract that much [2]. Then, student also lacks of historical knowledge because they were too passive in the process of learning and did not undergo deep learning and reasoning [3]. Next, less knowledge and skills among educators also led to the shortage of producing excellent students who understand the importance of learning History [4].

In the 21st century, education experts proposed that the learning method involving various technologies including the use of the multimedia element should be applied to test the extent to which it affects the interest of learning history [2]. Hence, in this project, interactive game approach will be used to reduce the problem not only for the student but for Malaysians overall as video games today are one of the popular tools used by the developer for many purposes to delivering message towards the player. As for educational type games, it is a game that was designed for learning purpose which covers a subject and consist of educational content. Many previous studies have demonstrated that learning motivation and efficiency can be enhanced through educational games [5].

Therefore, with the development of this game, it is intended to attract student to visualize the most important moment in the country through education. In addition, the element of fun in sharpening the historical knowledge could be incorporated thus cultivate the interest in learning Malaysia's history.

2 OBJECTIVE

There are three objectives in this paper and all the objectives listed tend to be achieved. The objectives are as follows:

1. To design storyboard of historic-themed 2D platform side-view based game.
2. To develop an enjoyable experience of learning Malaysia's history via gaming.
3. To evaluate the Malaysian's response towards game learning through enjoyment testing.

3 SIGNIFICANCE (S)

The significance of this game is to help individuals, especially students, to explore and having an enjoyable experience in learning history through interactive game. Other than using the old traditional ways to learn which is through books or newspaper, students will be having an additional option to choose from which is through gamification. The current technology which is digital type games and approach will make it easier for the students to use the application on their desired platform. Studies show that developer nowadays preferred the use of digital game-based learning [5]. With the inclusion of various multimedia elements such as images and sound along with bright colourful level design, it will surely gain the interest of the student [5].

When student studies about a particular subject, they should not learn just to answer the

exam in schools. In fact, deep understanding is also needed to achieve effective learning [6]. According to The Australian Society for Evidence-Based Teaching website, it is stated that deep learning brings up more than just recalling facts. Furthermore, additional information or fun facts will also be featured in this game project to provide students a knowledge which they might have not read in the textbook yet. Then, players had no other choice but to take their time in completing their objective and go through each level in order to complete the game. With this, the player does not only play to gain satisfaction but also achieve mutual understanding to actually getting the message that's been delivered from the game.

Educating nationalism awareness as well as nurturing patriotic values among students also one of the benefits and goals of this project. It is important to teach the student stories about the nation's history and to appreciate the struggle and sacrifices made by the past figures at a young age [7]. There is an English proverb "Strike the iron while it's hot". This paper is tended to help students to visualize and recognize the leading characters involved in every process of demanding independence from the colonist. Through the storytelling approach of the games and the fact that the level will be in a linear form (year by year), it will be easier for the students to remember each figure and item from each level or so-called, the process of independence.

4 METHODOLOGY/TECHNIQUE

Game Development Life Cycle (GDLC) model is the process of successive software development guideline where progress is considered to focus on the quality criteria as its main focus. There are many types of GDLC model from the different companies which suite their preferred requirement. The GDLC model also defines several phases that must be completed and testing until it meets the requirements before moving on to the final phase. The process is called iterative approach to increase flexibility towards changes during the development. Essentially, the GDLC model consists of six phases: Initiation, pre-production, production, testing, beta, and release [8].

5 RESULT

The evaluation was made to identify the player's enjoyment. The enjoyment factor will be measured from adapting the scale development in E-Game Flow questionnaire which consist of 8 factors which are: concentration, goal clarity, feedback, challenge, autonomy, immersion, social interaction and knowledge empowerment [9]. A total of 15 respondents were involved in the testing phase consisting of middle school students aging from 13 to 17 years old. There are 23 questions are adapted from the E-Game Flow which each of it will response in Likert scale.

Table 1: Total Mean of each factor and Overall Mean Value

Factor	Total Mean
Concentration	4.10
Clear Goal	3.61
Feedback	3.70
Challenge	3.27
Autonomy	3.82
Immersion	3.22
Social Interaction	3.07
Knowledge Improvement	4.13
Overall	3.62
Percentage of overall total mean value	72%

Based on Table 1, the overall result of the total mean which is 3.62, this shows that

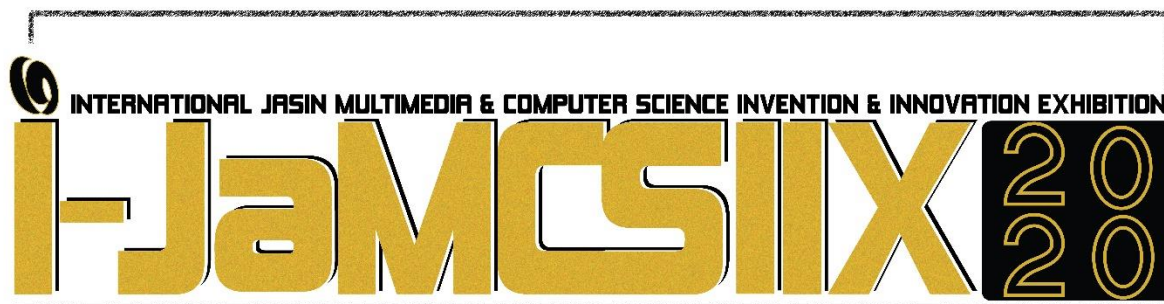
agreeability level of the game was a success with 72% of the respondents agree that the game provide an enjoyable experience through game learning.

6 CONCLUSION

Merdeka! Learn the History of Malaysia via 2D Interactive Game has been successfully made in order to help younger generation especially middle school student who wanted to increase their knowledge about the history towards the independence in Malaysia. This also acts as an alternative way to learn instead of using text book. The problem statement stated that students are feeling bored when studying history subject by using traditional method such as book and encyclopaedia, hard to achieve mutual understanding when learning and also bland and less attractive ways of learning history subject. Students tends to not enjoy in the way they are supposed to be while learning history of Malaysia. However, after the project implementation and game testing, the result of the evaluation shows a positive review with overall mean value of 72% (3.62). Along with additional reviews and recommendation for an improvement, the result shows that all the three objectives have been achieved. To conclude, Merdeka! Learn the History of Malaysia via 2D Interactive Game provide a game-based learning platform for user to learn the history of Malaysia in a fun and enjoyable way.

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Picoseconds Dark Pulse Zirconia-Yttria-Aluminium-Erbium-doped Fiber Laser

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ABSTRACT

A 3.4 picoseconds dark pulse fiber laser was successfully generated using Zirconia-Yttria-Alumina-Erbium-doped fiber laser (Zr-EDF) cavity with graphene oxide as saturable absorber. The laser cavity was 11.5 m long with the group delay dispersion of -0.04 ps². The multiwavelength optical spectrum provides 1 MHz repetition rate and 67.8 dB optical signal to noise, defines the high stability of the dark pulse. A strong nonlinearity and high birefringence of the Zr-EDF and GOSA cause the pulse turn down to dark region. An ultrafast dark pulse is demand due to low interference and excellent stability in the existence of noise that are required for high efficiency and accuracy demanding by biomedical devices.

KEYWORDS: Dark pulse, Zirconia fiber, Zr-EDF, Fiber Laser and Graphene Oxide

1 INTRODUCTION

Advances in ultrafast light sources have been applied as essential tools in a wide range of fields, such as laser physics, nanotechnology and medicine. Dark pulse was discovered 40 years ago in 1973 and attracts so much intention since then [1]. It defined as a train of intensity dips in the intensity of a continuous wave (CW) background of the laser emission. Moreover, dark solitons are widely used in optical signal trapping, atomic trapping, optical sensing and optical communication due to their advantages such as lower threshold [2], more stable in background of noise and spread slowly in presence of fiber loss, less interaction between neighboring dark solitons for their bright counterparts [3-4] and less sensitive on Gordon-Haus effect in a time jitter for both numerically and analytically [5].

The advance technology nowadays driven the biomedical devices to generate high-tech and ultrafast fiber laser due to its reliability and efficiency. Demand for extremely precise control to avoid thermal damage and infection during surgical process in human body. The need of innovation fiber for rare-earth material doping to develop an excellent stability of dark pulse fiber laser due to the cost of human life.

2 OBJECTIVES

- To develop dark pulse fiber laser using a homemade Zirconia-Yttria-Aluminium-Erbium-doped Fiber towards biomedical applications.
- To generate an ultrafast pulse duration in picoseconds with high stability of optical signal to noise ratio (OSNR) with employment graphene oxide saturable absorber (GOSA).

3 SIGNIFICANCES

- Avoid detrimental effect to achieve high optical gain up to 41 dB.
- Capable to provide dark pulse with simple method in ring cavity.
- Wideband transmission from C-to extended L-band region from 1550 to 1620 nm.
- Short gain medium of 1 m length that suitable for compact devices.
- Provide an ultrafast fiber laser in 3 picoseconds.

4 METHODOLOGY

An experimental setup of the mode-locked Zr-EDF fiber laser is shown in Fig. 1. The total length cavity is approximately 11.5 m including the 1 m length of Zr-EDF. A 980 nm laser diode is used to pump the cavity via 980 nm/1550 nm wavelength division multiplexing (WDM) coupler. An isolator is inserted before WDM to provide uni-directional operation and GOSA is used. The GOSA is placed before an intra-cavity polarization controller (PC) which is used to adjust the polarization state of the light inside the cavity to induce the intra-cavity filtering effect. The output is extracted via a 5% fiber output coupler, and measured by an optical spectrum analyzer (OSA, AQ6317C) and oscilloscope (OSC, WaveRunner 104MXI) with a high-speed photodetector.

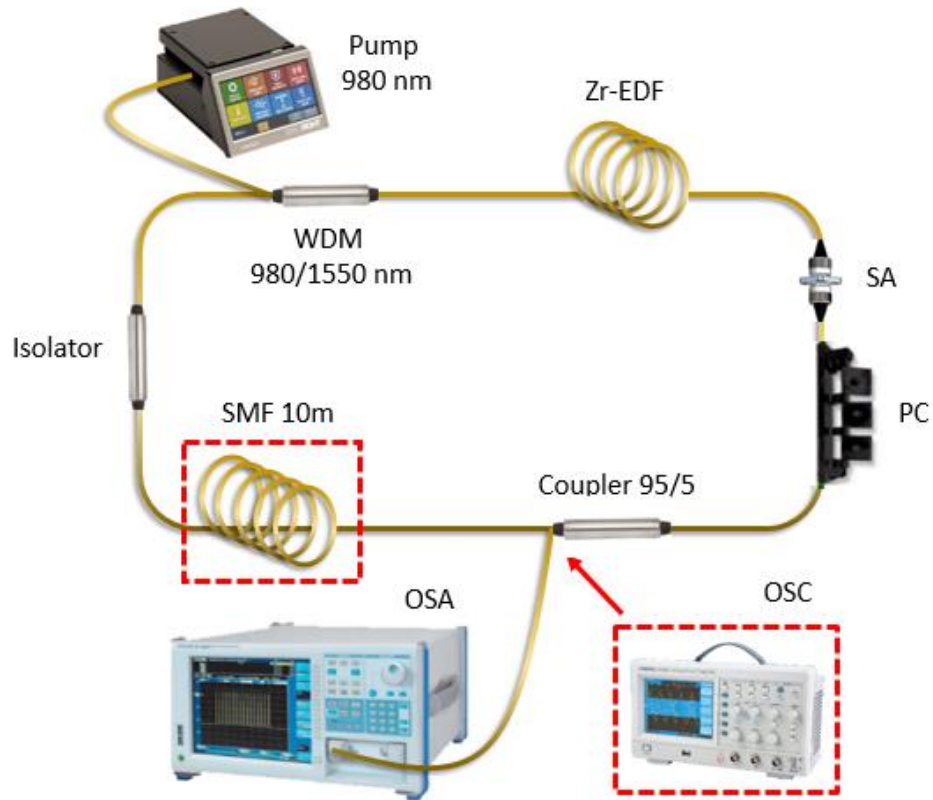


Fig. 1 Experiment Setup for the dark pulse fiber laser.

5 RESULT

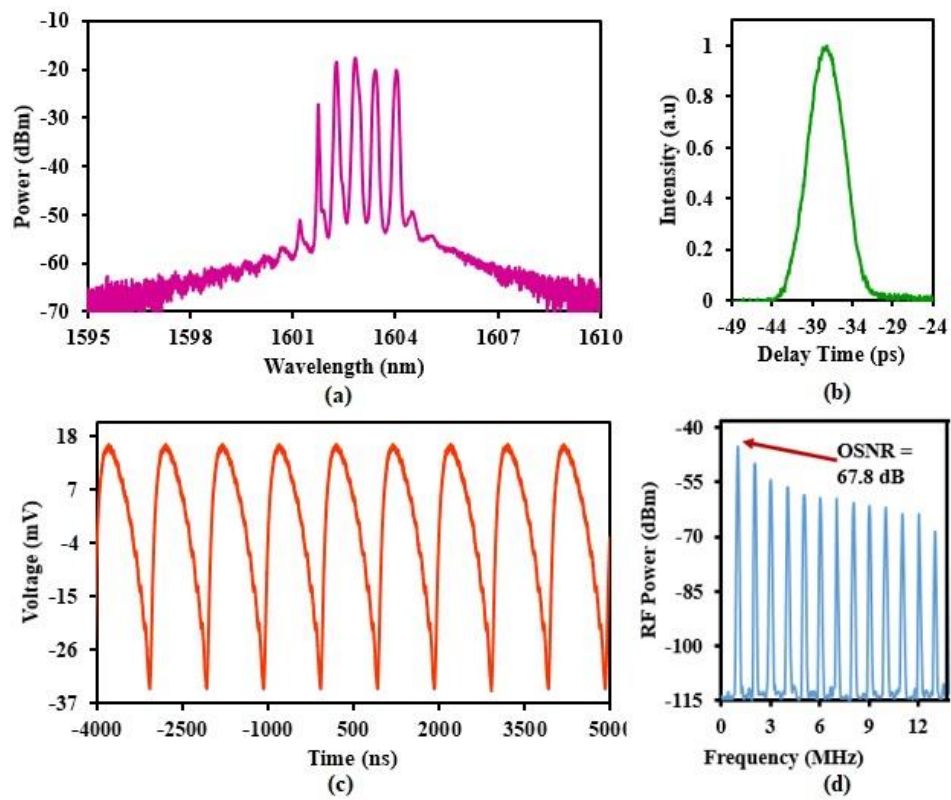


Fig. 2 (a) Optical spectrum (b) Pulse duration (c) Dark pulse train (d) OSNR

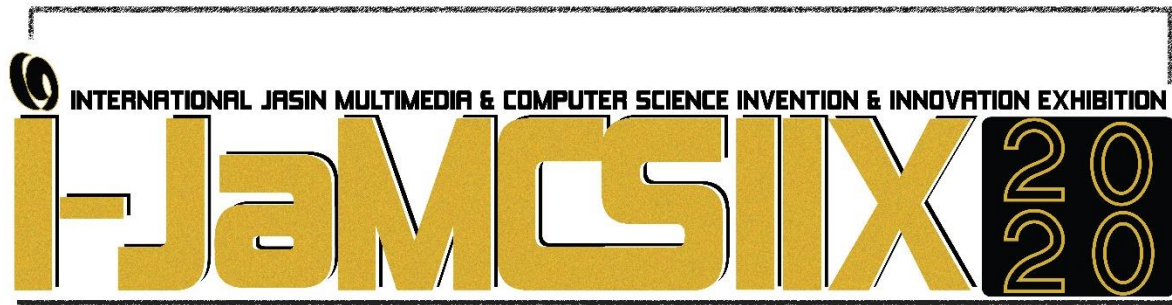
Fig. 2 shows the result of the dark Zr-EDF pulsed fiber laser. A multiwavelength with 5 lasing from 1602 nm to 1605 nm with uniform spacing of 0.6 nm is shown in Fig. 2 (a) measured by OSA. By using auto correlator, 3.4 ps is measured for pulse duration as illustrated in Fig. 2 (b). Then, the dark pulse train measured by OSC is shown in Fig. 2 (c) whereas as high as 67.8 dB OSNR in Fig. 2 (d) measured by radio frequency (RF) device. The high OSNR translates the high stability dark pulse in the cavity of experimental setup.

6 CONCLUSION

Summarizing, we experimentally demonstrated a dark pulse fiber laser in L-band regions from 1602 nm to 1604 nm wavelengths by employing graphene oxide saturable absorber (GOSA) as a saturable absorber. Furthermore, we report the new discovery of dark pulse shape with pulse duration down to 3.4 ps. Zirconia-Yttria-Aluminium-Erbium-doped fiber has a very high Erbium concentration with the help of GOSA, it produce a strong nonlinearity and high birefringence cause the picoseconds dark pulse fiber laser. A fundamental repetition rate of 1 MHz is obtained at the pump power of 79.58 mW. Then, the highest pump energy of 3 pJ is observed at the corresponding repetition rate.

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Qurban Distribution System: A New Dimension Towards A Fair And Equitable Distribution

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ABSTRACT

Qurban is a form of special Islamic ritual which is performed by slaughtering sacrificial animals and distributing the meat to the specified categories of recipients. In Malaysia, it is a common practice that mosques organised qurban on behalf of third parties and handled the entire process of qurban including its distribution. In the absence of a formal internal control system, the qurban distribution might be subject to mishandling. For instance, there is a risk that the distribution might not be made to the poor and needy at the appropriate rate, thus creating substantial doubt on whether the ritual performed has met the religious requirements or not. In order to mitigate the overall risks in qurban distribution, a group of researchers from UiTM Melaka has proposed a Qurban Distribution System (QurDiS). QurDiS is a documented internal control system consisting of policies, procedures and guidelines for qurban distribution in order to achieve a fair and equitable distribution. The system consists of various internal control activities including adequate segregation of duties among committee members, the use of specially labelled containers for meat distribution, policy of distribution over the counter only, maintenance of a computerised database of qurban recipients, acknowledgement of receipts of the distribution and reconciliation of the distribution through the preparation of distribution reports. The application of QurDiS has many advantages such as to promote transparency and

accountability and to reduce the risk of unfair and forbidden distribution. QurDiS may be applied suitably by mosques and other managers of qurban.

KEYWORDS: Sacrifice, Qurban, Fair, Distribution, System

1 INTRODUCTION

Qurban is a form of special Islamic ritual which is performed by slaughtering sacrificial animals and distributing the meat to the specified categories of recipients. One of the commonly used methods for qurban distribution is by distributing the meat to the following categories of recipients: i) the qurban participants, ii) the poor and needy, and iii) the family members and the public. In Malaysia, it is a common practice that mosques organised qurban rituals on behalf of third parties and handled the entire process of qurban including its distribution. In the absence of a formal internal control system, the qurban distribution might be subject to mishandling and misappropriation. For instance, there is a risk that the distribution might not be made to the poor and needy at the appropriate rate, thus creating substantial doubt on whether the ritual performed has met the religious requirements or not.

In order to mitigate the overall risks in qurban distribution, a group of researchers from UiTM Melaka has proposed a Qurban Distribution System (QurDiS). QurDiS is a documented internal control system consisting of policies, procedures and guidelines for distribution of qurban meat to the recipients in order to achieve a fair and equitable distribution in line with the requirements of the Islamic laws. QurDiS may be applied suitably by mosques and other managers of qurban distribution.

2 OBJECTIVE

The general objective of the study is to explain the basic internal control system that should be implemented by the mosques and other institutions in managing the qurban distribution. Specifically, the paper aims to explain the risks related to qurban distribution, the internal control policies and procedures that should be implemented by qurban managers, the documents and records that should be maintained as well as how the suggested internal controls system may reduce the risks associated with qurban distribution.

3 SIGNIFICANCE OF THE STUDY

The study may be used as guidelines for qurban managers to assess whether their existing practices are effective or not in achieving the objectives of qurban distribution as outlined in syariah or Islamic laws. The recommended internal control procedures presented in the study may be used as a source of reference in designing the appropriate policies and procedures in managing the qurban distribution. The application of a methodical approach in managing qurban distribution would in turn helps in improving the satisfaction of the Muslims society towards qurban distribution. In addition, findings from the study could provide a platform for further research to be carried out relating to the management of qurban distribution.

4 METHODOLOGY/TECHNIQUE

In general, the study adopts a descriptive methodology approach and the findings are explained by using qualitative **technique**. The goal of descriptive research is to describe a phenomenon and its characteristics (Nassaji, 2015). Specifically, this study identifies the risks associated

with qurban distribution and explains the recommended internal control policies, procedures and activities that should be implemented by the qurban managers. A questionnaire based research is not used in the study since its objective is neither to test a particular hypothesis nor to generalise the perceptions of respondents.

5 RESULT

The study highlighted that the absence of a good internal control system may lead to mishandling of qurban distribution. For instance, there are risks that distribution may not be made to the poor and needy at the appropriate percentage, qurban distribution not fairly made to the qariah members, excessive distribution to the committee members and distribution made without authorisation of the qurban managers.

In order to mitigate the risks of mishandling of qurban distribution, there is a need for the qurban managers to adopt a methodical approach by implementing a formal system for qurban distribution. In this regard, Qurban Distribution System (QurDiS) may be applied practically and suitably mosques and other managers of qurban distribution. QurDiS is a documented internal control system consisting of policies, procedures and guidelines for distribution of qurban meat to the recipients in order to achieve a fair and equitable distribution in line with the requirements of the Islamic laws. The key features of QurDiS are explained below:

In order to create a conducive control environment, it is suggested that education programmes such as seminars or talks be conducted to the qariah and committee members. Besides, every qurban manager should appoint selected committee members from those with good integrity to be in-charge of the qurban distribution. A formal planning documentation for the handling of qurban should also be prepared in advance before the qurban event as a source of reference. An aspect that should be given due emphasis at the planning stage is the need for assessment of the risk relating to qurban distribution such as the risk that the distribution might not be made to the poor and needy, the risk that the qurban meat is taken without permission and other relevant risks of mishandling.

On the day of qurban animal slaughtering, many internal control procedures should be implemented and practiced. Firstly, there should be a proper and adequate segregation of duties among the committee members. For example, a person in charge of packing the meat should be different from the person in-charge of counter operations and the person in-charge of recording the distribution. This control is to ensure that a particular committee member is not in a position to take or distribute the qurban meat solely without the control of the other committee members. Secondly, there should be a close monitoring and supervision of distribution by responsible committee members to ensure that the qurban meat may not be taken by any party without authorisation. Thirdly, the use of specially labelled containers for meat distribution is recommended so that the risk of improper distribution could be minimised. It is suggested that labelling be made for the different category of recipients such as the qurban participants, the poor and needy and the qariah members. Fourthly, a distribution counter should be set-up and there should be a policy of distributing qurban meat over the counter only so as to ensure that every distribution made is authorised.

Next, a computerised database of the name and other particulars of qurban recipients should be maintained by the qurban committee. This procedure is vital to ensure that the qurban distribution is made only to the targeted recipients only. Besides, acknowledgement of receipts

of the qurban distribution should be obtained from the recipients by requiring every recipient to sign on a proper qurban distribution form or record. The use of distribution coupons is also suggested in order to facilitate collection of the qurban meat through representatives. Lastly, in order to enable accountability of the distribution made, a written reconciliation showing the detailed percentage of the distribution made to different categories of recipients as well as a distribution report should be prepared by the qurban manager. The reconciliation and the report should be disclosed and made accessible to the public.

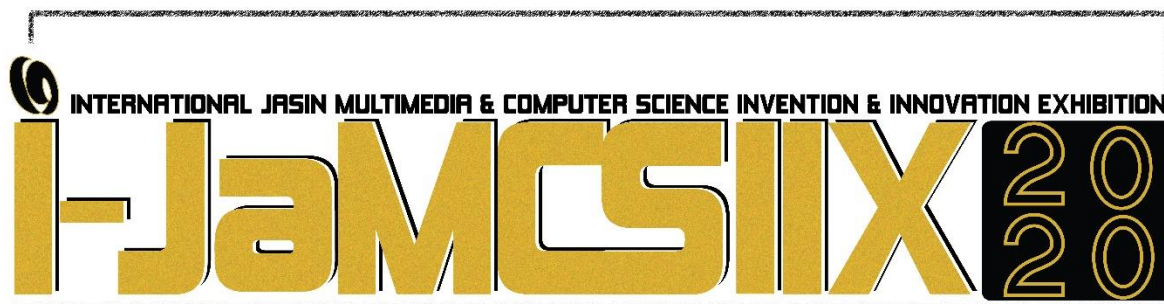
The application of QurDiS has many advantages such as to promote transparency and accountability, to reduce the risk of unfair and forbidden distribution as well as to ensure that distribution is made to the poor and needy at the appropriate rate.

6 CONCLUSION

The study revealed the importance of implementing an appropriate internal control system for qurban distribution. Every element of risk identified should be mitigated by the implementation of a suitable internal control procedure. In the absence of the appropriate policies and control activities, there is a risk that the qurban distribution might not comply with the requirements of syariah. Mosque and other managers of qurban are therefore urged to implement an appropriate system of internal control in managing the qurban distribution in order to achieve a fair and equitable distribution in line with stipulated guidelines.

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Optimization of Guava Chewable Toothpaste Tablets

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ABSTRACT

The idea of this project is to innovate the guava chewable toothpaste tablets against oral bacteria. The guava fruit were processed to a fine powder. 3 different formulas were developed; tablet with charcoal, tablet without charcoal and tablet without humectant. Each tablet, total weight of 1 g, 13.25 ± 0.67 mm diameter and 6.20 ± 0.24 mm thickness, were formulated by incorporated the sea salt, stevia, sodium bicarbonate, sodium benzoate, glycerol and peppermint. Using disk diffusion method, the antibacterial sensitivity of the tablets was evaluated. The largest zone of inhibition was observed in formulated tablet with and without charcoal; 2.6 and 2.5 cm respectively, while 1.8 cm in tablet without humectant. Comparing to the positive control (commercialized toothpaste), the zone of inhibition observed was 3.2 ± 3 cm. The hardness and pH value of the tablets were also tested. The hardness was 0 (with charcoal), 0.13 (without charcoal) and 0.27 (without humectant) kN. The pH values of all tablets were in between 6 to 7.

KEYWORDS: *Psidium guajava* L., Guava Chewable Toothpaste Tablets, Oral Bacteria

1 INTRODUCTION

Living in zero-waste lifestyles may seem difficult yet it is not impossible to do so. Zero-waste lifestyles entail the recyclable whole waste and the utilization of plastic is frowned upon. One of the initiatives that can be practised is through the transformation of toothpaste. The existing situation in Malaysia of disposal toothpaste tubes waste to landfills is not posing an environmental friendly management [1], due to the non-biodegradable form of the toothpaste tubes. In the current years, the use of plant extracts have resurfaced and grownup popularity to enhance health and for medicinal purposes. The guava (*Psidium guajava* L.) has an extra tremendous medicinal value and it has been used in folklore implementations to nurture oral hygiene. It also for long has been known for its anti-inflammatory, antimicrobial, antioxidant, antidiarrheal, antimutagenic properties [2]. Therefore, by merging the therapeutic effects of guava and the instilling of living in zero-waste lifestyles, a new formula of chewable toothpaste tablets is developed.

2 OBJECTIVE

The objective of this project was to innovate a new formulation of guava chewable toothpaste tablets. Additional objectives of this research were to determine the antimicrobial activities of guava chewable toothpaste tablets against oral bacteria and to evaluate the physical properties of the new formulation tablets.

3 SIGNIFICANCE (S)

The significance of the new formulation chewable toothpaste tablets resides in the features of medicinal values of guava as shown in the representations. It is tangible to modify the bioactive components of guava in the form of tablets in order to improve existing toothpaste in the market. We believe that production goals will largely benefit from this local Malaysia fruit toothpaste tablets that is nontoxic to all consumers.

4 METHODOLOGY/TECHNIQUE

The variety of guava that has been used in this project is GU9 and widely known as guava clone in Malaysia. This variety has less seed, round shape, sweet taste with white and thick flesh. The fruit of guava were collected, sliced thinly and baked in oven (56°C) and processed to a fine powder. 3 different formulas were developed; tablet with charcoal, tablet without charcoal and tablet without humectant. Each guava chewable toothpaste tablet were formulated by incorporated the sea salt, stevia, sodium bicarbonate, sodium benzoate, glycerol and peppermint. The tablets were moulded by pressing down the mixture of all ingredients using the hydraulic pressure Gauge. Using disk diffusion method, the antibacterial sensitivity of the guava chewable tablets against oral bacteria was evaluated. Each formulation of tablets was weight, test for their pH level and calculate for the hardness using hydraulic ram (MF40).

5 RESULT

3 different formulations of guava chewable toothpaste tablets were developed; tablet with charcoal, tablet without charcoal and tablet without humectant. Tablets without charcoal were created to evaluate the function of guava powder itself as antimicrobial agents. Many charcoal-related oral products were claiming to have antibacterial activities [3]. Tablets without the humectants were aimed to determine the necessity of humectant towards toothpaste tablets. The largest zone of inhibition was observed in formulated tablet with and without charcoal; 2.6 and 2.5 cm respectively (**Fig. 1**), while 1.8 cm in tablet without humectant. Comparing to the positive control (commercialized toothpaste), the zone of inhibition observed was 3.2 ± 3 cm. The toothpaste tablet without humectant showed smallest zone of inhibition may due to the factor decreasing concentration of antimicrobial agent in order to increase the concentration of binding agents. The hardness was 0 (with charcoal), 0.13 (without charcoal) and 0.27 (without humectant) kN and it showed tablets with and without charcoal is within the range of standard hardness [4]. The pH values of all tablets were in between 6 to 7. The pH value is reasonably similar to the commercialize toothpaste. The pH value showed that the toothpaste is neutral and weak acid. The environment in the mouth need to be in range of 6.7 to 7.3 to make sure the teeth is healthy [5].

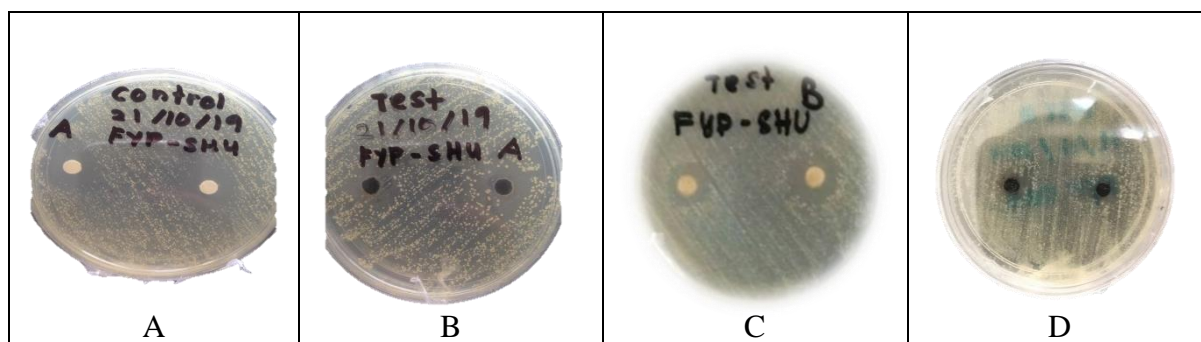


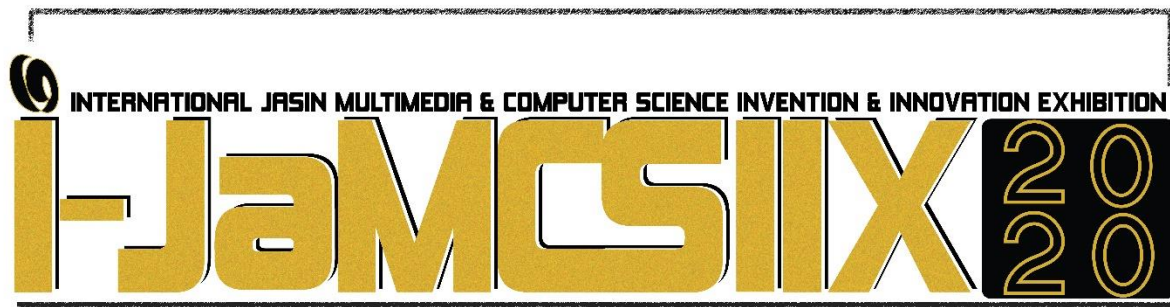
Fig. 1 Antimicrobial Sensitivity Testing (A) Commercialized toothpaste (positive control) (B) With charcoal (C) Without charcoal (D) Without humectant

6 CONCLUSION

While these results support the antimicrobial properties of guava chewable toothpaste tablets for oral bacteria and it has a great potential to be commercialized, further study is warranted to assure that the formula are safe with definitely no adverse effects.

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FINDTHON: Game-based Python Learning For PT3 Students

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ABSTRACT

Python language has emerged as one of the most widely used programming nowadays. However, from previous researches and survey that has been conducted, it is found that some of the techniques on teaching Python programming language in school nowadays are not quite helpful and effective. Because of that, a game-based learning application is suitable to make the learning of Python programming language more engaging and fun to the students. There are several problems that leads to the idea of this project which includes, learning Python using traditional methods is not effective and not enough time to learn Python in class, also students in general had difficulty recalling Python syntaxes. The Game Development Life Cycle (GDLC) model is used as the development methodology where it includes six phases namely the Initiation phase, Pre-production, Production, Testing, Beta and Release phase. Game Based Learning (GBL) model is implemented in the design and development process to ensure the game developed has elements of learning and later can be used as a tool for learning Python. This application was built on mobile platform for Android that is the most widely used operating system and has open source feature which provides ubiquitous learning to the user. At the end of the project, the Game Based Learning application has been successfully developed. However, it can be further improved by adding features such as introducing multilingual function, adding scoreboard for keeping track of high scores and allowing multiplayer session for more enjoyable game and learning experience for students.

KEYWORDS: Python, Game-based Learning, Game Based Learning Design Model, Game Development Life Cycle, Functionality Testing

1 INTRODUCTION

FINDTHON is a mobile game-based learning application that can be used by PT3 students that consists of Form 1, Form 2 and Form 3 in secondary school. This application can help solve the problems that exerts the PT3 students in learning Python programming language by applying game elements that'll make the learning more engaging and fun to the students. Some of the problems that exists are learning Python using traditional methods is not effective and

not enough time to learn Python in class, also students in general had difficulty recalling Python syntaxes. The elements that has been implemented are based on the Game Based Learning (GBL) Design Model. FINDTHON has two sections, that is the learning part and the assessments part. Users are required to learn first in order to proceed to the assessments part. This application has some limitations which can be improved in the future such as available only in one mobile platform which is Android, uses single language which is Bahasa Malaysia for the main contents of the game, no sociality which means only single player and in offline mode and lastly no scoreboard for the assessments part.

2 OBJECTIVE

Identifying objectives is very crucial to keep track on what is needed to be achieved and as a general guideline for the system development. The objectives for this project are to design an educational game for PT3 students taking Computer Science in secondary school to learn basic Python programming language using game-based learning. Other than that, the objectives of this project is to develop a mobile game-based learning application game for the students to learn basic Python. Lastly, the objectives of this project is also to test the functionality of the mobile application game.

3 SIGNIFICANCE (S)

This project which is a game-based learning mobile application is important to the PT3 students in secondary school taking Computer Science to help them learn basic Python using a more fun and interactive way and also provides an alternative method which is a game concept for learning basic Python. As the students gain more interest in that certain subject, they tend to understand better and excel well in that subject. Other than that, this project is developed in mobile application platform so that students can also learn this subject outside of their class whenever and wherever they want to, so it doesn't just limit to the class and schedule of school. Hence, the students can access it easily and it's very flexible.

4 METHODOLOGY/TECHNIQUE

Game Development Life Cycle (GDLC) model is the methodology that is used to develop FINDTHON. Generally speaking, Game Development Life Cycle (GDLC) is iterative in nature and focuses primarily on creating a game that has good qualities [1]. Other than that, the Game Development Life Cycle (GDLC) is a guideline for the development of games [2]. GDLC is based on Software Development Life Cycle (SDLC), also known as software process model, which is the development strategy that includes the processes, methods and tools that are used to develop software [3]. The benefits of SDLC are therefore inherited in part from the GDLC model. GDLC is divided into six phases which are initiation, pre-production, production, testing, beta and release. Table 1 shows the methodology activities.

Furthermore, Game Based Learning (GBL) Design model is used for this project's development process, which is said to be suitable in developing a game-based learning application. The GBL Design model can implement all sorts of game elements such as repetition that would help in memorization, challenges in solving problems and also rewards that would surge motivation.model has been used. Fig. 1 shows the GBL Design model

Table 1 Methodology Activities

Phase	Activitis	Description
Initiation	<ul style="list-style-type: none"> Identify the problem statement and objective of the project. Conduct a survey towards Form Four students to gather information about PT3 Python programming. Conduct an interview with SMK Dang Anum Computer Science teacher who is teaching Python programming language. Identify the target user for Python programming. Summary of continuous research for related topics pertaining to project that is stated in Literature Review. 	<ul style="list-style-type: none"> Determine problem statements, objectives, scope and significances of project. Determine technique for development and literature review conducted on related topics pertaining to project
Pre-Production	<ul style="list-style-type: none"> Implement the GBL design model of the game. Designing use case diagram. Making navigational chart of the game. Designing the storyboard of the game. Design the Graphical User Interface (GUI). 	<ul style="list-style-type: none"> To design a mobile application game to teach students about Python programming language.
Production	<ul style="list-style-type: none"> Identify the hardware and software to develop the prototype. Develop the prototype of the game according to the design. 	<ul style="list-style-type: none"> Produce the game prototype based on game design.
Testing	<ul style="list-style-type: none"> Initiate alpha testing whereby the game is tested by own developer to test the functionality of the prototype. Identify flaws or defects. Correct bugs and debugging. 	<ul style="list-style-type: none"> Test the prototype for its functionality.
Beta	<ul style="list-style-type: none"> Initiate beta testing whereby the game is tested by target user to test the usability of the prototype. Get feedback and response from target user. Evaluate the results from usability testing. 	<ul style="list-style-type: none"> Feedback. Final documentation.
Release	<ul style="list-style-type: none"> Release the final developed game for user. 	<ul style="list-style-type: none"> Release

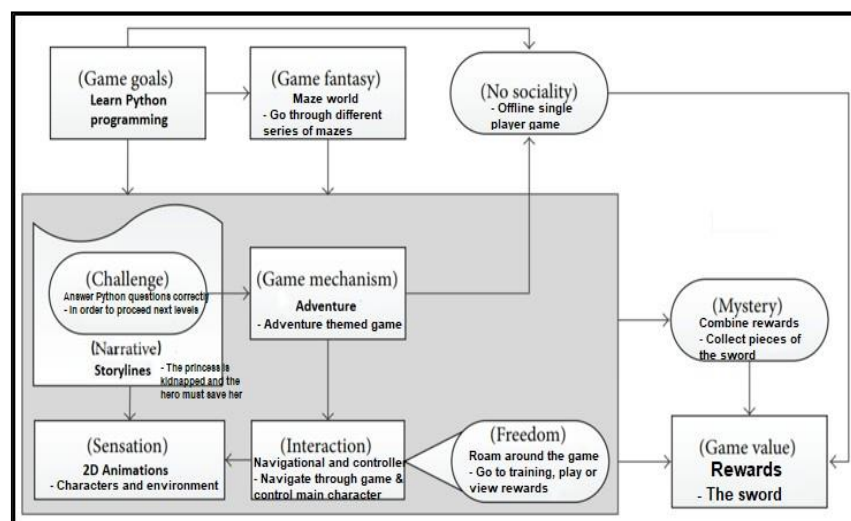


Fig. 1 GBL Design model

5 RESULT

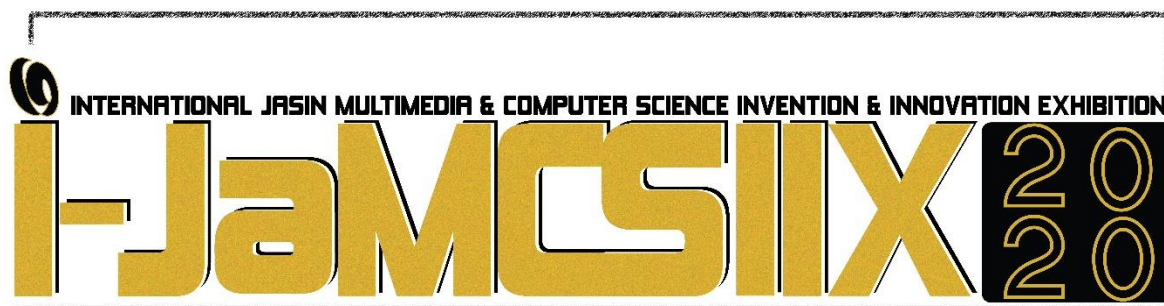
Functionality testing focuses on simulating how users interact with the application. A test case is used to conduct the functionality testing in order to make the testing more detailed. The developer will check whether the functions are properly performing as expected. Once the function shows the expected result, the test case will be labeled as 'pass,' while the other 'fail' test cases will be repaired and tested again until 'pass' in another cycle. The test cases for the functionality test consists of Start and Exit Application, Open Settings, Open Info, View Training Levels, Selecting Training Levels, Play Training Levels (Learn Python), Read Python Notes, View Game Levels, Selecting Game Levels, Play Game (Play Game Levels), View Rewards, Adjust Volume, Display Info and Answer Python Questions. All function performs as intended at the end of the testing with all the status of these test cases are 'Pass'.

6 CONCLUSION

In conclusion, FINDTHON seems to have met the overall objectives of this project, which are to design and develop an educational game for PT3 students taking Computer Science in secondary school to learn basic Python programming language using game-based learning and to test the functionality of the mobile application game. However, there are several things that become the drawback factors but it can always be improved in the future to provide a usable teaching assistance to the students and also to other users who wants to learn basic Python programming.

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Mari Mengeja: Edisi Jawi

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ABSTRACT

Nowadays, current education system does include Jawi such as inj-QAF programmed and Pendidikan Islam subject in school. However, from the researches and survey conducted, it is found that Jawi education in Malaysia is still taught using traditional ways such as using flash card and textbook, that has less interactivity which causes student to have difficulty in maintaining their concentration. Learning Jawi in class is bound to limited time and learning Jawi words is cognitively complex due to the number of rules applied. The purpose of this project is to give an alternative learning material to those who are interested in learning Jawi by using game-based learning approach which implements game elements such as repetition, reward system and penalty in the gameplay. This project is built in mobile device which let people learn ubiquitously. This project uses Game Development Life Cycle (GDLC) model approach where it has six phases which are initiation, pre-production, production, testing, beta and release phase. Game Based Learning (GBL) model is used as the guide in developing the game concept to ensure that the game is developed in line with the learning Jawi intention despite it being a game. At the end of the project, the Game Based Learning application has been successfully developed. However, some future works have also been identified to further improve the game such as to add various avatars, adding multi-language function and making it available for multiplatform.

KEYWORDS: Jawi Learning, Game-based Learning, Game Based Learning Design Model, Game Development Life Cycle, Functionality Testing

1 INTRODUCTION

Mari Mengeja: Edisi Jawi is a mobile game-based learning application and can be used by for students who are currently learning Jawi in school or anyone who are interested to learn about Jawi language. Jawi scripts have been developing and standardized until the present day. From 29 alphabets, it has increased to 36 alphabets. Therefore, this application focus on spelling with

these 36 alphabets that had been standardized. The application consist of two sections which are learning part and assessment part. GCLC model is used in developing this project.

2 OBJECTIVE

The objectives of this project are to design a Jawi spelling game via game-based learning, to develop a mobile learning application of Jawi spelling game via game-based learning and to test the functionality of the Jawi spelling game via game-based learning application.

3 SIGNIFICANCE (S)

The significances of this project are to provides an alternative way in learning how to spell in Jawi language and to give a new approach for students who want to learn on how to spell Jawi words correctly. In addition, the application can also be used as a ubiquitous application and enable learning anywhere outside class at anyplace and anytime.

4 METHODOLOGY/TECHNIQUE

The methodology used to design this project is Game Development Life Cycle [GDLC]. GDLC offers a guide to the development process of the game that focuses on the production of high quality output. GDLC model is proposed to answer the three research questions which are what steps needed to develop a game, what are the quality criteria that must to be considered during each step and how to create a good quality game [1]. GDLC model consists of 6 development phases. Production cycle consists of Pre-production, Production, and Testing. The first phase is initiation, this phase required to create a rough concept of what kind of game that will be created. Pre-production is the first step in production cycle. In this phase, game design and the development of the game prototype are created. Production is the principal process which revolves around the creation of assets, creation of source codes and integration of both elements. Testing phase is conducted to test the game usability. The testing method is specific to each stage of the prototype, formal details testing and refinement is the method used in this testing phase. Beta is a phase to conduct an external tester called beta testing. Method used is same as in testing phase. When the game is finished and ready to be released to the user, this release phase will play a big part as the product launch, project documentation, knowledge sharing, and maintenance and game development schedule are involved in this phase. Table 1 shows the methodology activities.

Table 1 Summary of GDLC Model

[6] Phase	[7] Activities
[8] Initiation	<ul style="list-style-type: none"> • Generate idea and game concept • Draft rough concept of the game • Get information from journal, article, by passing questionnaire and by conducting an interview • Plan the game concept
[9] Pre-production phase	<ul style="list-style-type: none"> • Implement the GBL design model of the game. • Design the game storyboard, use case, navigational chart and proposed GUI
[10] Production phase	<ul style="list-style-type: none"> • Choose suitable programming language • Define hardware and software requirements
[11] Testing phase	<ul style="list-style-type: none"> • Functionality case is conducted based on the test case • Identify bugs and error
[12] Beta phase	<ul style="list-style-type: none"> • Game is tested by user • Feedback is recorded for further view • Survey is being conducted based on testing that had been done
[13] Release phase	<ul style="list-style-type: none"> • Release game to public

The game concept was created based on the framework of Game-Based Learning (GBL) Design Model. Game based learning (GBL) is a type of gameplay that defines learning outcomes. GBL is designed to achieve a balance between playing and teaching, and to enable players to use their knowledge and skills in the real play environment [2]. The core concept behind game-based learning is teaching through repetition, failure and the accomplishment of goals. Table 2 shows the GBL design model and its elements.

Table 2 Summary of GBL Model

[14] Elements	[15] Description
[16] Game goal	[17] To learn Jawi words and characters
[18] Game mechanism	[19] Adventure
[20] Interaction	[21] Button interactivity for different functions
[22] Freedom	[23] Limited freedom to run throughout the game bound by the obstacles and set of question
[24] Game fantasy	[25] To save a village from sinking
[26] Narrative	[27] Run and solve Jawi question to retrieve magic brick to save the village from sinking
[28] Sensation	[29] The 3D animation
[30] Game value	[31] Bricks accumulation throughout the game by answering the question
[32] Challenge	[33] Spell Jawi words and avoid obstacle
[34] Mystery	[35] Find the magic brick to save the village from sinking

5 RESULT

Functionality test is conducted to test the functionality of the application and to identify any bugs. To test the overall application, it can be done via playtesting simultaneously with functionality test [3]. To make the testing more specific, a test case is used in performing the functionality testing. Once the feature shows the expected result, the test case will be marked as 'pass', while the 'fail' case will be repaired and checked again until the 'pass' status is obtained. The test case for the functionality test consists of start and exit application, start game, new game, continue game, learning mode, selecting level, play game, view manual and view

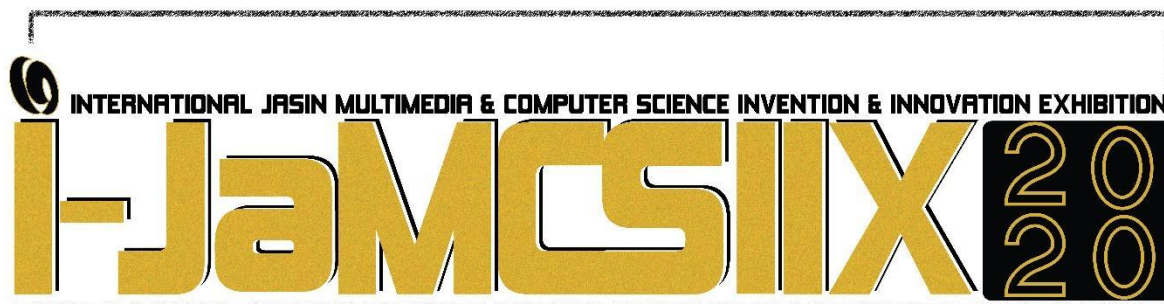
setting. At the end of testing, the game functions as expected as all test cases achieve the pass status.

6 CONCLUSION

As a conclusion, the application of Mari Mengeja: Edisi Jawi is successfully developed based on the objective that has been stated. The application is able to deliver its content which is to learn spell Jawi words in a more interactive ways. The application has been evaluated based on functionality test with positive result. There are some limitation that can be improve in the future.

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E-Application System For Sabk Maahad Ehyak Diniyah Islamiah

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ABSTRACT

Sekolah Agama Bantuan Kerajaan (SABK) Maahad Ehyak Diniyah Islamiah is a boarding school with around 500 students located in Perak. The school processes around 350 new application forms for Form 1 intake annually. However, the application process is tedious for both parents and teachers because it is done manually. The parents will come to the school office to get the application form, fill out the form and come back to the school to return the form including attachment of relevant documents. The teachers need to go through the application form one by one to shortlist the candidates that fulfill the academic requirements and then transfer the details from the form into Microsoft Excel. In view of the situation, an online application system has been developed to tackle the problem by using the Waterfall Model as the methodology, PHP with Laravel framework as the language and MySQL as the database. The system allows parents to apply online and the system checks the academic qualification automatically, provides the application status to the applicants whether qualified for a qualification test or not and lists the shortlisted candidates. The system relieves the parents from having to travel a few times to the school and relieves the teachers from the tedious and meticulous tasks of checking the candidates' academic background. However, several future works need to be done, with the most important is to provide features to upload attachments and to generate automatic offer letters.

KEYWORDS: e-application system, manual admission process, online application, reduce time and costs

1 INTRODUCTION

Sekolah Agama Bantuan Kerajaan (SABK) Maahad Ehyak Diniyah Islamiah is a government funded school. The school is one of the best SABK in Perak. In 2012, it was listed to be a cluster school and because of that, the number of applicants keeps on increasing. However, the growing application volume for Form 1 enrollment has posed a significant challenge to the school for the past years. The current school admission process cannot keep up well with the large number of applications because the process is done manually [1].

The admission process involves two major parties: the school administration and the applicants. On the administration part, handling the application forms consumes a lot of time and work hours. This is because the selection process requires meticulous checking if the applicants meet the admission requirements based on Ujian Penilaian Sekolah Rendah (UPSR), Sijil Pendidikan Islam and Sijil UPKK (KAFA) and also verifying the authenticity of these certificates. The staff also need to key in each details of the applicants taken from the application form into a Microsoft Excel template after the minimum requirement filtering process takes place. **Fig. 1** shows the current application form used in the manual system.

Fig. 1 Admission Application Form (Source: SABK Maahad Ehyak Diniyah Islamiyah)

The current process also prones to issues such as the application forms being misplaced and the school received the forms after the due date. The process also incurs higher cost for office supply such as papers, envelopes and postages because the school sends out two letters to the applicants; one letter is for the applicants that are eligible to sit for the qualification examination, the other is the offer letter for the applicants that pass the qualification examination with good results.

On the applicants part, the admission process is less user friendly. First and foremost is, in order to acquire the application forms, parents have to come to the school. This is really inconvenient to the parents because not only do they have to make time to visit the school but also to make it within office hours. Besides, there are also applicants that live far from the school such as in other towns and states. Thus, getting the application forms from school and to return the completed forms back to the school can take considerable time and cost. Based on the problems discussed, a solution is deemed necessary to help ease the school administrators in processing the admission application form while at the same time ease the process that the applicants need to go through in applying for the school. Therefore, an e-Application web based system has been proposed and developed which utilizes today's current web based technology. The system transforms most of the processes that are done manually into web based computerized systems.

The system is expected to give both users a more user friendly and engaging experience. It is accessible to the applicants and the school administrators anytime and anywhere they are. This can reduce the time and cost for both parties involved. As a whole, the system can help both parties to be more organized, efficient and more productive while at the same time, reduce cost and time [2].

2 OBJECTIVE

The project has three objectives. The first objective is to gather and analyse the system requirements for the system. The next objective is to design and implement a web-based system by utilizing the gathered requirement and finally the development part came in.

3 SIGNIFICANCE

The project is significant to two parties as described below:

a) The School (Administration Staff and Teachers)

The main impact of the system goes towards the school especially to the administration staff and teachers. The system is expected to significantly reduce the time taken in processing the application form. The staff do not need to enter the details of each applicant. Besides, the system will filter the academic qualification of the candidates automatically. The school also can cut down cost on the use of papers and postage as the information of the application is announced in the system.

b) The Applicants

The main benefit towards the applicants is that the applicants do not need to come to the school in order to pick up the application form and to return the completed form back to the school by hand or via postage. This impact will be more beneficial towards the applicants that live far from the school such as in other towns or other states. The system allows applicants to apply online anytime and anywhere they are. Thus, the process of applying for the school will be more convenient and user friendly as the applicants just need to apply and attach the important document in the system and wait for the result. This helps to reduce the cost of time and money of the applicants.

4 METHODOLOGY/TECHNIQUE

The e-Application web based system is developed by implementing the Waterfall Model. There are six phases in the Waterfall Model [3]. The first phase starts with requirement gathering. An interview was conducted with En Izzuddin Bin Fakharudin, the principal of the school to collect as much data and requirements related to the problem. Table 1 shows the interview questions.

Table 1: Interview Questions

NO	QUESTIONS
1.	How the intake of the students was made?
2.	How do the students from outside Perak apply for the school?
3.	Annually, how many students apply for the school?
4.	What is the minimum requirement to apply for the school?
5.	How many students usually passed the qualification examination?
6.	How does the qualification examination be graded?
7.	Who will manage the application form?
8.	How many staff are involved?

The data and findings from the interview are then used in the analysis phase. A Use Case Diagram (UCD) is created as shown in Fig. 2.

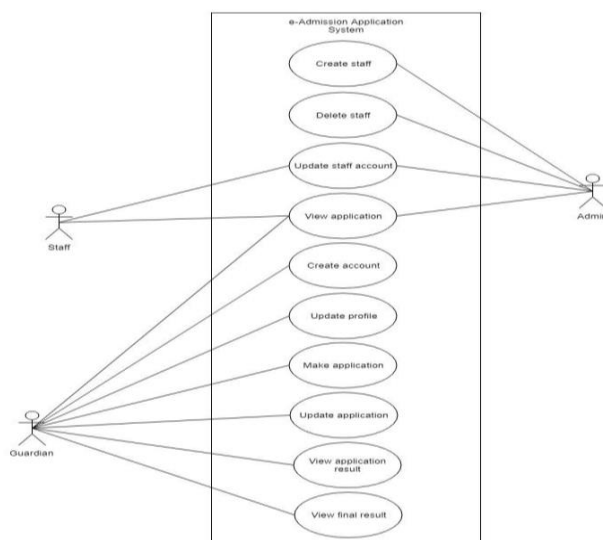


Fig. 2 The UCD for the system.

The next phase is to design the web-based system. Design specifications such as the Entity Relational Diagram (ERD) and Software Design Document (SDD) are produced. In the implementation phase, all the requirements and design specifications are implemented into coding. Software Requirement Specification (SRS) and Software Design Document (SDD) are the main references to make sure this phase fulfills the stakeholder requirements and achieves the third objective of this project. For the project, PHP with Model, View, Controller (MVC) concept which is considered as three-layer system architecture is used. The code is edited using PHPStorm software. As for the database, MySQL is used through phpMyAdmin as the client server to handle the MySQL over the web. Functional Testing is the final step involved in this project. All test cases from the UCD such as create staff, and delete staff are working properly.

5 RESULT

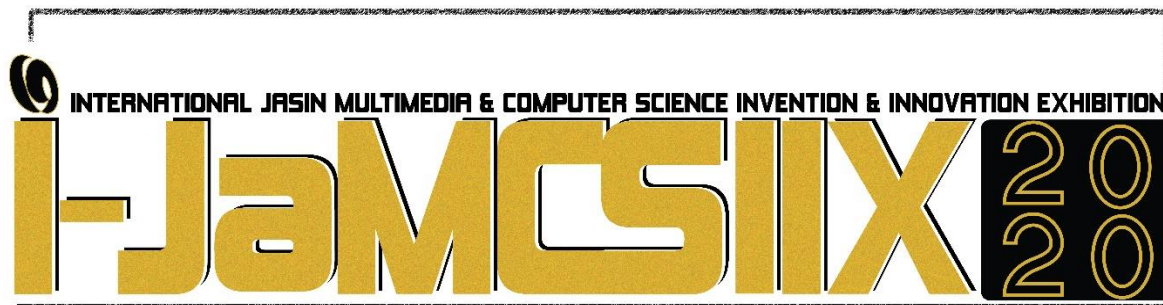
The result and finding focus mainly on the deliverable for each development phase which is the requirement gathering, analysis, design and implementation phase. The findings show the deliverables of each phase have achieved the objectives of the project. Features of the system are tested by the developer and the supervisor and it shows that all functionalities and processing coded in the implementation phase work correctly.

6 CONCLUSION

The finished system prototype has demonstrated that it has achieved all the project objectives mentioned above. The system prototype is built based on the school requirements. The successful testing of the features and processing show that it has high potential to be deployed to the school.

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Hydroponics Management System Based Internet of Things

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ABSTRACT

Nowadays, planting by using soils seems no more relevant as in the year of 1600th scientists had found an alternative method of growing plants much more faster which by using only water as a planting medium. Years by years, this method had been improvised until today but only focusing in the industrial sector and most of them only able to monitor the condition of plant. Hydroponic Management System Based Internet of Things is a project that combines biology and electrical engineering knowledge where the growth of a specific species of plant is being monitored and controlled based on their optimum and ideal factors such as the presence of water as planting medium, surrounding temperature, relative humidity, light intensity and also the pH of water. This product believes that if all the five parameters of plants could be controlled and maintained based on the requirements of each species of plant, the best quality of plant productivity could be produced. In this project, analog sensors are used to sense the condition of a selected species of plant such as the water level, surrounding temperature, etc. and all the value of parameters will be displayed on LCDs and also will be uploaded through the Internet of Things (IoT) application – ThingSpeak. To maintain a constant value of parameters, a few output components will be used if the values are out of their range. Commonly, hydroponics only involved in industrial sector, but this project will bring it into home so that everybody will be able to plant.

KEYWORDS : Hydroponics, Internet of Things, Sensors, Arduino

1 INTRODUCTION

Planting might be satisfactory when it comes out with good products. It is everyone's dream to grow any kind of plant at home during childhood such as strawberries. However, as we grow older, we realize that it is almost impossible to grow strawberries because most of areas in our country such Malaysia climates are not an ideal environments to fulfill the biological conditions of strawberries, where it requires specific conditions such as 5.5 pH of soil [1], ambient temperature around 20°C to 25°C with relative humidity ranges between 65% to 75% [1] which are something cannot be grown in this country. This is proven by many researchers that different plants are required a specific environment. In the modern world through the

advancement of science and technology knowledge, these biological requirements can be fulfilled even at home. In addition, all parameters are not only be monitored via LCD screens and internet sources, but it also be controlled automatically without any human effort to monitor and control manually. With advanced microprocessor capabilities combined with IoT integration, any plant can be grown in any country as long as all the plant needs are being monitored and controlled under certain conditions. The aim of this project is to build a prototype of automated hydroponics system by targeting better end product. A comparison method where a hydroponic plant is required to be set up with all inputs that gives information to the system based on plant requirements.

2 OBJECTIVE

The objectives of this product are :

1. To design a prototype of an automated hydroponic system by using Arduino MEGA 2560.
2. To monitor and grow healthier plants efficiently via ThingSpeak apps.
3. To analyze the effectiveness of an automated hydroponic system.

3 SIGNIFICANCE(S)

Hydroponic has been commonly used in industrial sector where a large number of plants are grown together. It is something rare to see this method to be used in home area due to lack of knowledge on the benefits of hydroponic compared to soil method [2] amongst people where it is proven to be more efficient and helps in cost savings. Furthermore, this prototype of project is also designed to be user friendly where it does not require a lot of spaces to be used at home. By the end, it is hoped that the effort of combining electrical engineering and biology knowledge into this one project could spark future generations to continue this some sort of legacy of combining knowledge into our daily lives thus eliminate the boundaries between any knowledge.

4 METHODOLOGY/TECHNIQUE

Four (4) sensors are used such as an ultrasonic sensor (HC-SR04), temperature/humidity sensor (DHT11), light intensity sensor (BH1750) and pH sensor (PH-4502C) to sense the selected input parameters. Furthermore, Arduino MEGA 2560 and NodeMCU ESP8266 are used as microcontroller and communication system respectively. There are six (6) outputs are involved such as 5V water pump, 5V cooling fans, 5V mist makers, ultra-violet light (UV light), Liquid Crystal Display (LCD) screens and ThingSpeak application. Fig. 1 shows the block diagram of this product.



Fig. 1 Block diagram

In this invention, a plant species of the vegetable type is selected as a model, where it requires desired condition. The requirement parameters are recommended to be ideal

temperature ranges between 7 °C to 24 °C, 95% to 100% of relative humidity, 6.0 to 7.5 pH of water and 14 to 16 hours of optimum period for sunlight. The project also will be targeting to build a simpler, more practical artificial hydroponic model and user-friendly design that allows users to move around and set up prototypes easily. In addition, this project comes with displaying all values and parameters of plant on the Liquid Crystal Display (LCD) screens and sending all gather information through the ThingSpeak application. It will allow users to monitor plants even when not at home.

The program starts when there is any change in the range of the parameters that are set by using *if* and *else* statements. If water level in hydroponic tank is below than the range required, water pump located in the treatment plant will turn on and the flow of water is required fulfilling the hydroponic tank. Next, if the ambient is below than the desired temperature, the cooling fan will turn on to decrease the surrounding until the ideal temperature is reached. The change of surrounding temperature will affect the relative humidity as a higher temperature will make a lower relative humidity. To stabilize this parameter, the mist maker will be turned on in order to generate cool mist until the optimum of relative humidity is achieved. To ensure the best light level supplied to the plant, the UV light will turn on when the level of sunlight is not enough for the photosynthesis process of plant. A pH sensor helps in monitoring the level of hydrogen ions in hydroponic tank either acidic, neutral or alkaline. All the values of sensors will be displayed on both 20x4 LCD screens and can also be accessed through ThingSpeak application. Fig. 2 shows a flowchart of the product which decides command of the output once sensor senses any change in the parameter.

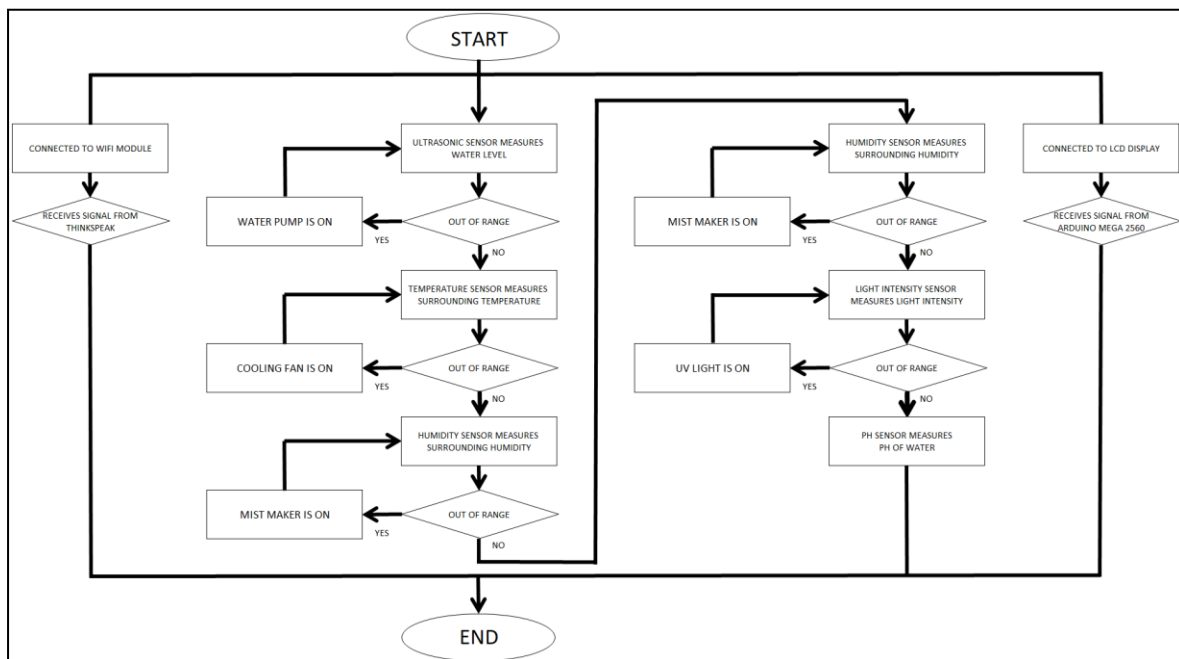


Fig. 2 Flowchart of production

5 RESULT

The value of water level in the hydroponic tank is shown centimetre (cm), the surrounding temperature in degree Celcius (°C), the relative humidity in percentage (%) and the light intensity in lumen (Lux) on the LCD 1 while the value of pH of wáter is shown in LCD 2. Fig. 3 shows the values of each parameter taken from the four sensors.



Fig. 3 LCD displaying sensor values

During day, light level is in the range of the optimum level due to the presence of sunlight. As the time goes by, the sunlight gets dimmer so the light sensor to trigger ultra-violet light on. Fig. 4 and 5 show the prototype of the product during day and night respectively.



Fig. 4 During day



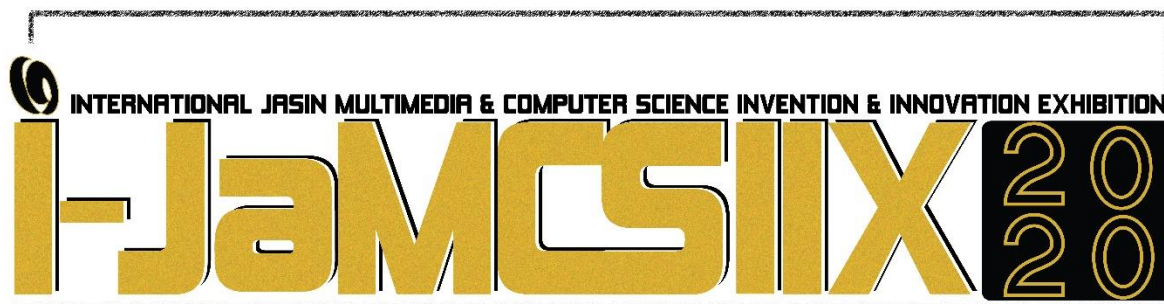
Fig. 5 During night

6 CONCLUSION

This project has been successfully done where the automated control system integrated with Internet of Things (IoT). It has enabled farmers to automate and control the several parameters in hydroponics plants and become a reality for farmers to harvest every plant that can be grown in any country. Theoretically, it has proven in the biological *sense that plants can grow as long as their basic needs are met no matter where they live. Through this innovation, it can be created something new and cheaper that it has potentially more useful to human civilization. Therefore, this product seems to be a good platform to help people realize that hydroponics can also be implemented in residential areas especially in urban areas and not just focusing on large-scale industrial sectors. In addition, the hydroponic growing method also saves water usage as it only requires constant water in the tank and unlike the soil method that needs to be watered daily.*

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Phytochemical Screening and Biological Activities of *Swietenia macrophylla* (Tunjuk Langit)

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ABSTRACT

The aims of this research were to extract phytochemicals and to screen antioxidant and antibacterial activities of the leaves of *Swietenia macrophylla*. Extraction by cold maceration method was done for 72 hours using three different solvent, petroleum ether (PE), ethyl acetate (EA) and methanol (MeOH). The highest extraction yield was shown by the methanol extract with percentage of 11.11%. The phytochemical screening analysis was done on each extract and confirmed the presence of secondary metabolites including alkaloids, phenols, saponins, terpenoids, steroids and flavonoids in the leaves of *S. macrophylla*. Disc diffusion method was used to determine the antibacterial activities of crude extracts using four pathogenic bacteria, *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella typhi* and *Escherichia coli*. It was found that ethyl acetate extract exhibited the strongest antibacterial activity with zone inhibition of 16.07 mm compared to the other extracts against tested bacteria. Meanwhile for antioxidant study, DPPH radical scavenging assay was used to determine antioxidant activity of the crude extracts. It was shown that methanol extract exhibited the highest antioxidant activity with IC₅₀ value of 85.32 µg/mL. The results of this study concluded that *Swietenia macrophylla* leaves extract contains medicinally important bioactive compounds with efficient biological activities and have a potential as antibacterial and antioxidant agents for pharmaceutical purpose.

KEYWORDS: *Swietenia macrophylla*, Phytochemical, Antibacterial, Antioxidant, Pharmaceutial

1 INTRODUCTION

The pharmacological activity in plant-derived natural product, especially secondary metabolites can act as an active components for modern medicines and play a critical role in the advancement of pharmacological industries aside from being a crucial element in maintaining human health [1]. Medicinal plants contain organic compounds which could produce definite physiological effect on the human body. These biological substances could

include tannins, alkaloids, terpenoids, steroids and flavonoids [2]. *Swietenia* is a genus in the Meliaceae family. This genus is natively grown in the Neotropics, from Southern Florida, Brazil, Mexico and Central America to Bolivia [3]. Three species of *Swietenia* genus which are *S. macrophylla*, *S. humilis* and *S. mahogani* were introduced into several Asian countries such as West India, Malaysia and Southern China [4]. The mahogany tree *S. macrophylla*, also called “sky fruit” due to the upward direction of its fruits towards the sky. *S. macrophylla* is a big-sized deciduous tree with height of 40–60 meters and trunk diameter up to 4 meters. It has been universally used as a traditional remedies to treat numerous illnesses such as diarrhea, fevers, hypertension and diabetes [5]. In this study, the phytochemical screening was done on *S. macrophylla* extracts in order to detect the presence of secondary metabolites such alkaloids, saponins, flavonoids, terpenoids, phenols and steroids. The screening of antibacterial and antioxidant activity of *S. macrophylla* extracts were also done.

2 OBJECTIVE

To investigate the potential of *S. macrophylla* as antibacterial and antioxidant agents for pharmaceutical purpose by conducting the preliminary analysis on the phytochemical screening and biological activities (antibacterial and antioxidant) of the *S. macrophylla* extracts.

3 SIGNIFICANCE (S)

The existence of the secondary metabolites in *S. macrophylla* extracts which were detected by phytochemical analysis may be useful as the preliminary step for further isolation of plant-derived natural product. Moreover, the result of *S. macrophylla* extracts on the antibacterial and antioxidant activity can provide initial information or data to find a natural antioxidant that can replace the usage of synthetic antioxidants. Finally, this study can give an extra knowledge to the pharmaceutical industries in medicinal development.

4 METHODOLOGY/TECHNIQUE

Plant Extraction

S. macrophylla leaves were collected from Puncak Alam, Selangor. Leaves were washed, shade dried, macerated and extracted with petroleum ether, ethyl acetate and methanol for 48 hours. The extracts were filtered through a filter paper and concentrated using rotary evaporator to obtained the crude extract.

Phytochemical Screening

Chemical tests for the screening and identification of bioactive chemical constituent such as alkaloid, flavonoid, phenols, saponins, terpenoids and steroid on *S. macrophylla* extracts were carried out by using standard procedure in [6].

Antibacterial Assay

The antibacterial activity of the crude extracts of *S. macrophylla* was determined using disc diffusion method with slightly modification [2]. The activity was tested against two Gram-positive bacteria, *B. cereus* and *S. aureus* as well as two Gram-negative bacteria, *E. coli* and *S. typhi*.

Antioxidant Assay

DPPH radical scavenging assay was utilized to determine the antioxidant activity of *S. macrophylla* with some modifications [7]. Each sample (1.0 mg) was dissolved in methanol (1 mL) to obtain a stock solution with concentration of 1000 µg/mL. A series of diluted solutions were prepared from the stock solution with methanol starting from 1000, 500, 250, 125, 62.5, 31.3, 15.63 and 7.81 µg/mL. The sample solutions with various concentrations (0.2 mL) were mixed with 3.8 mL of methanolic DPPH solution (50 µM). The mixture was incubated for 30 minutes at room temperature in the dark. After 30 minutes, the absorbance of reaction mixture was recorded at 517 nm.

5 RESULT

Phytochemical screening of *S. macrophylla* extracts

S. macrophylla contains many active compounds such as alkaloids, flavonoids, steroids, phenols, saponins and terpenoids. In this study, phytochemical screening was carried out to detect the presence of secondary metabolites in three leaves extracts which were petroleum ether, ethyl acetate and methanol. Table 1 shows the result of the phytochemical analysis of those extracts.

Table 1: Phytochemical analysis of leaves extract of *S. macrophylla*

Group of phytochemicals	Petroleum ether extract	Ethyl acetate extract	Methanol extract
Alkaloids	+	+	+
Flavonoids	+	+	+
Phenols	-	-	+
Saponins	-	+	+
Terpenoids	-	+	+
Steroids	+	+	+

+: present ; -: absent

According to the result, alkaloids and flavonoids can be found in all of the three extracts. Moreover, the appearance of saponins and terpenoids can be found in methanol and ethyl acetate extracts. However, these groups of compounds were absent in petroleum ether extract.

Antibacterial Activity

The diameter of inhibition zone for each extract was measured. Table 2 showed ethyl acetate extract gave the greatest inhibition zones against *S. aureus* with diameter 16.07 mm compared to other extracts. In contrast, there was no inhibition zone observed for petroleum ether extract against *S. typhi*.

Table 2: Inhibition zone (mm) of each extract against tested bacteria

Type of bacteria	PE extract (mm)	EA extract (mm)	MeOH extract (mm)	Streptomycin ^a (mm)
<i>B. cereus</i>	7.20 ± 0.05	12.13 ± 0.07	7.13 ± 0.17	17.20 ± 0.20
<i>S. aureus</i>	7.33 ± 0.08	16.07 ± 0.13	14.01 ± 0.11	18.07 ± 0.13
<i>S. typhi</i>	-	14.24 ± 0.12	10.05 ± 0.13	13.02 ± 0.24
<i>E. coli</i>	7.23 ± 0.03	10.13 ± 0.09	10.03 ± 0.10	16.05 ± 0.15

Data represent mean ± standard deviation of three replicate experiments; Inhibition zone diameter (mm) including diameter of disc 6 mm; ^aPositive control

Antioxidant Activity

Based on Table 3, the methanol extract showed the highest antioxidant activity with IC₅₀

value of 85.32 $\mu\text{g/mL}$ followed by the ethyl acetate extract with IC_{50} value of 387.18 $\mu\text{g/mL}$.

Table 3 Percentage inhibition and IC_{50} value of *S. macrophylla*

Extract	% inhibition at 1000 ($\mu\text{g/mL}$)	IC_{50} ($\mu\text{g/mL}$)
Petroleum ether	11.16 ± 0.09	ND
Ethyl acetate	59.40 ± 0.34	387.18 ± 0.96
Methanol	92.56 ± 0.42	85.32 ± 0.94
Ascorbic acid	97.50 ± 0.16	49.42 ± 0.08

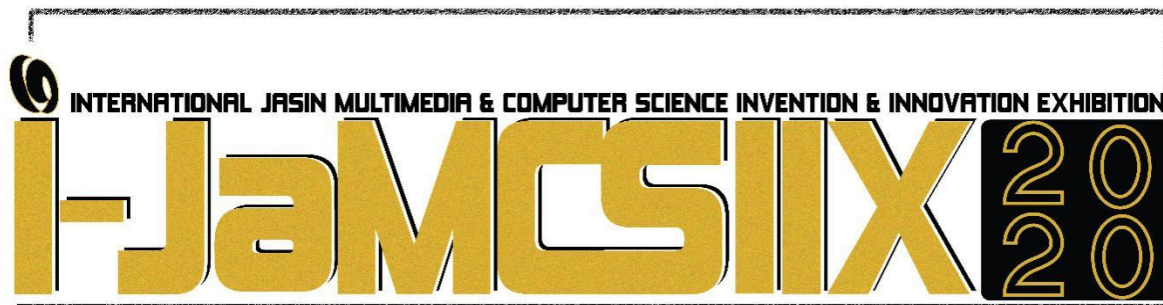
Notes; ND: Non determined

6 CONCLUSION

Phytochemical screening analysis revealed the presence of alkaloids, flavonoids, phenols, saponins, terpenoids and steroids in the leaves of *S. macrophylla*. Methanol extract demonstrated the highest DPPH radical scavenging activity compared to the other extracts with IC_{50} value of 85.32 $\mu\text{g/mL}$ meanwhile ethyl acetate extract gave the highest antibacterial activity against *S.aureus* with diameter of inhibition 16.07 mm. The results showed that the leaves extract of *S. macrophylla* have a potential as antibacterial and antioxidant agents for pharmaceutical purpose.

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Evaluation of Heavy Metals Content in Pineapple Waste

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ABSTRACT

Heavy metals can exist in many types of food crop including fruits and vegetables which may lead to human and animal health. Crop waste such as pineapple can be used as animal feed and fertilizers. The objective of this study is to evaluate several heavy metals (Cu, Fe, Cr, Ni) content in pineapple waste using Flame Atomic Absorption Spectroscopy (FAAS). The concentration of heavy metals content in three different parts (core, crown, peel) was determined and compared with WHO permissible limit. Wet digestion method was applied during sample preparation using mixture of HCl and HNO₃ acid. Results show that the concentration of iron was higher in all parts of pineapple waste which were 0.553, 3.975 and 1.285 mg/L for core, crown and peel respectively while the concentration of nickel was the lowest in all parts of pineapple waste which were 0.028, 0.076 and 0.043 mg/L for core, crown and peel respectively. The calibration curves were linear for all heavy metals ranging between 1- 5 mg/L with correlation determination (R^2) which 0.9999, 0.9999, 0.9998, 0.9998 for Cu, Fe, Cr and Ni respectively. In conclusion, the concentration of all heavy metals that obtained in this study were lower as compared to WHO permissible limit value. Therefore, it can be considered safe for human and animal to consume.

KEYWORDS: Heavy metal, Pineapple, Waste

1 INTRODUCTION

Food crops such as fruits, vegetables and grains which provide food for human and animals consumption are considered as a major part of human nutrition and health [1]. With modern urbanization and industrialization, heavy metals may contain naturally or as inherent components of plant.

Contamination of the food crops can cause serious problems to all organisms. Heavy metals bioaccumulation in the food chain especially can be highly dangerous to human health [2]. Uptake of heavy metals by plants through absorption and accumulation along the food chain is a potential threat to animals and human health [3].

Fruits such as pineapple rich with vitamins and mineral salts can be used for treatment of various diseases as it can reduce risk of cancer, cardiovascular and stroke [4]. However, human only eat the mesocarp and the waste including crown, core and peel will be discarded.

As time goes by, there will be a huge amount of pineapple waste that need to be eliminated. Thus, it can lead to serious environmental pollution since disposal of these wastes are expensive due to high cost of transportation and limited availability of landfill [5]. Nutrient in fruits can be diminished by heavy metals contamination. It occurs when the fruit plant absorbs heavy metals from the contaminated soil and polluted air [6]. Besides that, method used during the analysis must be correctly chosen as it may introduce error due to volatilization of the heavy metals.

2 OBJECTIVE

In this study, the concentration of heavy metals such as copper, iron, chromium and nickel in pineapple waste including core, peel and crown were determined by using Flame Atomic Absorption Spectroscopy (FAAS) and were compared to the World Health Organization (WHO) permissible limit.

3 SIGNIFICANCE (S)

Pineapple waste contain many components of simple sugar example sucrose, glucose and fructose. Hence, the waste can be useful such as it been used as animal feed in order to recycle the waste instead of discarding or burning the waste [7]. Farmers usually used this waste because it is cheaper compared to maize germ, wheat or barley. Other than that, it can be used in fermentation process and can undergo pyrolysis process (biomass convert into organic charcoal and pyroligneous acid [8]. Therefore, it can reduce the transportation cost, burning process and the limitation of landfill availability. It is important to determine whether it is free from heavy metals as it safe to be consume in future.

Heavy metals are not harmful when they are below the limit. As example, Cu beneficial in the production of red blood cells, regulation of heart rate and blood pressure. These metals also important in survival and microbes growth. However, higher concentration of these metals may inactivate the protein molecules [9].

4 METHODOLOGY/TECHNIQUE

4.1 Material

Raw material was purchased from selected supermarket located in Kuala Pilah, Negeri Sembilan. Several chemicals were used such as HNO_3 , HCl , standard solution of Cu, Fe, Cr and Ni.

4.2 Sample preparation and heavy metal standard solution

Pineapple peel, crown and core were cut into small pieces, dried under sunlight for a few days and blended using food blender. The paste then was kept in a food container in a dry place. A series of different concentration of standard solution were prepared for each heavy metals (Cu, Fe, Cr, Ni).

4.3 Sample digestion and analysis

Sample was digested using mixture of HNO_3 and HCl . 3 g of sample was mixed into 3 mL of 37% HCl and 10 mL of 65% HNO_3 . The mixture then was heated using hot plate in the fume

hood until white fumes was evolved and turned brown. The flask that contain the white residue was cool down and was filtered using Whatman filter paper. Lastly, the filtered residue was transferred into 50 mL volumetric flask and diluted with deionised water until calibrated mark. Analysis of sample and standard were done using Perkin Elmer Analyst 700 AAS Spectrometer.

5 RESULT

As shown in Fig. 1, Fe was found to be the highest concentration detected in all parts of pineapple waste (core, crown, peel) while the lowest concentration was showed by Ni. All heavy metals showed high value of concentration in crown as compared to the other part of waste. Different with Cr, the concentration value was highest in peel of the pineapple waste. However, all concentration detected for each heavy metal was still below the WHO permissible limit as shown in Table 1. Moreover, the concentration of iron in the samples still does not exceed the maximum permissible limits which was 5.6 mg/L. The calibration curves were linear for all heavy metals ranging between 1- 5 mg/L with correlation determination (R^2) which 0.9999, 0.9999, 0.9998, 0.9998 for Cu, Fe, Cr and Ni respectively. Therefore, all parts of pineapple waste can be recycled and were safe to consume.

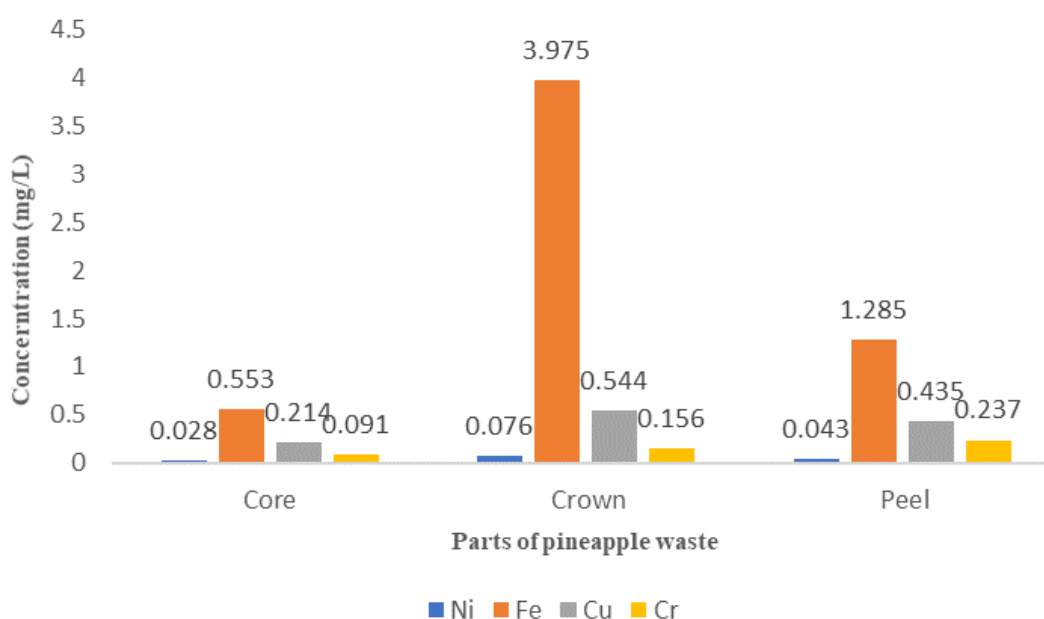


Fig. 1 Heavy metals concentration in different parts of pineapple waste

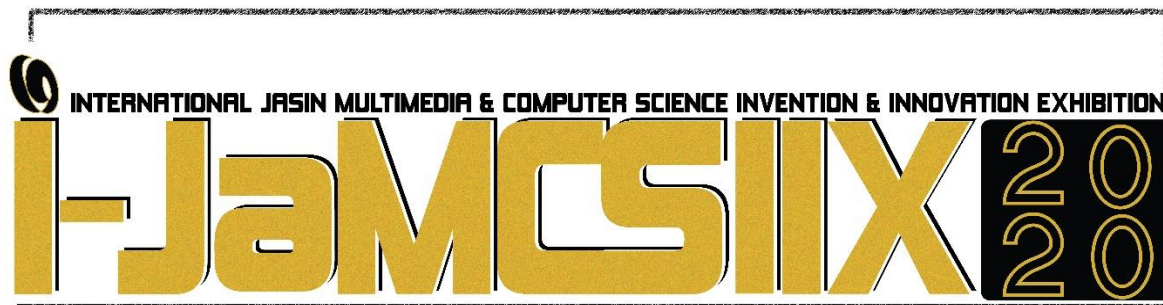
Table 1: WHO permissible limit	
Part of pineapple waste	Concentration (mg/L)
Fe	5.6
Ni	5.0
Cr	0.7
Cu	3.5

6 CONCLUSION

Results obtained show that all four heavy metals (Cu, Fe, Cr, Ni) being studied has the concentration below the limit as compared to the WHO permissible value. It can be concluded that the pineapple waste is consider safe to be consumed by human and animals. Moreover, this study may beneficial to the environmental issues which associated with the solid waste disposal.

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Smart Catalogue Mobile Application (SCM) with Beacon Device

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ABSTRACT

Catalog is one way of promoting their business, goods and services to the customer by way of supermarket, shop and mart. The printed catalogue has been the helpful approach of promoting to the customers for the last decades. Unfortunately, there have been massive issues with such a printed catalogue. The purpose of Smart Catalogue Mobile Application (SCM) is to create a smart catalogue mobile application to the customer smartphone. This application is use Internet of Things product which is beacon device that will detect and send a push notification towards the customer smartphone when the customer enters the store. The SCM project will solve the problem that occurred on printed catalogue. Besides, SCM have many more advantages than printed catalogue which are SCM provide a push notification, SCM provide beacon notification and SCM developed for green development. For the testing of SCM catalogue, WW Food Mart has been chosen to be first store that used SCM catalogue.

KEYWORDS: Internet of Things (IoT), Mobile Development, Web-based

1 INTRODUCTION

The catalogue has been a significant impact on the customer in which they thinking and decisions about what they will buy at the supermarket [1] . The catalogue has been used as a major medium to advertise the product at the supermarket. We need to know whether catalogue helps the customer in buying the product. Besides, the advantages and disadvantages of the catalogue also need to be recognized to create a good catalogue which to give sight for the customer during shopping at supermarket, mart or shop. A survey has been conducted to answer all these questions. Based on the survey, the catalogue is very effective in supporting

decision making for customer buying item. On the other side, paper catalogue lead to wasting paper and disturbing customer because the catalogue was thrown away into the trolley.

The impact from that makes the customer feels annoying when they saw the catalogue been thrown away into a trolley that they want to use. As a result, throwing the catalogue into trolley is one of the habits at the supermarket, mart or shop. The result of the survey also shows that the customer is not alert about catalogue that gives away from the supermarket where the catalogue not distributed to customers and some of the catalogue that been placed at catalogue rack was not noticed by the customer. In the end, the catalogue has only been a replica at the catalogue rack.

In modern technologies, mobile devices have been used as a great platform in advertising product and mobile advertising grows faster as result predict that \$65 billion profit by 2019 only in United Stated. In other hands, mobile devices approaches will maximize customer looking into the catalogue and offer that been advertise. By developing a mobile catalogue, can give more awareness and help in deciding for a customer to buy an item. BLE (Bluetooth Low Energy) beacon is a tool that determines the positioning of the customer into a mall where catalogue will be pop out and notify into customer mobile devices [2]. This technique helps auto push up a notification about offer catalogue. Besides, business advertisement cost process can be reduced because reduce in paper uses and towards the green environment.

2 OBJECTIVES

There are four objectives for this project:

- i. To gather and analyze data needed for SCM.
- ii. To design SCM interface for web-based and mobile application.
- iii. To develop SCM web-based and mobile application.
- iv. To integrate Beacon with SCM mobile application.

3 SIGNIFICANCE (S)

The significance of this project is to improve advertising processes and management using the catalogue at the supermarket. This strategy could really help the supermarkets develop a new approach to advertising their product catalogue. It should make it easier for supermarkets to handle their inventory as well as lower marketing costs. Supermarket can also go for green environment since reducing usage of paper. Business process can be more fluent and fully utilize of catalogue since customer will get push up notification directly when they enter shop. Smart catalogue be new business advertisement processes.

4 METHODOLOGY/TECHNIQUE

The Waterfall Model is chosen to be used in developing SCM is because of its suitability to the project itself. It is suitable because this project is a simple, small and straightforward project and all the requirements can be specified in the early phase of the Software Development Life Cycle (SDLC). Other than that, the approach of this model; which is to not proceed to the next phase until the current phase is all done is also one of the reasons why this model is chosen. By using this approach, it can be ensured that all the tasks and deliverables have been done and achieved before moving to the next phase. Fig. 1 shows Waterfall model phase in SCM.

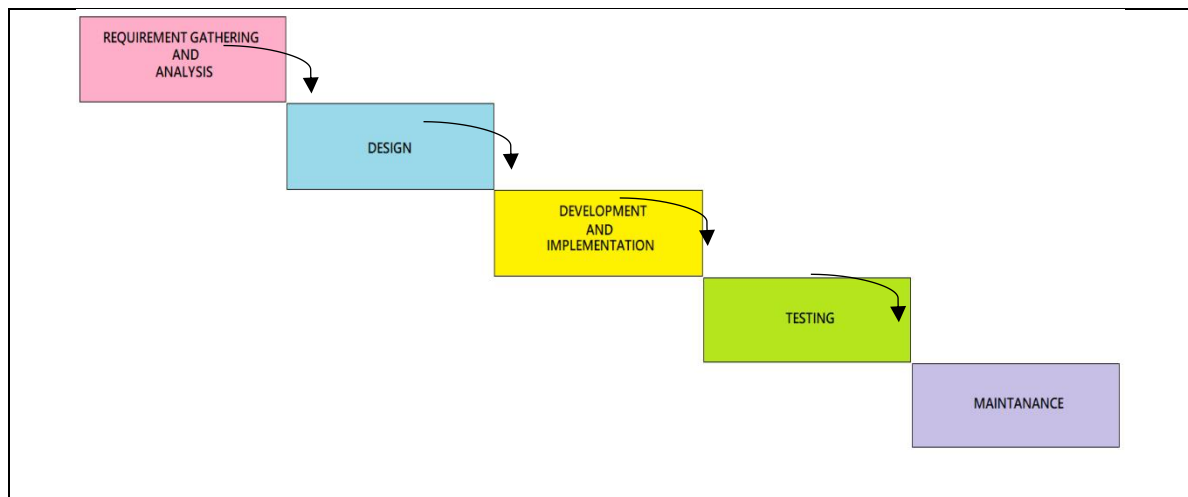


Fig 1 Waterfall model phases in SCM

(Source: Mahalakshmi & Sundararajan, 2013)

5 RESULT

Smart Catalogue Mobile Application (SCM) was created in web-based and mobile application (Refer Fig. 2 and 3). The web-based used to create a new catalogue from management and customer will receive the catalogue throw out the mobile application. These two applications were integrated using one database which is server database. The supermarket management only need to create a new catalogue from the web-based system. Besides, there are features which supermarket management can notify their customer regarding to the new sales and offer and the supermarket. The customer will get a notification through mobile application of the catalogue from the supermarket management.

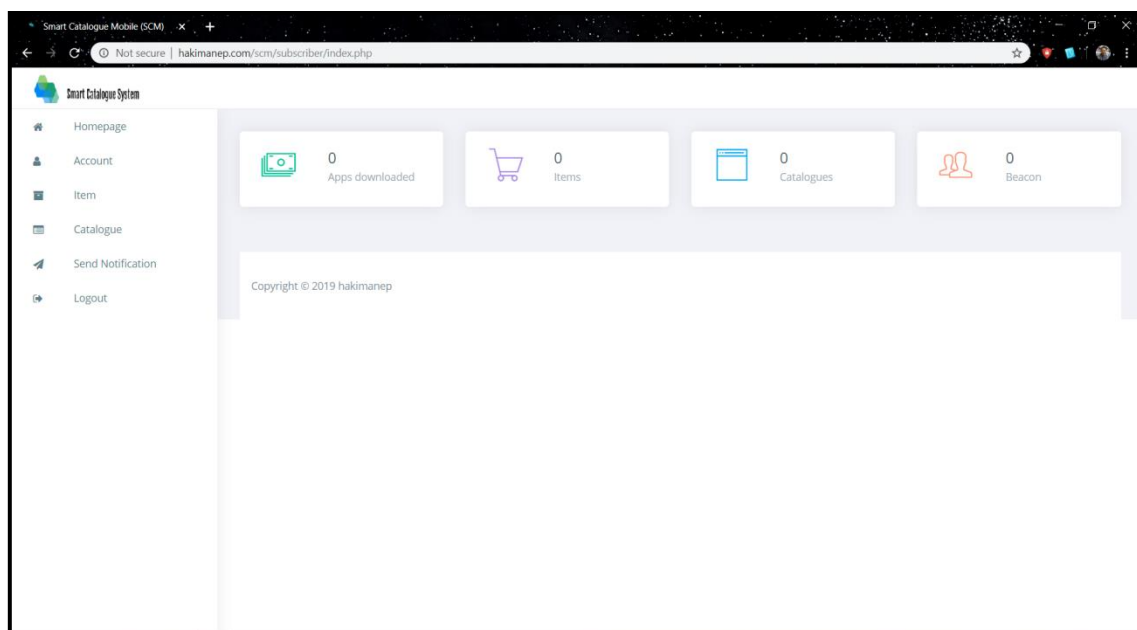


Fig. 2 Homepage for SCM web-based

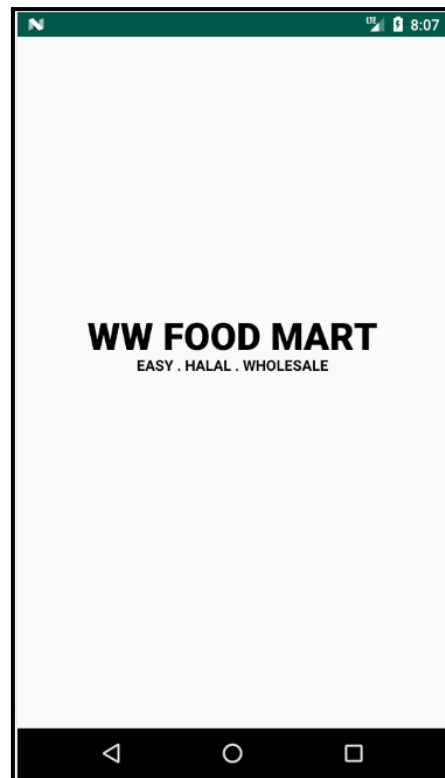


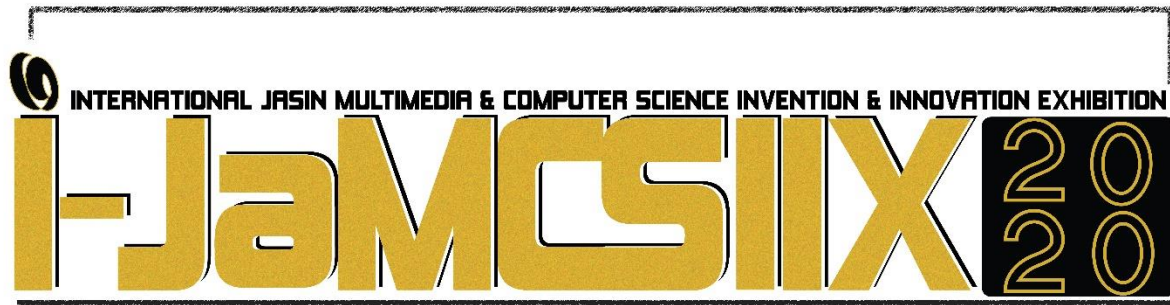
Fig. 3 Home screen for SCM mobile application

6 CONCLUSION

Smart Catalogue Mobile Application with Beacon device (SCM) is web-based system and mobile application with push notification from beacon device. The aim for SCM is to create a push notification catalogue based on android mobile application. Instead of using the printed catalogue that will costly to management and effect to environment wasted using paper. The challenge of this mobile application is limited beacon devices that use to detect the customer as well as give the customer the notification to smartphone. In short, the key of this project development of convenient, secure, and accurate mobile application which is being built on Android platform. All the objectives of this project were achieved after carrying out the activities during each of the methodology phases.

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Anti-Driving While Intoxicated Device (Anti-DWI Device)

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ABSTRACT

Driving while intoxicated (DWI) caused by alcohol can increase the risk of a road accident. This is because a drunk driver is 13 times more likely to cause a road accident compared to a sober one. The cases of road accidents due to DWI have risen alarmingly and the consequences are dire that includes minor injury, major injury, or even death towards the driver, passengers, or pedestrians. To prevent road accidents, a solution needs to be done before the driver operates the motor vehicle. So, the objectives of this project is to design and develop a prototype device called Anti-Driving While Intoxicated Device (Anti-DWI Device). This device can detect the alcohol level, temperature, and heart rate of a person before driving. These three stimulants will be detected by three sensors and these sensors are controlled by a microcontroller that applies Arduino code. When the person exhibits the signs of intoxication, the engine of the motor vehicle will not start. A message will then be sent to a registered family member to inform of the situation as to make certain the intoxicated person can get home safely. Consequently, it will prevent the driver from driving and curb road accidents from happening. This situation will not only benefit the driver but also other people on the road in terms of safety. Overall, the result of designing and developing the prototype device is successful.

KEYWORDS: intoxicated, drunk, driving, accidents, safety

1 INTRODUCTION

Road accidents are common worldwide. In Malaysia, the number of road accidents has increased yearly. From the report, it shows that the rate of fatal road accidents in Malaysia was among the highest in the world [1]. Detailed information on the number of road accidents is presented in Table 1 [2], [3], [4].

Table 1 Statistics of Road Accidents from Year 2012-2018

Year	Cases
2012	462,423
2013	477,204
2014	476,196
2015	489,606
2016	521,466
2017	533,875
2018	548,598

One of the causes of road accidents is drunk driving. Drunk driving is an offense of driving a motor vehicle with an excess of alcohol in the blood. There are many terms for drunk driving which are DWI, DUI, OUI, and OWI [5]. DWI is an acronym that stands for ‘driving while intoxicated’ or ‘driving while impaired’. DUI is an acronym for ‘driving under the influence.’ OUI is an acronym that means ‘operating under the influence.’ OWI is an acronym for ‘operating while intoxicated’ A drunk driver is 13 times more likely to cause a road accident compared to a sober one. People who are involved in DWI road accidents may endure a minor injury or major injury and the worst-case scenario is death. The statistics of road accidents due to DWI is illustrated in Table 2 [6].

Table 2 Statistics Of DWI Road Accidents from Year 2012-2018

Year	Death	Serious Injury	Minor Injury	Total
2012	136	50	60	246
2013	207	47	73	327
2014	192	56	84	333
2015	229	95	96	420
2016	237	113	111	461
2017	58	81	73	212
2018	54	74	63	191

From Table 2, it can be seen that the trend of DWI road accidents increase from the year 2012 to 2016, but decrease from the year 2017 to 2018. Although the statistics shown are only until the year 2018, there are many recent road accidents because of DWI that can be read in newspapers or heard via televisions or radios. The reports indicated that the driver was unharmed while other people suffered from a minor injury, serious injury, or death [7], [8], [9]. In Kuala Lumpur alone, it is said that 158 drunk drivers have been arrested earlier this year, January 2020 [10]. Currently, the driver is only tested on alcohol consumption after road accidents occurred [8]. However, a solution needs to be done before the driver operates the motor vehicle to prevent road accidents from happening.

2 OBJECTIVES

The objectives of this project are to design and develop a prototype device that can detect the alcohol level, temperature, and heart rate of the driver before driving.

3 SIGNIFICANCE (S)

The significance of this project is in terms of safety on the road. The prototype device will be used before the driver drives. It will prevent the driver from driving if the driver is found to exceed the alcohol level legal limits, have low body temperature, and have a slow heart rate. Additionally, family members will also know about the situation as they will receive a message

that inform them about it and bring the intoxicated driver home safely. Therefore, road accidents due to drunk driving will not take place and many people will benefit from the use of this prototype device regardless of the driver or other people.

4 METHODOLOGY/ TECHNIQUE

Design and Program Code:

The philosophy of design is mini size, effective, and commercial. CAD software was used in the designing stage. Based on the identification of intoxicated symptoms which are alcohol level, temperature, and heart rate, the program code was prepared to signal the sensors. If the output is satisfied, the next stage is to fabricate the prototype. In this project, the Arduino code was used as the main operating code.

Prototyping and Testing:

The prototype was built using Arduino as a microcontroller and three types of sensors which are an infrared temperature sensor, heartbeat sensor, and alcohol sensor. Then, the test was conducted to ensure the output as the design project. According to Section 45G of the Road Transport Act 1987, a person is intoxicated when the concentration of alcohol in the breath is 35 microgrammes of alcohol in 100 millilitres of breath which is the prescribed limit [6]. Other than that, the person is also intoxicated when the body temperature is low and the heart rate is slow [11]. When the person exhibits these signs of intoxication, the engine of the motor vehicle will not start. A message will then be sent to a registered family member to inform of the situation as to make sure the intoxicated person can get home safely. Fig. 1 shows the 3D diagram and installation of the prototype device on the sun visor at the driver's side.

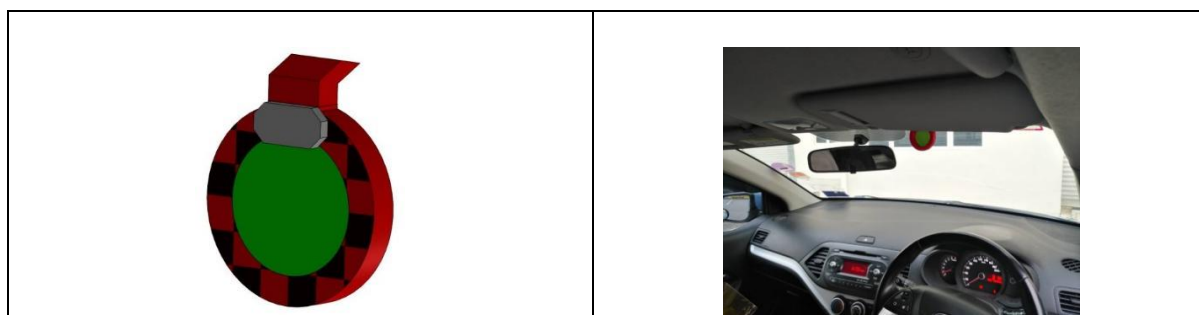


Fig. 1 Prototype of Anti-DWI Device

5 RESULTS

The operation of prototype has been tested for its effective time detection DWI by using multiple sensors of alcohol (A), temperature (T), and pulse rate (P) sensors as demonstrated in Table 3. The effective time detection by using a single sensor alcohol is 3 seconds, followed by 10 seconds of combined alcohol and temperature sensors. The additional of pulse rate sensors resulted of 16 seconds of effective time detection. The effective time detection of DWI prototype by applying three types of sensors is acceptable since the values are still 30 seconds.

Table 3 Effective Time Detection of DWI Prototype by using Multiple Sensors

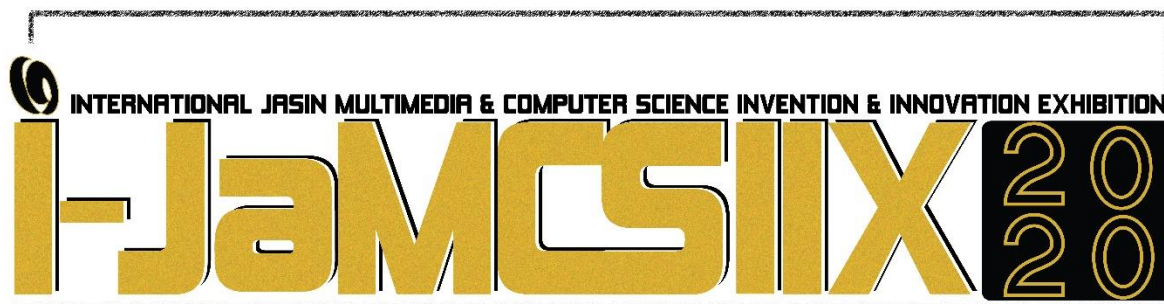
Apply Sensor	A	A+T	A+T+P
Effective Time (Second)	3	10	16

6 CONCLUSIONS

This project achieved the objectives which are to design and develop a prototype device that can detect the alcohol level, temperature, and heart rate of the driver before driving. The effective time detection of DWI condition of this prototype is 16 seconds combined of three sensors. The prototype device can be commercialized as an additional feature in automotive industries to emphasize safety. However, the prototype could also be improved in terms of design and material used. The design should take into consideration of vehicle's interior design.

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Identifying the Factors Affecting Internet Memes to Become Viral on Social Media

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ABSTRACT

Memes is a post that social network user usually post in social network to convey messages, feeling or opinion in sarcastic ways. The tendency of people using memes nowadays should be exploited by the people in good and more useful ways. The aim of the study is to examine the factors contributing to the largest number of internet memes shares or its virality. The data of the study is obtained from a famous Malaysian Facebook named 'Gag Malaysia'. Negative Binomial Regression was used to find the factors that affects the number of shares. In the Negative Binomial Regression analysis indicates that all variables are significant except for the main effect of Types of Memes and Self-enhancing, the main effect of day of posting and Weekdays and the Number of Comments.

KEYWORDS: memes, viral, social media, statistics

1 INTRODUCTION

In this modern 21st century, the rise of social media and social networking has transformed communication landscape drastically. Nowadays, any information and news can be easily shared and received anywhere and anytime by just using the internet. Even though this situation has given a lot of advantages, it also can produce some bad effects if it is not used properly.

The Internet *memes* is a term commonly used to spread contents such as jokes, pictures, and rumors from online users to others through the webpage. The example of the content of *memes* is shown on Fig. 1. The meteoric growth of community websites, such as Facebook, Twitter and LinkedIn, have brought the world into a new era of social media (M.Saravanakumar, 2012). It is supported by (Shifman, 2013), who found that *memes* are just like genes, will go through the processes of competition, selection, and preservation. *Memes* also need to compete among themselves to gain from peoples.

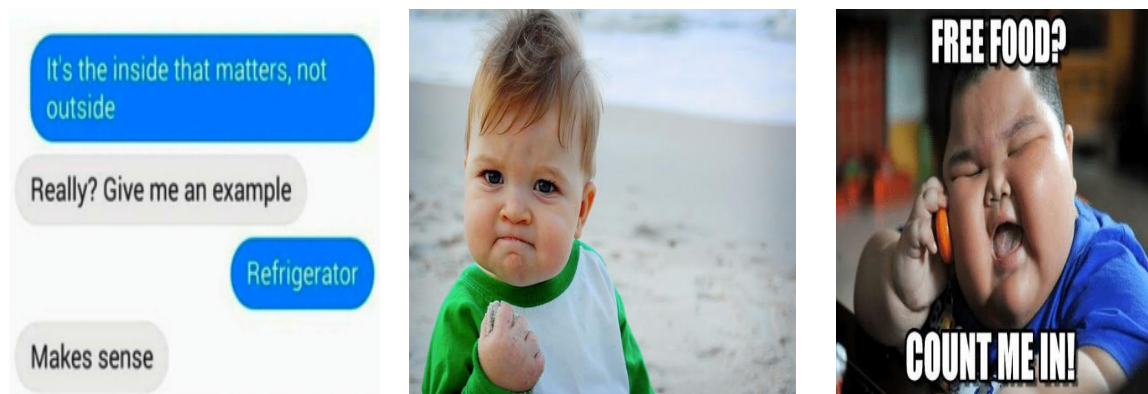


Fig.1 Example of *memes* with the content of text, image only and both image and text (*image by google*)

When there is a post that is famous or trending among online users in social network, it will become ‘viral’. ‘Viral’ came from the word ‘virus’ which generally defined small infectious agent that replicates only inside the living cells of an organism (Moreau, 2019). On the internet, however, when people are "infected" when they see it, a piece of content will spread like a virus. According to Moreau (2019), the infection will influence a social network user to share the post so that they can relate it with other people and discuss how they feel about it. The more people share the post, the higher the tendency for the post to appear in our latest feed. Therefore, we can say that the virality of a post is based on number of shares.

Nowadays, *memes* are used as a platform for social network users such as Facebook, Instagram, Snapchat and Twitter to convey their messages in form of images towards other social network users. The characteristic of *memes* is contagious. It means that a *meme* is easily spread and viral among social network users if other people find it interesting.

2 OBJECTIVE

The objective of this study is to analyze the factors that contribute to the number of shares of internet *memes*.

3 SIGNIFICANCE (S)

The significance of this research will give benefit mostly to online users. The online users will find a more effective and suitable ways to spread an information widely in the social network. This study shows the type and criteria of *memes* that have high number of likes and shares. In social media, advertisers and advertising professionals working on the viral campaign can use the information to efficiently and creatively promote their new product or advertisement using *memes*. This is called ‘viral marketing’, which is widely used by business online users in social network in this era. Finally, this study also propose the type of *memes* which have the greatest number of shares and likes for the advertisers to be included on their viral campaign.

4 TECHNIQUE

Nowadays, most people, who are likely a social network user, tend to express their humour in social network using *memes*. An interesting *meme* will be easily spread and gone viral in social network. This study explores the ‘Gags Malaysia’ page in Facebook. This page has about

589000 likes. This page is chosen because it is a portal that collects and posts internet jokes in picture format on a daily basis.

Gags Malaysia already have shares more than 10 thousand *memes* or jokes in image format. Three hundred *memes* were chosen from the *memes* that posted from 3rd December 2018 to 23rd of August 2019. In summary, there are many factors contribute to number of shares such as number of like, number of comments, line of text content, days of posting and types of *memes*. Table 1 shows the explanation and the role of the variables. However, there are only several factors which can give positive impact significantly to the number of shares.

Table 1 Description of variables

NO	VARIABLES	DESCRIPTION	ROLE
1.	Type of <i>memes</i>	Consists of four types: Affiliative, Aggressive, Self-Defeating, And Self-Enhancing. It will be divided by researcher's judgement on the <i>memes</i> based on the keyword below: Affiliative: funny things, jokes, cheerfulness, relationship satisfaction, positive moods and emotions Self-Enhancing: self-esteem, avoid negativity, healthy defence mechanism Self-Defeating: negative feelings, emotional neediness, low self-esteem, depression, anxiety Aggressive: Sarcasm, teasing, put down, anger	Input
2.	Number of likes	Number of people that liked the post.	Input
3.	Content	Consist of two types: image, text or both.	Input
4.	Line of texts	Number of texts written in the <i>meme</i> .	Input
5.	Day of posting	In what day the <i>meme</i> is posted.	Input
6.	Number of comments	Number of people commented at the post.	Input
7.	Number of shares	Number of peoples who shared the post.	Output

The method chosen in this study to find out the relationship between independent and dependent variables. It helps to identify the significant factors that affect the number of shares or rate of virality of a *meme*. The methods that used was Negative Binomial (NB) regression as follows. The Negative Binomial Regression was applied because there was over-dispersion issue exist when using Poisson Regression where the data is countable.

$$P(y | X) = \frac{\Gamma(y + \alpha^{-1})}{y! \Gamma(\alpha^{-1})} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu} \right)^{\alpha^{-1}} \left(\frac{\mu}{\alpha^{-1} + \mu} \right)^y$$

where α^{-1} = dispersion parameter

5 RESULT

Based on the analysis and findings the result for Negative Binomial Regression method, all variables are significant except for the main effect of Types of Memes and Self-enhancing, the main effect of day of posting and Weekdays and finally the Number of Comments as depicts in Table 2.

Table 2 The significance of parameter of negative binomial regression

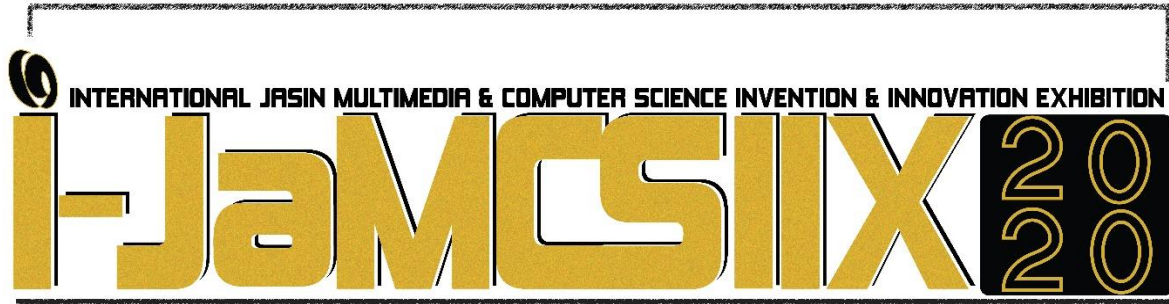
Interaction Within Variables	Parameter Estimate	p-value
Constant	3.902	0.000
Main effect of Types of Memes and Affiliative	0.352	0.049
Main effect of Types of Memes and Self-enhancing	0.225	0.176
Main effect of Types of Memes and Self-defeating	0.666	0.000
Main effect of Types of Memes and Aggressive	0.000	0.000
Number of likes	0.000	0.0000
Main effect of Content and Image	0.377	0.0211
Main effect of Content and Text	0.532	0.008
Main effect of Content and Both	0.000	0.014
Line of Texts	0.063	0.002
Main effect of Day of Posting and Weekdays	0.108	0.420
Main effect of Day of Posting and Weekends	0.000	0.000
Number of Comments	-0.00005541	0.748

6 CONCLUSION

Negative Binomial Regression method was used to find the factors that affect the number of shares. The analysis of Negative Binomial Regression shown that all variables are significant since all of p-value is less than 5% significance level except for the main effect of Types of Memes and Self-enhancing, the main effect of day of posting and Weekdays and the Number of Comments. The further research should consider to increase the sample size to get more accurate and precise result. It is recommended to add different variables that may affect the number of shares.

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Intelligent Traffic Control (i-TC) for Road Construction

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ABSTRACT

Work operation in heavy construction site requires high safety level, which includes the management of the traffic congestion near the constructed road. Nowadays, many roads require maintenance or newly built construction thus disturb the road traffic, especially near the narrow road. This problem will cause traffic congestion from two opposite directions and hence the user should wait longer. To cater such problems, Intelligent Traffic Control (i-TC) was innovated for mitigating the purpose. With an improved characteristic, i.e. portable and easy operation, the product can be used at shuttle working sites with restricted road condition of one-directional road route. Our aims to construct a smart portable traffic light that can control the flow of the car at an affordable cost comprises of microcontroller, RF receiver and transmitter, and I/O accessories of the button and LED arrays. As results, this invention could increase productivity, shorten the required time and human intervention for traffic patrolling, and ultimately reduce the operating costs. The better coordination between two roadsides ensures a smoother traffic flow.

KEYWORDS: intelligent system, smart traffic control, safety, road construction

1 INTRODUCTION

According to the statistic that has been issued by Road Safety Department (Malaysia), the number of accidents that caused by road defects is increase over years. On average, 11.25% of the total number of road traffic death is related to these road defects [1]. Moreover, it has identified that road construction can cause congestion which leads to car accidents as well. The only way to lower this percentage by repairing the road damage back to the original condition. Current operation of managing the road traffic during road construction was either conducted by manual intervention or operated by stagnant indicator. However, existing approach was inefficient due to driver's limited eyesight, hence may cause accident to occur [2]. Considering the factors which drives the accident, new approach by innovating the existing method at low cost product development in order to handle the traffic congestion during construction has necessary to be developed.

2 OBJECTIVE

The objective of this work aims:

- i. To design an intelligent and low-cost traffic control system for road construction.
- ii. To develop an algorithm mechanism capable to automatically control the traffic congestion without human intervention.
- iii. To compare the system performance before and after the technology implementation.

3 SIGNIFICANCE

The significance of the intelligent-Traffic Control (i-TC) [3-4] for road construction seems important to cater the issue of manpower utilization known as flagman to control the traffic queue that might pose the probability of accident. This portable traffic light system is more effective to be used for two-way road where one way is under construction or maintenance and the other ways is used for vehicles traffic. Moreover, this i-TC is very useful in construction area such as road construction. It can help with the traffic flow as it will manage the traffic to flow smoothly compared to use a flagman to control the traffic. To solve all this problem, i-TC has been built to increase productivity, shorten the time for the road works to complete as the construction workers can only focus on repairing the road and it also can reduce the costs of construction works. This is because, Portable Traffic Light is built using a low-cost component [5-6]. This project will assist to improve our industry and economy. With this project, the communities are aware about the importance to keep the safety at the road that under construction. This to keep away the communities from any accident that may happen at the construction area. Thus, by using i-TC is the simple way to communicate directly with the drivers compared by using flaggers. Besides, the innovation allows flagger to do other works that is needed within the area which means more works can be accomplished at a faster rate. Other than this i-TC can keep the safety of the flagman, by keeping away from exposed to vehicle conflicts or to deal with angry motorist and there is no longer a need to rotate flagman works every two hours.

4 METHODOLOGY/TECHNIQUE

The project has been developed by using Arduino Uno microcontroller, radio frequency HC12, push button, LED and relay [7-9]. Besides, the programming wise using the microcontroller with RF connectivity module was developed in order to light up the LED based on the three designated of light sequence. Once the first circuit (TL1) turns red, it will transmit the data through the radio frequency to another circuit (TL2). The TL2 would receive the data and then turns green. This will continuously be repeated since this circuit involves relay at both sides. The designed system also incorporates the safety measure which is equipped by a reset button. Each time the reset button is pressed, it will transmit the signal to the TL1 and the red led will light up before the sequence started. Furthermore, the connectivity module using HC12 as radio frequency to transmit and received signal capable of transmitting signal up to 1km, which is considerable sufficient for this kind of application. The function of this LED is to check the sequence of the right LED. As we all know this portable traffic light are putting opposite to each other, so it is difficult to check either the other side of the traffic light is running the correct

sequence. Therefore, this LED that is connected directly to the left traffic light is used to display the TL1 light.

5 RESULT

Experiments were conducted in the lab scale environment to examine the product functionality. This is the condition when the TL1 turns green while TL2 turns red. Radio frequency is used to transmit and receive the data. While the delay time is needed to prevent both traffic light from being overlapped. According to the coding, it mentioned about yellow LED, but this project only used red and green led so the yellow LED command can be ignored. Since this Portable Traffic Light is not using yellow LED it will cause danger to the user as yellow light on the traffic light means the user need to be caution as it will chance the colour to red, so the time delay is increase at red LED and this is to make sure at both side of the road is clear to proceed turning into green light. Fig. 3 demonstrates several conditions examined according to its sequence of the i-TC; Firstly, TL1 at red light condition while TL2 is at green light condition. Secondly, both TL1 and TL2 are at red light condition and this show the delay time at set A for red led is increasing. Thirdly, the condition for TL1 in green light condition while TL2 at red light condition. Finally, both TL1 and TL2 are at red light condition and demonstrates that the delay time at TL2 for red led is increasing. Meanwhile the performance of the i-TC was measured by varying the distance and examine the button functionality as tabulated in Table 1.

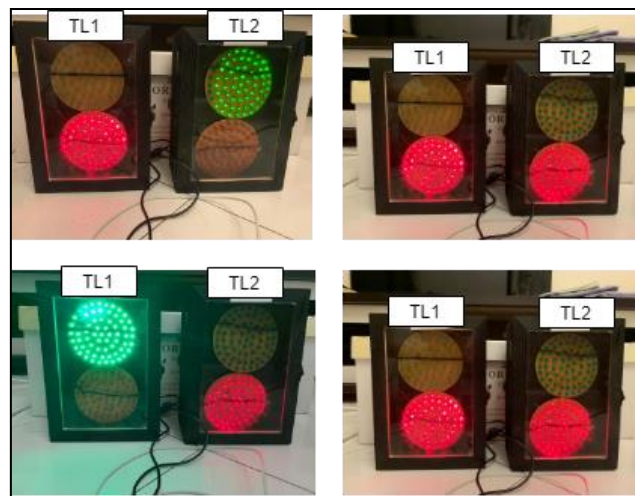


Fig. 1 Verification of results for the traffic sequence

Table 1 Delay timing experiments on different button functionality

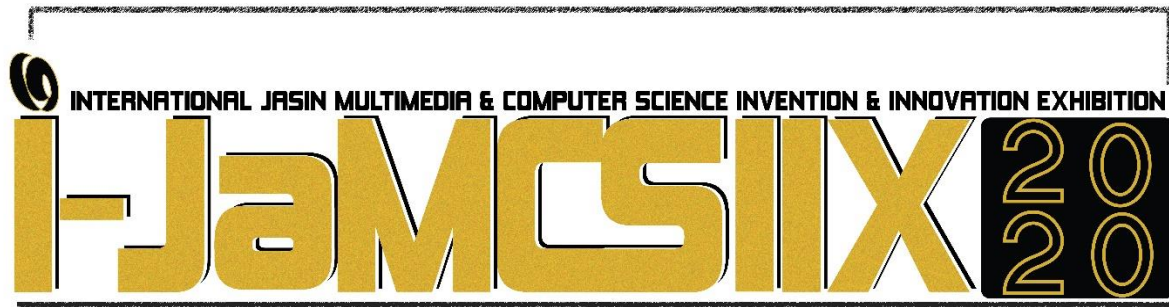
Traffic Light (TL) sequence	Button 1 (below 10m)	Button 2 (between 10m to 90m)	Button 3 (greater than 100m)
TL1: Green, TL2: Red			
TL1: Red, TL2: Red			
TL1: Red, TL2: Green	10 sec	20 sec	40 sec
TL1: Red, TL2: Red			

6 CONCLUSIONS AND FUTURE RECOMMENDATION

In conclusion, this i-TC is built to design a smart traffic control for road construction. It assists with the traffic flow and manage the traffic smoothly as compared to manual control using manpower. The i-TC has been built to increase productivity with low-cost product development, shorten time for the road construction works to complete as the construction workers can only focus on repairing the road and it also can reduce the costs of construction works. As suggestion for future recommendation, the improvement on the product can be improved by adding counter clock which able to avoid an increased in delay time. Another feature improvement by adding the warning alarm. An additional alarm in this system can alert the user if the traffic light is not working. The alarm will turn on and send to user so the user could respond faster. Finally, this project can be further improved by adding a sensor to detect the car. This sensor supports to control the i-TC based on the density of the vehicles beneficial to avoid traffic congestion.

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Eduplay Dashboard Application

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ABSTRACT

As the use of technology evolves in education, an extensive range of new smart devices and digital applications is becoming available to academics. Eduplay Dashboard is an example of such technologies, which can help educators to improve the learning experience of their students inside and outside of the classroom. This app allows access to mediate and self-access services, as well as databases, online quizzes, go live, create game, slide presentation and etc. The project provides Mobile and Web-based application tools (apps) that allow online access for different users - students, instructors, and administrators. In addition, the app provides integrated all the existing free game based interactive learning platform and presentation tools into one center control.

KEYWORDS: Mobile learning, mobile application and service, teaching and learning, Software Development

1 INTRODUCTION

The emergence of smart device technologies and mobile applications is offering educators new platforms to engage students with class material and facilitate classroom discussions. The continued surge by students to adopt smart devices as an integral part of their educational experience is also forcing educators to adapt their teaching styles in utilizing these new technologies. Thus, Eduplay dashboard application is a hub that integrated all the existing free games based interactive learning platform such as Kahoot, Padlet, Quizlet and others. Eduplay dashboard also collects all presentation tools such as Powtoon, Prezi, Visme and others into one control center.

Eduplay Dashboard application contains three main interfaces include learning tools where there are 20 interactive learning platforms in which user can choose and then create their own quizzes and content in a second, play anywhere, anytime on their own. The second interface is presentation tools that also contains 20 types of presentation platform such as that you can choose and create your own slide in a second, use anywhere anytime on your tablet or PC. Eduplay Dashboard can help user to get familiarize with variety interactive learning and presentation tools.

2 OBJECTIVE

The purpose of this study is to explore the level of acceptance of Mobile Learning among students and lecturers.

3 SIGNIFICANCE

Eduplay Dashboard applications can be created and played on the go. It is also make searching easier in one stop centre.

4 METHODOLOGY/TECHNIQUE

Method of analysis used is descriptive and uses questionnaire as a research instrument. The questionnaire was used to show the level of acceptance of using Eduplay Dashboard Applications. The participants in this study were Polytechnic students and lecturers. They were 32 students of Diploma Islamic banking and finance and three lecturers from Polytechnic Metro Johor Bahru.

5 DISCUSSION

Overall, most of the students pointed out that they prefer using Eduplay Dashboard applications because they are meaningful, especially for student who always need such applications because it takes a more time to find the learning and presentation tools platform for performing assessment task with Eduplay Dashboard searching easier because all learning and presentation tools already in one control center. Furthermore, they declared that they like using Eduplay Dashboard applications due to their educational benefits. They find it more fun and interesting during learning when using Eduplay Dashboard.

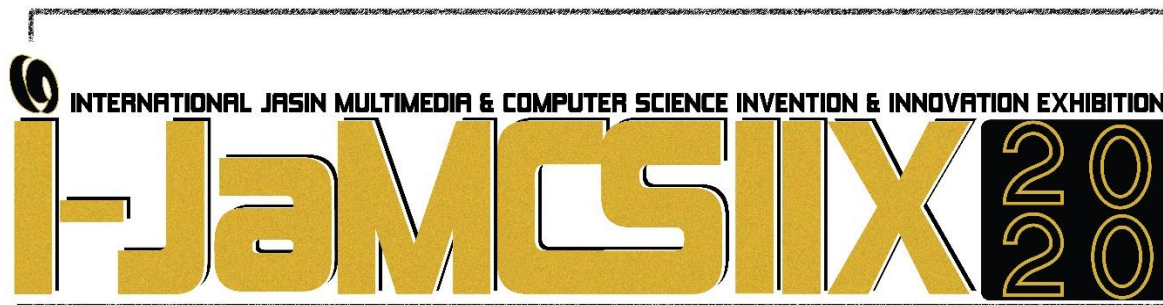
The feedback from lecturers towards using Eduplay Dashboard applications were positive and similar to some extent. There was no contradiction among them. They explained that using Eduplay Dashboard applications have a lot of advantages in terms of access to information and convenience, they can ask their students to play on the go quizzes. They also agree that through Eduplay Dashboard application can encourage more effective use of interactive learning tools.

6 CONCLUSION

In conclusion, this application provides an easier platform to search the provided learning and presentation tools, save time and there have many choices. Eduplay Dashboard can help more student and lecturer to be more active and creative in their assessment task using this application.

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Planet Jawi: Mastering Jawi Through Gamified Assessment

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ABSTRACT

Jawi is an art of writing that originated from the Arabic writing system, which is Arab letters infused into the Malay writing system. Nowadays, the lack of use of Jawi and the assumption that Jawi is challenging to learn to cause the young generation now slowly to forget Jawi and deny this language. Based on the preliminary study conducted, most of the student agrees that Jawi is a crucial subject and student strongly agree that they did not enjoy learning Jawi through a traditional method such as a textbook. Hence, this project develops an application, namely *Planet Jawi*, to learn Jawi through gamification. The target audience for this application is students ages seven to nine years old. This project implemented Rapid Application Development (RAD) as a method to design and develop *Planet Jawi*. The application involved three topics about Jawi such as basic Jawi Alphabet, which comprises 37 Alphabet, '*Huruf Jawi tidak Bersambung*', and '*Padan Huruf*' which cover '*Huruf Vokal*' topics. For the future works of *Planet Jawi* application, the use of a variety of languages such as English can enhance to attract more users and variety the content covered in Jawi.

KEYWORDS: Jawi, Gamification, Learning, Rapid Application Development (RAD)

1 INTRODUCTION

Nowadays, the usage of multimedia applications in education has its strength to meet the needs of the 21st-century learning method. Multimedia act as one of the medium for the educators to represent their information towards the student. The generation of this 21st century needs to think out of the box and be creative besides being knowledgeable in technology and sciences. One solution is to introduce educational games [1]. According to [2], computer games can make the learning process easier to understand and improve cognitive skills among children.

Gamification refers to the enrichment of software with design features known from games to invoke similarly engaging experience as games do [3]. According to [4], he defines gamification is used in learning and contains game-based mechanics, aesthetics and game thinking. Gamification is used to engage people, motivate action, promote learning and solve

problems. The component of the games is mechanics, which contain a set of rules and feedback loops that make the game enjoyable [5]. Other than that, the purpose of gamification is to give players' experience, increase players' motivation, and engagement while playing games [6]. A student who is learning through the gamified assessment will more motivate to exploring the knowledge and having fun. The benefits of implementing the gamification approach give us the motivation to develop Jawi application.

The assumption that Jawi is challenging causes the young generation to deny this language gradually. Kids need to learn Jawi in their childhood moments. Although to learn Jawi is vital to the Muslim in Malaysia, studies on learning and writing Jawi are still lacking. There are a decreasing number of Jawi writing in printed materials and other media, including electronic media [7]. Therefore, a Jawi application through the gamification approaches needs to develop to help kids in their learning process.

2 OBJECTIVES

The project aims to design and develop an application named *Planet Jawi* to learn Jawi through the gamification approach. In accomplishing the main aim, the following specific objectives need to achieve: 1) to design a 2D dimension about *Planet Jawi: Mastering Jawi Through Gamified Assessment*, 2) to develop an application *Planet Jawi: Mastering Jawi Through Gamified Assessment* and 3) to evaluate the enjoyment in Jawi learning through *Planet Jawi: Mastering Jawi Through Gamified Assessment*.

3 SIGNIFICANCE (S)

The advancement of technology has exposed children to a gadget such as smartphones, iPad and tablet. Children use this application as a practical learning tool compared to the book. Implementing gamification elements in the learning process will ease students to understand and memorize the content. Besides, the implementation gamification approach will help children to understand better, recognize and remember the Jawi script. The application focuses on learning Jawi, which includes a basic introduction to Jawi. By using this application, the children can practice Jawi by learning through the assessment and complete up the task provided. Besides, this application will be one of the learning tools to help parents and teachers to educate and teach their children about basic Jawi in an enjoyable environment. Children will not get bored in the learning process and become motivated to learn Jawi.

4 METHODOLOGY

Rapid Application Development (RAD) methodology is being implemented in this project because it provides more quality product in less time to meet the requirement. Besides, the RAD process involved directly integrates the end-user in the project's development. By identifying the flow of the project, it can reduce the time between the *User Design* phase and the *Cutover* phase, which can reduce the cost of project development. Therefore, the project will fit the users whose demands to complete much earlier than ever before. Fig. 1 shows the architecture of the RAD methodology model.

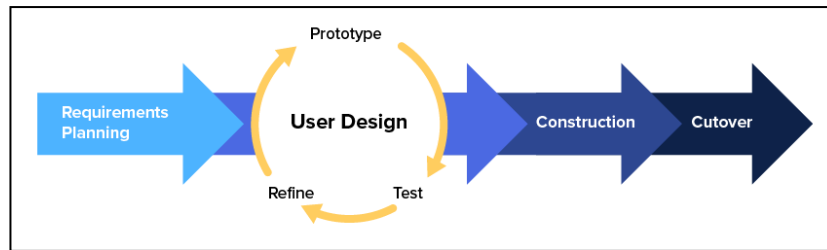


Fig. 1 The architecture of RAD methodology model

RAD methodology consists of four phases, including *Requirement Planning Phase*, *User Design Phase*, *Construction Phase*, and *Cutover Phase*. Each phase comprises their flow and process that can make the project more systematic. Fig. 2 show the part of the scene that produce during the *User Design* phase.



(a) (b)

Fig. 2 Part of the scene (a) and (b) in *Planet Jawi*

5 RESULT

In this study, we implemented the EGame Flow Model to measure the enjoyment experience of the respondents. The adapted version comprises seven elements, including *Concentration*, *Goal Clarity*, *Feedback*, *Challenge*, *Control*, *Immersion* and *Knowledge Improvement*. Each element includes a set of criteria for accomplishing enjoyment in games. To get feedback from users, they need to answer the set of questionnaires based on the EGameFlow Model after playing the game. We give each criterion into the Likert Scale from 1 to 5, which is between strongly disagree to strongly agree. Table 1 shown the result of the average mean for each element when doing the descriptive analysis. The analysis computed every average mean of the elements into a total average to identify the outcome of the evaluation. The result for the total mean is 4.53, or 90.6% of enjoyment experienced felt by the respondent while playing the game.

Table 1 The total of average mean

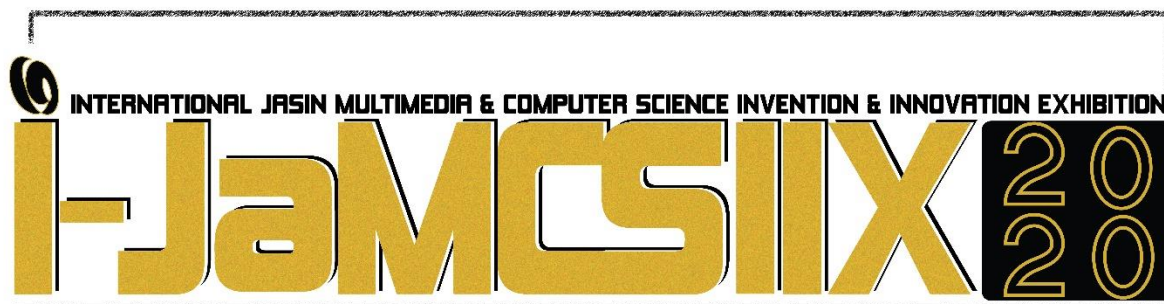
Element	Mean
Concentration	4.42
Goal Clarity	4.60
Feedback	4.52
Challenge	4.59
Control	4.65
Immersion	4.29
Knowledge Improvement	4.62
Average Mean	4.53 (90.6%)

6 CONCLUSIONS

According to the findings, the total average mean of all elements was 4.53 (90.6%), which is above the average scale. The highest mean score among the seven elements is the *Control* element, with a score of 4.65. The findings showed that the user enjoys while they have control in-game. This proof that element control is one of the essential elements to provide the student with an enjoyable experience.

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Saff-Chol Juice: Your Healthy Drink

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ABSTRACT

Atherosclerosis has been established to be an indolent inflammatory disease of the arteries which can give rise to coronary artery disease (CAD), one of the most prevalent causes of death in developed and developing countries. Saffron, one of the world's most expensive spices, is collected from dried stigmas of *Crocus sativus L.* Saffron exhibits favourable effects in the prevention or treatment of a variety of diseases including dyslipidemia, hypertension and diabetes mellitus. Our previous in-vitro work showed that Saffron downregulates gene and protein expressions of inflammation, endothelial activation and upregulate the gene of oxidative stress and inhibit monocyte- endothelial interactions which are the key events in pathogenesis of atherosclerosis. Thus, we have translated our research finding into saffron formulated drink; Saff-Chol Juice. It can be used as daily healthy drink to combat many atherosclerosis complications such as heart attack, stroke and renal failure. It is safe and easy to consume. This product may benefit patients with heart problem, hypertension and renal failure. It is also useful for smokers who is at risk to develop atherosclerosis.

KEYWORDS: Saffron, *Crocus sativus L.*, Formulated drink, Atherosclerosis, Dyslipidemia

1 INTRODUCTION

Cardiovascular diseases (CVDs) which include coronary heart disease are important component in non-communicable diseases (NCDs) which are the world's biggest killers. An estimated 17.9 million people died from CVDs in 2016, representing 31% of all global deaths [1]. In Malaysia, the population-based health survey which is known as the National Health and Morbidity Survey (NHMS) in 2015 showed that the prevalence of NCD risk factors

continue to rise. It is estimated that 3.5 million adult Malaysians living with diabetes, 6.1 million with hypertension, 9.6 million with hypercholesterolemia and 3.3 million with obesity [2]. The rapid increase in the number of people suffering from NCDs presents one of the biggest challenges to the current healthcare system in Malaysia. Therefore, research in recent years has sparked great interest among researchers towards prevention and treatment of atherosclerosis which is one of the main cause of CVDs. Atherosclerosis has been established to be an indolent inflammatory disease of the arteries which can give rise to coronary artery disease, one of the most prevalent causes of death worldwide. Statin, a HMG-coA reductase inhibitor has favorable pleiotropic effects on atherosclerosis. Though they have confirmed safety and efficacy profile, statins have been reported in epidemiologic and observational studies in which 15% to 20% of all patients on statin might suffer from different statin-associated adverse effects (SAAE) [3].

Saffron, the dried stigmas of *Crocus sativus* L. have been shown to exhibit favourable effects in the prevention and treatment of a variety of diseases such as dyslipidemia, atherosclerosis and myocardial ischemia [4]. Our previous in-vitro work showed that Saffron downregulates gene and protein expressions of inflammation, endothelial activation and upregulate the gene of oxidative stress and inhibit monocyte-endothelial interactions which are the key events in pathogenesis of atherosclerosis [5]. Thus, saffron has potential to be promising anti-atherosclerosis agent. Therefore, we formulated saffron drink; “Saff-Chol Juice” which has proven in in vitro study in attenuating atherosclerosis.

2 OBJECTIVE

To translate our research findings into saffron formulated drink, Saff-Chol Juice.

3 SIGNIFICANCE (S)

It is useful for patients with statin intolerance which develop side effects following statin administration. It can be used as daily healthy drink to reduce atherosclerosis complications, such as heart attack, stroke and renal failure. Therefore, hospital admission, mortality and morbidity rate, and financial burden of healthcare could also be reduced.

4 METHODOLOGY/TECHNIQUE

Saffron stigmas were tested for their effect on atherosclerosis by using human coronary artery endothelial cell (HCAEC). The significant amount to cause the atherosclerotic changes were determined. Crude saffron was later formulated as a juice in 250 ml amount which contain significant amount of saffron that has been proven in vitro study to cause significant effect in reducing atherosclerosis. Market survey on saffron juice prototype was done to 200 random people through online survey to get respondent feedback on the interest to buy the product.

5 RESULT

Saffron downregulates gene and protein expressions of inflammation, endothelial activation and upregulate the gene of oxidative stress and inhibit monocyte- endothelial interaction which are the key events in pathogenesis of atherosclerosis (Table 1). 250 ml Saff-Chol Juice prototype is produced with completed packaging bottle (see Fig 1). Market survey showed 89.0 % of respondents would be interested to buy the product (see Fig 2).

Table 1. Effect of Saffron on various atherosclerosis markers.

Atherosclerosis Marker	Minimum Saffron concentration (ug/mL) that cause significant changes of atherosclerosis marker	p-value
eNOS	25	< 0.05
DCFHDA	31.3	< 0.01
IL-6 protein expression	3.1	<0.05
IL-8 protein expression	25	<0.05
IL-6 gene expression	25	< 0.01
IL-8 gene expression	-	-
NF-κB p50 protein expression	25	<0.01
NF-κB p65 protein expression	25	<0.05
NF-κB p50 gene expression	12.5	<0.05
NF-κB p65 gene expression	25	<0.05
sICAM-1 protein expression	3.13	<0.01
sVCAM-1 protein expression	3.13	<0.05
E-selectin protein expression	12.5	<0.01
sICAM-1 gene expression	12.5	<0.05
sVCAM-1 gene expression	3.13	<0.05
E-selectin gene expression	6.25	<0.05

eNOS: endothelial nitric oxide synthase; DCFHDA: 2',7'-Dichlorofluorescein diacetate, IL: interleukin; NF-κB: nuclear factor-kappa beta, sICAM-1: soluble intercellular adhesion molecule-1, sVCAM-1: soluble vascular cell adhesion molecule-1.



Fig. 1 Poster of Saff-Chol Juice

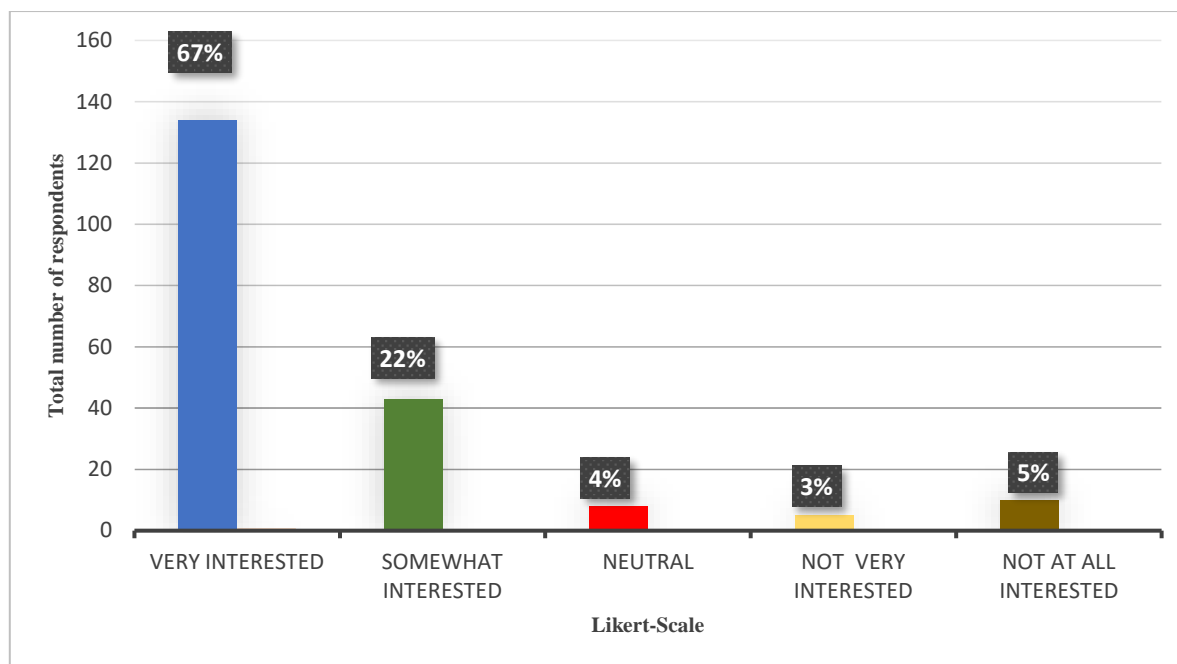


Fig. 2 Market survey showing the percentage and total number of respondents that interested to buy Saff-Chol Juice.

6 CONCLUSION

Saff-Chol juice could be used as natural supplement to reduce atherosclerosis. Further testing of Saffron on animal study and randomised control trial would be beneficial to improve the formulation of Saff-Chol juice.

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