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Contents

| No. | Registration ID | Project Title | Page |
|-----|-----------------|---|------|
| 1 | JM006 | Hiding Information Digitally Under Picture (HIDUP) Using Image Steganography | 1 |
| 2 | JM009 | Learning Shapes and Colours using JomLearn & Play Application for Children | 5 |
| 3 | JM010 | A Novel Quality Grading Determination using Boxplot Analysis and Stepwise Regression for Agarwood Oil Significant Compounds. | 9 |
| 4 | JM011 | A Novelty Classification Model for Varied Agarwood Oil Quality Using The K-Nearest Neighbor Algorithm | 13 |
| 5 | JM012 | The Development of Web-Based Student Leadership Program Management System for 'Unit Kepimpinan Pelajar' | 16 |
| 6 | JM020 | Jom Solat-iVAK: An Interactive Android Mobile Application in Learning Wudhu and Salah for Children with Learning Disabilities | 20 |
| 7 | JM024 | Gold Price Forecasting by Using ARIMA | 24 |
| 8 | JM025 | Recycle Now: Learning the 3R of Waste Management Through Game-Based Learning | 28 |
| 9 | JM031 | Go Travel Application | 32 |
| 10 | JM032 | SmartPark | 36 |
| 11 | JM033 | iKEN 3D Environment Mobile Application | 40 |
| 12 | JM034 | Click Car Services | 44 |
| 13 | JM035 | Smart Vector Backpack | 47 |
| 14 | JM036 | MY Ole-Ole Application | 51 |
| 15 | JM040 | SH Jacket | 55 |
| 16 | JM041 | FemaleSafe2Go | 59 |
| 17 | JM042 | Avalyn | 63 |
| 18 | JM043 | MyConvenient Travel Application | 67 |
| 19 | JM044 | Visnis Apps | 71 |
| 20 | JM045 | Cyclo Application | 74 |
| 21 | JM046 | i-seeuWatch | 78 |

| | | | |
|----|-------|---|-----|
| 22 | JM047 | ArenaSport Application | 82 |
| 23 | JM048 | Melastomaceae species : A New Potential of Antioxidant Agent | 86 |
| 24 | JM049 | Travesy | 90 |
| 25 | JM051 | Borneo Food Hunter App | 94 |
| 26 | JM052 | NIXON PACK | 98 |
| 27 | JM053 | Ecoin Sustainable Smartwatch | 102 |
| 28 | JM054 | SpaceBook | 105 |
| 29 | JM061 | Nafas Face Mask | 109 |
| 30 | JM062 | Handy Scrubby | 113 |
| 31 | JM064 | POMCUT (PORTABLE MULTI-COOKING UTENSIL) | 116 |
| 32 | JM065 | 4 in 1 Tumbler | 120 |
| 33 | JM072 | Understanding Social Media Influence In Reviving The Trishaw Or “Beca” As A Popular Tourism Attraction In Melaka. | 124 |
| 34 | JM074 | First Aid Stick | 127 |

SmartPark

Darveena Debbie Binti Blaise¹, Gloria Piper Anak Babang², Heather Gesai Anak Sidi³, Ivyliana Binti Nordin⁴, and Alvin Gatu⁵

^{1,2,3,4,5} Faculty of Hotel and Tourism Management, Universiti Teknologi MARA (UiTM) Sabah Branch, Kota Kinabalu Campus, Sabah, Malaysia

¹ddebbie.work@gmail.com, ²gloria12piper@gmail.com, ³heathergesai00@gmail.com, ⁴ivylianainordin@gmail.com, ⁵alvingatu@uitm.edu.my

Abstract—Parking facilities are vital components of the roadway system as every vehicle trip needs proper parking at its destination. Parking space will be the first component to be exposed to potential customers, providing them with the first-hand experience that people will face during their visit to the destinations. Certainly, users will be frustrated if they are faced with difficulties in finding parking spaces such as due to them being inadequate, inconvenient, or expensive. Conflict and confusion arise among several people due to common parking issues such as inadequate parking availability information, inefficient use of existing parking capacity and difficulties with parking ticket fee regulation. The SmartPark application is a feature-rich application with its main objective being to ensure the convenience of vehicle users in terms of parking. This all-in-one, environmentally friendly application offers services such as a contactless e-payment function for parking fees and displays directional ways of finding vacant parking spaces even from outside of the building. Apart from that, a feature highlighted as its novelty is the function of locating your vehicle with exact coordinates as pinned the moment one has parked. Functioning similarly to a map, one can head to their car without worrying about which floor, or which section they park at. Furthermore, with its e-wallet concept utilised for parking fee payment, there is also a reminder feature for when one must top up their balance if it is running low to avoid fuss during times when payment needs to be done.

Keywords—smart parking, e-payment, cashless parking, park conveniently, find my car

I. INTRODUCTION

Parking is often overlooked, but undoubtedly an essential service for every brick-and-mortar business. Customers' initial point of contact with a company is parking. When initial interaction is favorable, it sets the tone for the entire customer experience. A bad parking experience, on the other hand, might irritate customers right away. Parking that is plentiful and easily accessible can attract new customers while also retaining old ones. Meanwhile, it has been established that a lack of conveniently available parking deters potential clients. Parking, like the layout of a place, the quantity of noise, and even the general setting, may build or break a customer's impression of a business and it will probably determine whether or not they come back. According to Curry [1], "40% of drivers say they avoid shops where parking is a challenge". SmartPark is a multifunctional application that makes parking simple and easy; attributing multiple features such as being able to locate and inform on vacant parking in shopping mall parking spaces even when you have not arrived at the destination. This can certainly reduce the congestion rate in shopping mall parking spaces [2]. The application also provides a map-like feature to help locate where one parked their vehicle, within the building. The easy-to-use interface allows even beginners to easily utilize the application to ease the parking search journey. Users also benefit from the elimination of paper-based tickets through the faster entry, exit, elimination of ticket loss, and contactless payment. Not only is SmartPark a game-changer in the parking search journey in shopping malls, but it also helps to ensure one experiences a stress-free journey when going out, especially when going to malls.



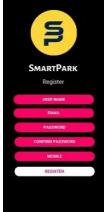




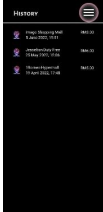
II. OBJECTIVES


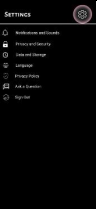


- To avoid congestion in parking facilities.
- To ensure ease of locating one's vehicle in parking facilities.
- To encourage paperless environment with no parking tickets.
- To encourage contactless payment especially in our current endemic era.

III. METHODS

Table 1 summarizes the SmartPark application interfaces with its description.

Table 1. SmartPark application interface

| User Interface | Description | User Interface | Description |
|---|---|---|---|
|  | A. After downloading SmartPark, users need to sign in as an existing user or create an account for a new user. |  | G. Users can click on the payment button to pay for their parking. This page will also show their SmartPark e-wallet balance along with their vehicle details. |
|  | B. New users will need to register by filling in their personal details such as username, email, password, and mobile number. |  | H. The notifications page will show the wallet updates and updates on the nearest parking inside the mall that they wish to visit. |
|  | C. As for existing users, they will only need to fill in their username, email, and password to sign in. |  | I. On the account page, it will show the users' profiles which enables them to edit it from time to time. |
|  | D. After users successfully log in to the application, users will be brought to the home page. Search features are included for the users to search for a mall that they want to visit. |  | J. Three lines on the top right of the interface indicate the icon for the user's app history. It shows the malls that the user has ever been to within a certain period. |

| | | | |
|---|---|---|---|
|  | <p>E. After selecting the mall, users will be brought to another page that includes Google Maps-powered guidance features to find the nearest car park with detailed, live information on the availability and distance.</p> |  | <p>K. Users can always click on the setting icon which contains configuration options that will affect the application. For example, settings for the language type, notifications, privacy, and others.</p> |
|  | <p>F. Users will be able to find their vehicle location if they clicked the activity button and it will be showing the location along with the car plate number. Users can also click on the directions button to find their way to their car.</p> |  | <p>L. Whenever users sign out or settled their vehicle payment on the app, this page will appear on the screen.</p> |

IV. RESULTS AND FINDINGS

The Internet of Things (IoT) has completely changed human behaviour in recent years by delivering a plethora of facilities and comfort alternatives to make everyday living easier. IoT technology connects electrical devices in the digital world that have an Internet connection and sensor networks [3][4]. Many large cities have a difficult time finding available parking spaces during peak hours. As a result, residents waste a significant amount of time looking for the ideal parking spot or waiting in line for one. According to [5] roughly 30% of vehicles on major city roadways are manually searching for vacant parking places, and it takes an average of 7.8 minutes to find one. One of the major issues is that finding parking inside the mall is usually difficult, and users also must wait in line to pay for parking tickets. The application has a feature called SmartPark that allows users to discover parking availability in the mall without having to enter the facility. When compared to the regular parking method, this is lightning fast. Furthermore, the SmartPark payment method significantly saves a lot of time spent by users seeking for the right amount to complete a payment at the parking place. It allows consumers to make fast payments using their smartphones. Users do not need to carry small parking tickets that are easy to misplace when using ticket-less and cashless parking. Finally, all operations such as payment, alerts, location search, and so on will function seamlessly and become a part of the overall parking experience.

V. CONCLUSIONS

SmartPark application is essential for drivers because it is a tremendously beneficial application with its various functions. Users can avoid congestion in parking facilities as the application allows user to have prior information regarding parking availability even within a distant away. This application can also assist drivers to ensure ease of locating one's vehicle in parking facilities. Apart from that, the application encourages users to practice environmentally friendly and contactless lifestyle by having the paperless parking ticket system as well as the e-wallet function. It allows users to pay their parking fees with no fuss, reduce impact on the environment and simultaneously experience contactless payment process, which is absolutely important during this endemic era. The SmartPark application is potentially excellent to have in the market because it provides tons of benefits to users in the future.

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