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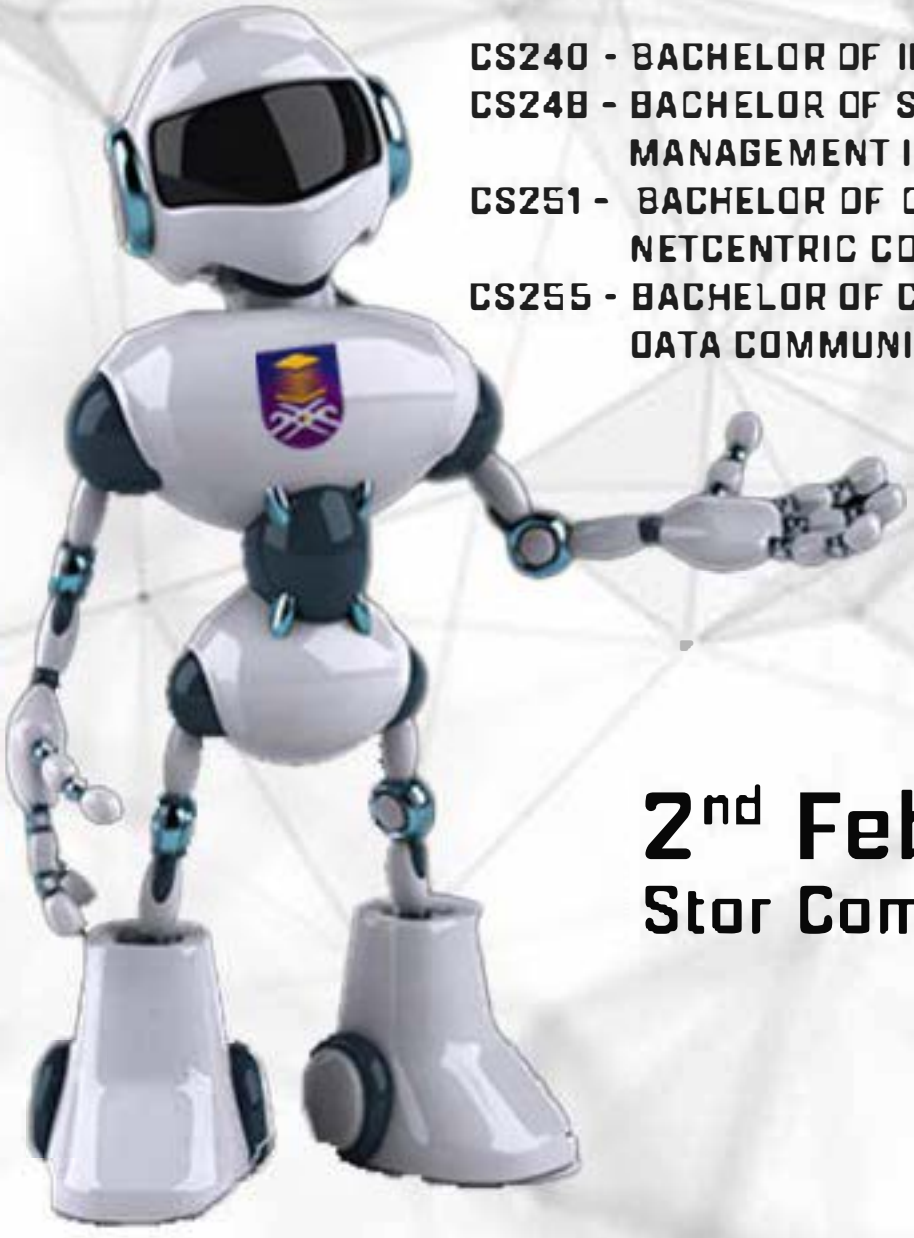
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



CS240 - BACHELOR OF INFORMATION TECHNOLOGY (HONS.)
CS248 - BACHELOR OF SCIENCES (HONS.)
MANAGEMENT IN MATHEMATICS
CS251 - BACHELOR OF COMPUTER SCIENCE (HONS)
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CS255 - BACHELOR OF COMPUTER SCIENCE (HONS)
DATA COMMUNICATION & NETWORKING

2nd Februory 2023

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Rafiza Ruslan, Mohamad Najib Mohamad Fadzil, Noorfaizalfaird Mohd Nor, Mohammad Hafiz bin Ismail

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CONTENTS

Preface	**iii**
Committee	**iv**
Event Schedule	**v**
List of Papers	**vi-xxiii**
Articles	**1-278**

Preface

It is with great pleasure that we present this extended abstract book, titled "The 5th Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)". This book is a collection of research work in the fields of Computer Science and Mathematics, contributed by the final year students from Universiti Teknologi MARA, Perlis Branch. The aim of this book is to showcase the diversity and depth of research in these two interrelated fields.

Mathematics and Computer Science are two fields that have seen tremendous growth and advancement in recent years. With the rise of new technologies and the increasing demand for data-driven solutions, researchers in these fields have been working hard to develop new theories, algorithms, and models that can help solve some of the most pressing problems of our time. This book is a testament to their hard work and dedication.

The abstracts in this book cover a wide range of topics, including algebra, analysis, logic, computer architecture, algorithms, artificial intelligence, machine learning, computer network, netcentric computing and many more. The work presented here is both theoretical and practical, and has the potential to impact many areas of society, from finance and healthcare to education and security.

We hope that this book will serve as a valuable resource for future students in the fields of Mathematics and Computer Science. We also hope that it will inspire more students to pursue innovative and groundbreaking research in these two fields. Finally, we would like to express our gratitude to all the contributors for their hard work and dedication, without which this book would not have been possible.

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RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

EVENT SCHEDULE

8:00 – 8:30 am
•Registration

8:00 am – 12:00 pm
•FYP Project Presentation

12:00 - 2:00pm
•Lunch Break

2:15 – 2:35 pm
•National & Wawasan Setia Anthems
•Doa Recitation

2:35 – 2:45 pm
•Welcoming Address by Director of REMACS 5.0

2:45 – 2:55 pm
•Officiating & Closing Remarks from Rector of UiTM Perlis

2:55 – 3:00 pm
•REMACS 5.0 Montage

3:00 – 4:00 pm
•Awarding of Winners:
•Best Poster
•Best Project Award

•Photo Session

•End of Ceremony

Dress Code: Formal / Corporate

List of Papers

Article Title	Page
WEB-BASED BLOOD DONATION MANAGEMENT WITH REWARDS SYSTEM Ahmad Syakir Mohd Sakeri and Nadia Abdul Wahab	1
FINAL YEAR PROJECT MANAGEMENT SYSTEM (FMS) Aimuni Nadhrah Yazit and Ros Syamsul Hamid	3
UNIBUKU: UiTM Book Reselling Web Application Anis 'Aisyah Md Nazri and Mohammad Hafiz bin Ismail	5
STUDENT INTERNSHIP PLACEMENT USING PERSONAL DECISION AID Anis Nabila Azizi and Azmi Abu Seman	7
INTERNSHIP MONITORING AND ASSESSMENT SYSTEM Ezza Liyana Jalaludin and Azmi Abu Seman	9
AR FOR PLANTATION AND AGROTECHNOLOGY AREA AT UITM PERLIS Faizah Ahmad Rodi and Nor Arzami Othman	11
MOBILE APPLICATION FOR COLLEGE LAUNDRY BOOKING SYSTEM IN UITM PERLIS Haizatul Zulaikha Annual and Siti Zulaiha Ahmad	13

SKIN CARE E-COMMERCE MOBILE PLATFORM WITH PRODUCT RECOMMENDATION BASED ON SKIN TYPE 15

Haziq Asyraf Abu Hanifah and Nadia Abdul Wahab

HEALER – MENTAL HEALTH PERSONAL DECISION AID 17

Huda Nabila Ishak and Norfiza Ibrahim

VETERINARY CLINIC MANAGEMENT SYSTEM 19

Mas Nur Alya Binti Mohd Yusof and Prof. Madya Ts. Dr. Shukor Sanim Bin Mohd Fauzi

SOCIAL MARKETPLACE WEB APPLICATION FOR UITM PERLIS STUDENTS 21

Mohamad Azimi Zakariah and Muhammad Nabil Fikri Jamaluddin

FASTBLOOD: BLOOD DONOR MOBILE APP INTEGRATED WITH QR CODE 23

Muhamad Saifullah Yussri and Nora Yanti Che Jan

MOBILE APPLICATION FOR HEALTHY SLEEP RECOMMENDATION WITH CALM TECHNOLOGY 25

Muhammad Arif Haikal Meli and Romiza Md. Nor

ROADMATE: IMPROVING RIDESHARING AND CARPOOLING VIA MOBILE APP 27

Muhammad Farid Muhammad Dahri, Arifah Fasha Rosmani

FELINERINARY: CAT HEALTH MANAGEMENT APP WITH APPOINTMENT REMINDERS USING PUSH-NOTIFICATION 29

Muhammad Hakimie Azraei Mahzir, Siti Sarah Md. Ilyas

MOBILE INTERVENTION FOR USED CLOTHING MANAGEMENT WITH GEOLOCATION 31

Muhammad Haziq Anuar, Siti Sarah Md Ilyas

UITM ARAU BICYCLE RESERVATION APP WITH IMPLEMENTATION OF QR CODES (UBIKE COLLEGE) 33

Muhammad Nur Hakimi Azman, Siti Zulaiha Ahmad

EASYRENT: A WEB BASED RECOMMENDATION SYSTEM FOR SHOP RENTAL – A CASE STUDY IN JITRA, KEDAH 35

Nur Azlina Ariffin, Nora Yanti Che Jan

MEDCARE: A WEB-BASED CLINIC APPOINTMENT SYSTEM WITH SHORT MESSAGE SERVICE (SMS) NOTIFICATION 37

Nur Elya Fhazlein Zamri, Mohd Nizam Osman

FASTPARK MOBILE APPLICATION USING GEOLOCATION 39

Nur Hazmiera Mohd Hazline, Nora Yanti Che Jan

AN ISLAMIC MULTIMEDIA LEARNING APPLICATION OF MENSTRUATION FOR ADOLESCENT GIRLS 41

Nur Irham Atikah Mohd Rafee @ Sukiman, Aznoora Osman

FUTSAL BOOKING WEB BASED SYSTEM INTEGRATE WITH TELEGRAM NOTIFICATIONS 43

Nur Izzat Hakim Bin Norazam, Mohd Nizam Bin Osman

HOUSE RENTAL MANAGEMENT SYSTEM FOR STUDENT IN UITM PERLIS 45

Nur Nadiah Husna Samsudin, Muhammad Nabil Fikri Jamaluddin,

PENANG TRAVEL SERVICE PROVIDER APPLICATION USING GEOFENCING 47

Nurezzatul Husna Ismail, Mohd Nizam Osman

MOBILE APPLICATION SYSTEM FOR CARDIOVASCULAR DISEASE PATIENT 49

Nurul Azwa Atikah Ahmad Tarmizy, Abdul Hapes Mohammed

WEB-BASED CARBON FOOTPRINT CALCULATOR FOR BAKERY FOOD WASTE 51

Nurul Fatihah Mohamed Yusof, Romiza Md Nor

FOOD TRUCK FINDER 53

Qistina Amirah Abdul Hadi, Iman Hazwam Abd Halim

RESPONSIVE WEB-BASED CAFE FOOD ORDERING SYSTEM USING BOOTSTRAP AND QR CODE 55

Siti Nadzirah Parsikun, Khairul Anwar Sedek

WHEELS4RENT: A WEB-BASED VEHICLE RENTAL AND MANAGEMENT SYSTEM WITH SHORT MESSAGE SERVICE (SMS) NOTIFICATION 57

Siti Zulaikha Zaidi, Mohd Nizam Osman

IMPLEMENTATIONS OF QR-CODE FOR BUS TRANSPORT PASS USING MOBILE APPS 59

Wajeehah Hamdzar Hamizan, Norziana Yahya

DEVELOPING A CATERING SERVICES MOBILE APPLICATION FOR LOCAL COMMUNITY 61

Masturina Binti Azmi, Ts Dr Norziana Binti Yahya

ON-DEMAND HOME SERVICES USING MOBILE APPS FOR DIGITAL HOUSEHOLDS 63

Sarah Nurhasya Abd Aziz, Norziana Yahya

FAKE NEWS CLASSIFICATION USING MACHINE LEARNING TECHNIQUES 65

Adib Farhan Ahmad Rashdi and Mohd Nizam Osman

DATA VISUALIZATION OF FAMILY INCOME AND EXPENSES 67

Aimi Amisha Ahmad Sabri and Mohd Nizam Osman

DATA VISUALIZATION : CAUSES AND RISK FACTORS OF DEATH 69

Amirah Mohd Yusof and Jiwa Noris Hamid

DEVELOPING GRAPHICAL VISUALIZATION FOR UNDERSTANDING THE PATTERN OF STUDENTS PERFORMANCE IN EXAM 71

Anisah Rosli and Norfiza Ibrahim

DIABETES RISK PREDICTION SYSTEM AND DATA VISUALIZATION 73

Azizah Mohamad Imran and Hawa Mohd Ekhsan

WEB-BASED APPLICATION FOR PLACES RECOMMENDER USING MACHINE LEARNING 75

Farah Nurshaziela, Ruzita Ahmad and Shukor Sanim Mohd Fauzi

DATA VISUALIZATION OF CHRONIC KIDNEY DISEASE SYMPTOMS 77

Hanif Ikmal Ahmad Akibi and Hawa Mohd Ekhsan

SMART SUPPLY CHAIN MANAGEMENT USING DATA VISUALIZATION 79

Hidayah Hushairi and Jiwa Noris Hamid

DATA VISUALIZATION OF BLOOD DONATION DURING CORONAVIRUS DISEASE (COVID-19) IN PERLIS 81

Maisarah Aisisa and Khairul Anwar Sedek

DIABETES PREDICTION USING MACHINE LEARNING 83

Muhammad Adib Mohd Nazri and Mahfudzah Othman

THE DEVELOPMENT OF DISEASES PREDICTION SYSTEM BASED ON SYMPTOMS 85

Muhammad Faiz Mohd Faisol and Mohd Nizam Osman

LUNG CANCER PREDICTION USING MACHINE LEARNING TECHNIQUES 87

Muhammad Muhaimin Mohd Fauzi and Mohd Nizam Osman

OBJECT DETECTION MODEL FOR MANGO LEAF DISEASES 89

Muhammad Norzakwan Mohd Sham and Mohammad Hafiz bin Ismail

ANALYZING ON HOW FOOD CONSUMPTION CAN AFFECT IN DIABETES 91

Muhammad Saiful Azim Mohd Ariff and Khairul Anwar Sedek

DASHBOARD : RISK PERCEPTION AND TRAVEL SATISFACTION USING PUBLIC TRANSPORT DURING COVID-19 93

Nafeis Sukaiynah Noor Azli and Jiwa Noris Hamid

DASHBOARD VISUALIZATION OF MOBILITY COVID-19 95

Noor Syarafana Nordin and Noorfaizalfarid Mohd Noor

DEVELOPING GRAPHICAL VISUALIZATION FOR ANALYZING STUDENT ADAPTABILITY LEVEL IN ONLINE EDUCATION 97

Nur Balqis Mohd Azuddin and Norziana Yahya

DATA VISUALIZATION ON STUDENT STRESS LEVEL 99

Nur Syifa Ramzi, Mohammad Hafiz bin Ismail and Tajul Rosli Razak

DASHBOARD: DATA VISUALIZATION OF COVID-19 CONFIRMED AND DEATHS IN MALAYSIA (COVIM) 101

Nurul Izzati Iddarus, Ruzita Ahmad and Shukor Sanim Mohd Fauzi

DATA VISUALIZATION OF HUMAN STRESS DETECTION LEVEL 103

Nurul Syahirah Md Saad and Hawa Mohd Ekhsan

DASHBOARD VISUALIZATION ON RENTAL HOUSE DATA IN PERLIS FOR UITM ARAU STUDENTS 105

Putera Mohd Aliff Bakhtiar Mohd Zahir and Khairul Anwar Sedek

DATA VISUALIZATION OF HIGHER EDUCATION STUDENTS' PERFORMANCE EVALUATION 107

Siti Nur Syahirah Osman and Hawa Mohd Ekhsan

FUZZY ANALYTIC HIERARCHY PROCESS TO STUDY THE IMPACTS OF OPEN DISTANCE LEARNING ON UiTM PERLIS STUDENTS 109

Adriana Nazihah Cha Ariff and Norpah Mahat

FORECASTING UNEMPLOYMENT RATE IN MALAYSIA: COMPARISON BETWEEN ARIMA AND FUZZY TIME SERIES 111

Ahmad Faidhi Amir Faisol and Nur Azriani Mohamad Nor

STAGNATION POINT FLOW OF NANOFLUIDS OVER STRETCHING/SHRINKING SURFACE WITH HEAT SOURCE/SINK AND CONSTANT WALL TEMPERATURE 113

Aifa Afrina Ahmed Rodzuan, Nur Fatihah Fauzi and Nurizatul Syarfinas Ahmad Bakhtiar

EVALUATION OF FORECAST PERFORMANCE OF COVID-19 WITH DIFFERENT TIME HORIZONS 115

Amirul Rashid Che Samsol and Azlan Abdul Aziz

SELECTION THE TYPE OF INVESTMENT IN MALAYSIA USING FUZZY ANALYTIC HIERARCHY PROCESS (AHP) 117

Ardini Athirah Mhd Munawar and Mohd Fazril Izhar Mohd Idris

PREDICTING STROKE USING ANT COLONY OPTIMIZATION ALGORITHM 119

Azfaruddin Azri and Rizauddin Saian

STAGNATION POINT FLOW OF HYBRID NANOFLUIDS OVER STRETCHING/SHRINKING SHEET WITH HEAT SOURCE/SINK AND CONSTANT WALL TEMPERATURE 121

Fatin Nur Ayuni Mohd Nor, Nur Fatihah Fauzi and Nurizatul Syarfinas Ahmad Bakhtiar

ANALYSING THE EFFICIENCY OF LOCAL AND FOREIGN CARS IN MALAYSIA USING DATA ENVELOPMENT ANALYSIS (DEA) 123

Khairul Sanusi Samuil and Anas Fathul Ariffin

APPLICATION OF VANILLA LONG SHORT-TERM MEMORY NETWORKS (LSTM) AND AUTO-REGRESSIVE INTEGRATED MOVING AVERAGE (ARIMA) ON EXCHANGE RATE FORECASTING 125

Mysarah Haslan and Nor Hayati Shafii

RANKING THE EFFECTIVE PREVENTION MEASURES AGAINST COVID-19 BY USING FUZZY AHP METHOD 127

Nur Afifah Zabidi and Teoh Yeong Kin

A NUMERICAL STUDY ON A HIV TRANSMISSION MATHEMATICAL MODEL 129

Nur Izyan Hasna Suhaili, Nur Izzati Khairudin and Nurizatul Syarfinas Ahmad Bakhtiar

APPLICATION OF FUZZY DELPHI ON THE FACTOR INFLUENCING BUYING BEHAVIOUR FOR ORGANIC FOOD 131

Nur Syafiqah Abdul Rashid and Mohd Halimi Ab Hamid

THE USE OF TRAPEZOIDAL RULE TO APPROXIMATE THE VOLUME OF CLODS OF SOIL AT GUNUNG PERLIS TAMAN NEGERI PERLIS 133

Nur'Afaf Zahiah Khairulfahmi, Mohamad Najib Mohamad Fadzil and Zaki Ahmad Dahlan

THE USE OF TRAPEZOIDAL RULE TO APPROXIMATE THE VOLUME OF CLODS OF SOIL AT GUNUNG PERLIS TAMAN NEGERI PERLIS 135

Nur'Afaf Zahiah Khairulfahmi, Mohamad Najib Mohamad Fadzil and Zaki Ahmad Dahlan

AN APPROACH OF FUZZY AHP TO ANALYZE THE FACTORS OF DOMESTIC VIOLENCE AMONG WOMEN IN MALAYSIA 137

Nurain Syahirah Mahusin and Norpah Mahat

THE USE OF SIMPSON'S RULE TO APPROXIMATE THE VOLUME OF CLODS OF SOIL AT GUNUNG PERLIS, TAMAN NEGERI PERLIS 139

Nurliyana Najwa Husaini Failos, Mohamad Najib Mohamad Fadzil and Zaki Ahmad Dahlan

FACTORS INFLUENCING THE SELECTION OF HALAL PRODUCTS AMONG PERLIS COMMUNITY USING FUZZY AHP 141

Nurul Asyqin Abu Bakar and Siti Nor Nadrah Muhamad

ANALYSING ON INFLUENCING FACTORS OF STUDENTS' CAREER CHOICE USING FUZZY ANALYTIC HIERARCHY PROCESS (FAHP) 143

Salsabila Saimuddi and Khairu Azlan Abd Aziz

APPLICATION OF FUZZY AHP ON THE SELECTION OF ONLINE SHOPPING PLATFORM IN MALAYSIA 145

Siti Nurmaisarah Zakaria and Khairu Azlan Abd Aziz

CLASSIFICATION OF DIABETIC PATIENTS WITH IMBALANCED CLASS DISTRIBUTION BY USING A COST-SENSITIVE FOREST ALGORITHM 147

Ummi Asyiqin Che Muhammad and Muhammad Hasbullah Mohd Razali

A FUZZY CONJOINT ANALYSIS APPROACH FOR EVALUATING CREDIT CARD SERVICES: A CASE STUDY OF MALAYAN BANK 149

Ummi Umira Mohd Akhir and Zurina Kasim

SELECTION THE BEST TYPE OF INVESTMENT IN MALAYSIA USING FUZZY TOPSIS 151

Muhamad Aizat Iman Roslan and Fazril Izhar Mohd Idris

ONLINE EMPLOYMENT PLATFORM SELECTION BY USING FUZZY ANALYTIC HIERARCHY PROCESS 153

Muhammad Iqbal Muhamidi and Mohd Halimi Ab Hamid

TOURIST TRIP DESIGN PROBLEM WITH USER PREFERENCE AND POPULARITY: A CASE STUDY OF LANGKAWI ISLAND 155

Nabilah binti Anuar Ahmad and Huda Zuhrah Ab. Halim

ANALYZING FACTORS AFFECTING TO E-LEARNING SUCCESS BY FUZZY ANALYTIC HIERARCHY PROCESS (FAHP) 157

Nor Syahazlin Mohd Zaki and Jasmani Bidin

EARLY DIABETES RISK PREDICTION USING ANT COLONY OPTIMIZATION ALGORITHM 159

Nur Aisyatul Husna Ahmad Yusri and Rizauddin Saian

COMPARISON BETWEEN ARIMA MODEL AND FUZZY TIME SERIES: FORECASTING ENDEMIC COVID-19 CASES IN MALAYSIA 161

Nur Atikah Mohd Razali and Nor Azriani Mohamad Nor

ANALYSING STUDENTS' PERCEPTIONS OF ONLINE MATHEMATICS LEARNING 163

Nur Izza Hazwani Azali Azman and Zurina Kasim

Reconstruction the Rational Quadratic Bezier Curve Using Properties of Rational Quadratic Bezier and Segmentation 165

Nur Nabilla Azmi and Siti Sarah Raseli

ANALYSING INFLUENTIAL FACTORS IN UNIVERSITY SELECTION USING FUZZY TOPSIS 167

Nurul Athilah Azaman and Jasmani Bidin

NUMBER OF STAFF OPTIMIZATION OF TOLLMAN SCHEDULING WITH INTEGER LINEAR PROGRAMMING 169

Nurul Athirah Syuhadah Ruslan and Diana Sirmayunie Mohd Nasir

A FUZZY PROMETHEE APPROACH FOR CHOOSING THE MOST PREFERABLE HEALTH INSURANCE COMPANIES 171

Nurul Qistina Mohd Kamal and Raihana Zainordin

THE NUMBER OF EMPLOYED PEOPLE AND TOURIST ARRIVAL IN MALAYSIA USING ARIMA AND FUZZY TIME SERIES MODEL: PRE, DURING AND POST COVID-19 173

Siti Norashikin Roslan and Siti Fatimah Abd Rahman

THE PREFERRED SOCIAL NETWORKING SITE (SNS) FOR INFORMATION DISSEMINATION AMONG UiTM STUDENTS USING FUZZY AHP METHOD 175

Siti Nuraisyah Syafiqah Abdullah and Noorzila Sharif

MATHEMATICAL MODELLING ANALYSIS OF DIET PLANNING FOR THALASSEMIA PATIENTS 177

Siti Sarah Md Zulkifli and Siti Nor Nadrah Muhamad

RANKING FIVE MODELS OF LAPTOPS USING FUZZY PROMETHEE 179

Wan Nur Syahirah Wan Muhammad Sukardi and Raihana Zainordin

PREDICTION OF BREAST CANCER DISEASE USING MACHINE LEARNING APPROACH 181

Wan Nashua Amira and Nor Hayati Shafii

HEAT SOURCE AND CONSTANT WALL TEMPERATURE OF MHD FERROFLUIDS ON EXPONENTIALLY STRETCHING AND SHRINKING SURFACE UNDER STAGNATION POINT REGION 183

Natasya Syafina Ismail, Nurizatul Syarfinas Ahmad Bakhtiar and Nur Fatihah Fauzi

WEB-BASED UITM BOOK STORE MANAGEMENT SYSTEM INTEGRATED WITH WHATSAPP API AND GOOGLE SERVICES 185

Amir Imran Ahmad and Mohd Nizam Osman

FACIAL EXPRESSION RECOGNITION USING DEEP LEARNING TECHNIQUES 187

Aznal Anas Azlan and Muhamad Arif Hashim

ANALYSIS ON RANSOMWARE CHARACTERISTICS USING STATIC ANALYSIS METHOD 189

Maryam Adreena Mohd Mokhtaruddeen and Mohd Faris Mohd Fuzi

WEB-BASED JEWELRY MANAGEMENT SYSTEM USING WEB SCRAPPING 191

Mohd Irfan Hafizi Bin Fakhrurrazi, Ts. Noorfaizalfarid bin Mohd Noor

EMPLOYEE ATTENDANCE SYSTEM USING FLUTTER 193

Muhamad Faiz Akmal Bin Mohamad Noor and Sir Alif Faisal Ibrahim

STAFF RESIDENT COLLEGE (SRK) REPORT MANAGEMENT SYSTEM USIGN FLUTTER 195

Muhammad ‘Atif Abdul Rahim and Ahmad Yusri Dak

UiTM PRIHATIN DONATION SYSTEM USING A RESPONSIVE WEB DESIGN APPROACH 197

Muhammad Aiman Bin Rosli and Zulfikri Paidi

FOOD COURT MANAGEMENT SYSTEM 199

Muhammad Alif Rusyaidi Bin Abdul Rashid and Alif Faisal Bin Ibrahim

INVENTORY MANAGEMENT SYSTEM FOR SMEs IN KULIM 201

Muhammad Bilal Hakim Bin Azmi and Muhammad Nabil Fikri Bin Jamaluddin

FINAL YEAR PROJECT SUPERVISOR ACCEPTANCE SYSTEM (FYPSA) 203

Muhammad Fikri Bin Mohd Firdaus and Ros Syamsul Hamid

UiTM ARAU STUDENT ORIENTATION APPLICATION EXTENDED ABSTRACT 205

Muhammad Hafiz Bin Ghazali and Nurzaid Mohd Zain

VOAS: VETERINARY ONLINE APPOINTMENT BOOKING SYSTEM 207

Muhammad Harith Bin Mokhtar and Arifah Fasha Binti Rosmani

ZAKAT MANAGEMENT SYSTEM WITH ELECTRONIC MAIL 209

Muhammad Najmi bin Othman and Noorfaizalfarid bin Mohd Noor

PINEAPPLE DISEASE DETECTION SYSTEM USING MOBILENETV2 MODEL 211

Muhammad Nu'man Hakim Abdul Aziz and Iman Hazwam Abd Halim

FIGHTING FISH IDENTIFICATION USING DEEP LEARNING 213

Muhammad NurSyafiq and Mohammad Hafiz bin Ismail

C++ RUSH: INTERACTIVE GAME IN LEARNING COMPUTER LANGUAGE FOR NOVICE 215

Muhammad Salman Hakim bin Shaiful Nizam and Arifah Fasha binti Rosmani

E-EXAMINATION SYSTEM FOR ANSWERING OBJECTIVE AND SUBJECTIVE QUESTIONS 217

Muhammad Yasir Zulfikri and Nurzaid Muhd Zain

SPORT FACILITIES AND EQUIPMENT BOOKING SYSTEM FOR UITM PERLIS 219

Musfira Mohd Azmir and Nurzaid Muhd Zain

ONLINE HOSPITAL APPOINTMENT CARD WITH QR CODE 221

Nabilatulwidad Binti Abdul Mueiz and Mahfudzah Binti Othman

MYBUKU PINK MOBILE APPLICATION USING ANDROID 223

NorHafizah Ayob, Mohammad Hafiz bin Ismail and Tajul Rosli Razak

MOBILE APPLICATION FOR ORDERING FOOD FROM UITM ARAU CAMPUS CAFETERIA 225

Norsyuhana binti Noordin and Nurzaid Mohd Zain

UITM WEB PRACTICAL LOGBOOK SYSTEM 227

Nur Arifa Najiha Bt Ahmad Zawawi and Mahfudzah Bt Othman

BLOOD BANK MANAGEMENT SYSTEM 229

Nur Syamimi Izzati Binti Zulkifli and Ros Syamsul Bin Hamid

WEB-BASED FOR UiTM ARAU FOOD ORDER 231

Nur Zahirah Izzati binti Mohd Zahir and Zulfikri Paidi

MASK AWARE: IOT FOR FACEMASK DETECTION AND MONITORING 233

Siti Nurfatin Binti Mohtar and Aznoora Osman

IOT-BASED FLOWER GARDEN CARE SYSTEM USING ESP8266 WIFI MODULE AND TELEGRAM APPLICATION 235

Syahida Atirah Binti Che Omar and Rashidah Binti Ramle

UITM STUDENT'S ATTENDANCE SYSTEM BASED ON BIOMETRIC FINGERPRINT WITH IoT IMPLEMENTATION 237

Wan Muhammad Rahimi bin Wan Fadzli and Abidah Hj Mat Taib

CORN LEAF DISEASE DETECTION SYSTEM USING CONVOLUTIONAL NEURAL NETWORK 239

Wan Nurul Izzah Binti Abd Hadi and Iman Hazwam Abdul Halim

HOMENETSEC: ENHANCING HOME NETWORK SECURITY BY SURICATA INTRUSION DETECTION SYSTEM USING RASPBERRY PI 241

Ahmad Shariff and Abidah Hj Mat Taib

MALWARE DETECTION IN WINDOWS USING DEEP LEARNING CLASSIFICATION APPROACH 243

Aishah Anuar and Mohd Faris Mohd Fuzi

E-VOTING SYSTEM PROJECT IN LARAVEL BASED ON WEB-BASED APPLICATION 245

Anis Natasha Zahimi and Ros Syamsul Hamid

WATER LEVEL MONITORING USING WIFI 247

Azizie Azizan and Iman Hazwam Abd Halim

FACE SKETCH RECOGNITION SYSTEM USING CLOUD-BASED DEEP LEARNING 249

Faiz Elmie Shah Izahar Shah and Muhamad Arif Hashim

AN ENHANCEMENT OF SMART TRAFFIC LIGHT IN LORA NETWORK FOR SMALL SCALE AREA 251

Lutfi Hadi Azizul Adry and Rafiza Ruslan

REMOTE CONTROL DESKTOP SYSTEM 253

Muhammad Akmal Idlan Hissamuddin and Ros Syamsul Hamid

IoT-Based Smart Chili Farm Monitoring Using Arduino and GSM Module 255

Muhammad Baihaqi Bakar and Rashidah Ramle

IMAGE AUTHENTICATION SYSTEM USING DEEP LEARNING 257

Muhammad Faisal Amer Faudzli and Muhamad Arif Hashim

NETWORK AUTOMATIONS ON ACCESS CONTROL LIST (ACL) FOR MULTIVENDOR DEVICES USING ANSIBLE AND NAPALM IN GNS3 259

Muhammad Haziq Ikhmal Suhaimi and Rafiza Ruslan

PERFORMANCE ANALYSIS OF HTTP FLOODING ATTACK AT APPLICATION LAYER IN MOBILE AD-HOC NETWORK (MANET) 261

Muhammad Hilmi Hafizi Muhamad and Ahmad Yusri Bin Dak

PERFORMANCE ANALYSIS OF DOS ATTACK AT MAC LAYER IN WLAN 263

Muhammad Naufal Abdul Rahim and Ahmad Yusri Dak

SMART IRRIGATION SYSTEM USING LORA-BASED IOT DEVICE 265

Muhammad Nizamuddin Abd Muttalib and Iman Hazwam Abd Halim

ANDROID MALWARE DETECTION USING DEEP LEARNING CLASSIFICATION APPROACH 267

Nur Amirah Amri and Mohd Faris Mohd Fuzi

STUDENT ATTENDANCE REGISTRATION SYSTEM USING QR CODE FOR TUITION CENTRE 269

Nur Farizah Ishak and Zulfikri Paidi

STUDENT ATTENDANCE SYSTEM USING FACIAL RECOGNITION BASED ON DEEP LEARNING 271

Syahila Aina Haris and Zulfikri Paidi

REDUCING DOS ATTACKS BY RUNNING MULTI INSTANCES OF NGINX WEB-SERVER IN DOCKER USING SHELL SCRIPT 273

Ismail Arif M. Zulkepli and Abidah Mat Taib, Nor Alifah Rosaidi

SMART CHICKEN FEEDER SYSTEM USING NODE MCU ESP8266 275

Ilham Syahmin Nasruddin and Mohd Nizam Osman

REMOTE MONITORING AND CONTROLLING OF LIGHTS USING IOT 277

Nurul Najihah Yusra Zolkarnain, Nurzaid Muhd Zain and Mahfudzah binti Othman

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

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EXTENDED ABSTRACTS

CORN LEAF DISEASE DETECTION SYSTEM USING CONVOLUTIONAL NEURAL NETWORK

Wan Nurul Izzah Binti Abd Hadi, Iman Hazwam Abdul Halim
College of Computing, Informatics and Media, Universiti Teknologi MARA Perlis Branch, Malaysia

Abstract

Monitoring a plant's health and looking for signs of infection are two highly important aspects of sustainable agriculture. Monitoring plant diseases by manually is an extremely time-consuming and tedious task. It takes a significant amount of time, a substantial amount of labor, as well as knowledge in plant diseases to achieve. Image processing is thus used in the process of detecting plant diseases. This project mainly focuses on corn leaves disease detection using convolutional neural network. The Xception model, which is a part of a convolutional neural network capable of classifying images into broad object categories, would be the model of choice for this image classification. Using Convolutional Neural Network (CNN), this study aims to build and test a web-based image classification tool for identifying corn leaf diseases detection. This research dataset is trained by analyzing a big dataset that contains pictures of various diseases that might affect corn leaves as well as pictures of corn leaves that are healthy in order to precisely identify them. The data were then analysed using a methodology known as the Agile model, which included phases for planning, requirement analysis, design, development, testing, and documentation. The findings from the study provide evidence on the precision with which the Xception model performed has reached 92.11 percent when applied to the datasets that have been gathered. Strongly, the results of the study will emphasize the need for developing a thorough image classification system in detecting plant diseases without human intervention.

Keywords*: corn leaf, disease detection, Convolutional Neural Network (CNN), Xception model*

1. Introduction

Two research objectives are created based on the problem statements described. Firstly, to develop an image classification system that includes deep learning technology which is convolutional neural network with Xception model to detect corn leaf diseases based on the symptoms of specific diseases. The second objective is to run performance testing of the corn leaf diseases detection system in terms of accuracy identifying disease types based on the symptoms. This research intends to develop a corn leaf disease detection system to improve deep learning-based disease identification. The proposing project will cover the usage of TensorFlow, Python. The system will then be put to the test to see how well it achieves the objectives. Besides, corn crops from Chemor, Perak will be chosen as the research area to apply the diseases detection system. Thus, the target users would be the people in agriculture sector especially in handling corn crops.

2. Methodology

This research will use Agile methodology for planning, requirement analysis, design, development, testing, and documentation. In planning, the research should describe its background, problem statement, project objectives, scope, and significance. In requirement analysis, hardware and software requirements are obtained. The design phase involves data collecting from the research area and CNN model computation and algorithm. Development includes training the algorithm with previously acquired data and Python code modifications. The research shall assess hardware-software integration and disease detection accuracy during testing. Finally, all recorded tasks, results, and data will be compiled and documented.

3. Results and Discussion

After 10 experiments, this project can conclude that when batch size = 60, epoch = 15, image size = 256*256, the model achieved the highest classification accuracy of the corn leaf diseases image data set. Additionally, the loss function curve and the accuracy curve of the training set and the validation set fit together the best. Besides, the lowest classification accuracy of all the samples is 90.04% for 8 epochs and the best classification accuracy of it is 92.11% for 15 epochs. As a result, there is a difference of 2.07% between those two epochs, which suggests that both these model and those datasets function well with larger epochs.

4. Novelty of Research / Product

This disease detection system will save corn farmers time by eliminating the need to manually identify which diseases the plant may contract. In fact, issues like mistakenly identifying the type of diseases could be avoided. The implementation of a convolutional neural network with the Xception model for training datasets on corn disease classification is the foundation of this research, which used local crop datasets as opposed to Internet-sourced datasets. Therefore, local corn crop handlers would find this method valuable since the similarity of the disease could be correlated throughout the country. Also, this approach will be the start of other agriculture researchers in the implementation of various plants especially local plants like durians and other classification needs such as sorting the fruit into its respective grades.

5. Conclusion

In conclusion, it can be stated that the development of corn leaf disease detection system based on a convolutional neural network has reduced human intervention and time invested on corn crop management, while exposing users to the rise of deep learning technologies. Plus, the study findings show that the Xception model's accuracy on datasets has reached 92.11 percent. The implementation of this system could be useful to define other characteristics like colors for future work. Therefore, all stated objectives for this research have been accomplished.

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