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Perlis Branch
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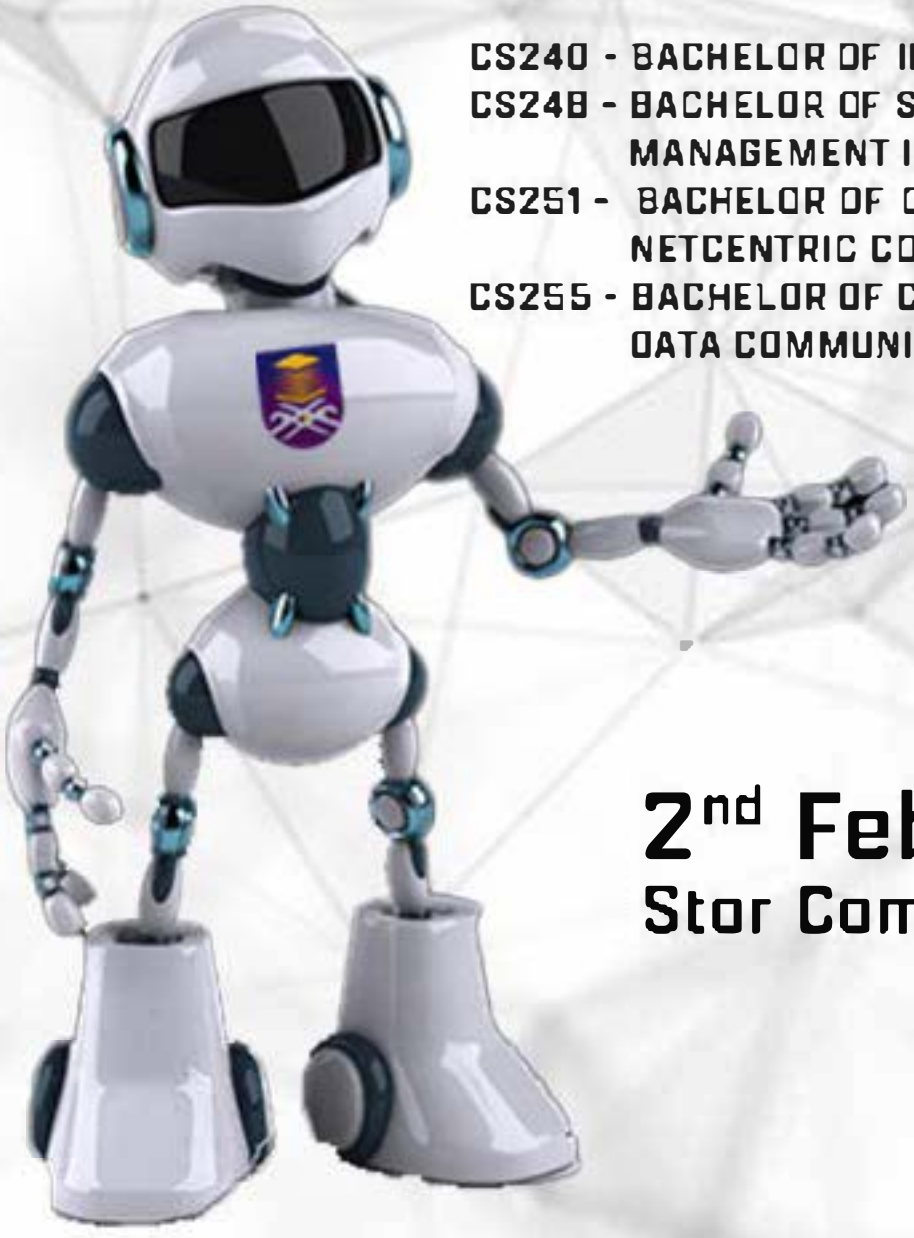
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



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

2nd Februory 2023

Stor Complex, UiTM Perlis

Organized by:
College of Computing, Informatics and Media
Universiti Teknologi MARA Perlis Branch

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

Editors
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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

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

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EXTENDED ABSTRACTS

OBJECT DETECTION MODEL FOR MANGO LEAF DISEASES

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Abstract

Deep learning is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised. A deep learning method was used to develop a leaf disease object detection model. However, this project will focus on collecting datasets mango leaf disease images samples from UiTM Harumanis mango tree farm. In addition, this object detection model for mango leaf diseases used the techniques mean average precision (mAP) to performance accuracy and speed of the algorithm. This project would detect mango tree growers' leaf diseases using the YOLOv4 darknet. This model can also be utilised by homeowners that grow mango trees. On object detection, farmers can detect leaf diseases like black sooty molds and white wax scales earlier and treat them. Thus, leaf disease-detecting projects will use this feature to help the users facing this leaf disease problem. This object detection model will also benefit mango farmers and agriculture students. This study will also help farmers monitor several mango trees rapidly.

Keywords*: YOLOv4 Darknet, mean average precision (mAP), dataset leaf diseases image samples*

1. Introduction

A computer vision technology called object detection helps find and identify things in an image or video. To identify early on the types of leaf diseases found on the mango Harumanis tree and take early action in overcoming the disease of the mango Harumanis leaf tree from suffering from damage. The goal of this project is to make it easier for mango farmers, especially Harumanis, to detect the leaf diseases they face. In order to achieve the aim, the objective is to collect white wax scales and black soothy mold mango leaf images samples, develop early object detection model for leaf disease for mango farmers and evaluate the performance of white wax and black soothy mold object detection model. This project aims to formulate an object detection model for leaf disease by using deep learning techniques.

2. Methodology

However, this project will collect datasets of mango leaf disease images from UiTM Harumanis mango tree farm. To take high-quality leaf disease images, turn an A4 paper box into a mini studio. Additionally, the dataset must be extracted in JPEG format. The dataset needs leaf disease labels. A model can be trained using an image dataset of leaf diseases, along with information on their locations in the image and a label identifying the type of leaf disease each four class represents, such as Athronous, Black Soothy Mold, White Wax Scale, Healthy. The model will list the objects it detects, the position of a bounding box that includes each object, and a mean average precision (mAP) score that indicates confidence in the detection's accuracy and speed.

3. Results and Discussion

This project is developed to focus on object detection model for mango leaf diseases using the best deep learning techniques. The best deep learning techniques are being used in this research to concentrate on object detection model for mango leaf diseases. The mean average precision (mAP) accuracy and speed of deep learning algorithms serve as benchmarks. 150 image samples for each 4 classes were used to create the project's dataset, which was then transformed into the training phase for object detection

model. The result of training will show the performance mean average precision (mAP) of the model development and the analysis can be done to distinguish phrases training is done.

4. Novelty of Research / Product

There have been a number of research that have investigated how to implement object detection, According to Tong & Wu (2022), robot vision, autonomous driving, intelligent transportation surveillance, human-computer interaction, content-based picture retrieval, drone scene analysis, consumer electronics, and augmented reality are just a few of the applications that employ object detection. Darknet has a distinct architecture and set of capabilities than other deep learning frameworks and is mostly used for object detection. According to Carata et al., (2019), the ability to quickly create different network configurations, starting with the original Darknet network, was the other key goal. It is faster than many other Neural Network architectures and approaches like Faster R-CNN etc. Additionally, whereas Darknet architecture & YOLO is a specialised framework and at the top of their game in terms of speed and accuracy, TensorFlow has a wider reach. YOLO can run on the CPU; however the GPU offers 500 times the performance due to CUDA and cuDNN exploitation.

5. Conclusion

This project successfully to collect dataset mango leaf diseases for example White Wax Scale, Black Soothy Mold and Anthracnose, develop early object detection model for leaf disease for mango farmers and evaluate the performance of white wax and black soothy mold object detection model.

REFERENCES

Carata, S., Mihaescu, R., Barnoviciu, E., Chindea, M., Ghenescu, M., & Ghenescu, V. (2019). Complete Visualisation, Network Modeling and Training, Web Based Tool, for the Yolo Deep Neural Network Model in the Darknet Framework. *Proceedings - 2019 IEEE 15th International Conference on Intelligent Computer Communication and Processing, ICCP 2019*, 517–523. https://doi.org/10.1109/ICCP48234.2019.8959758

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