
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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DATA COMMUNICATION & NETWORKING

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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)

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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.



RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

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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

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EXTENDED ABSTRACTS

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

DIABETES RISK PREDICTION SYSTEM AND DATA VISUALIZATION

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Abstract

Diabetes is a deadly chronic disease that has a negative impact on the entire body system. This disease affects millions of people, and a significant number of patients die because of its side effects each year. Undiagnosed diabetes can lead to nerve and kidney damage, heart and blood vessel disease, slow wound healing, hearing loss, and a variety of skin diseases. Moreover, the rapid growth of diabetes is very alarming and the need to identify the significant factor that leads to diabetes is increasing. Therefore, an efficient way to predict diabetics is required so that necessary procedures can be implemented ahead of time. A diabetes prediction system is implemented for predicting diabetes and visualizing the significant factors that lead to diabetes. The target users for this system are medical practitioners, individuals working in diabetes research centers, and the government. Secondary data has been used for this research. HTML, CSS, Python, and data visualization techniques are used to design the system. The overall development process is divided into four phases: planning, analysis, development, and testing. To determine Diabetes, the prediction model used and compared different machine learning algorithms such as Logistic Regression (LR) and Support Vector Machine (SVM). As a result, Logistic Regression has been selected as the prediction model because it displays the highest accuracy score. According to the usability testing evaluation, many respondents were satisfied with the system's usability.

***Keywords:** diabetes, diabetes prediction system, machine learning, Logistic Regression, data visualization*

1. Introduction

The aim of the study is to develop a system using machine learning techniques that can predict diabetes in an early stage to prevent worse health complications. Furthermore, data visualization has been used to aid end-users in analyzing diabetes conditions and identifying key factors that are significantly involved with diabetes disease. Therefore, the objective of this project is (1) To implement machine learning technique in predicting diabetes, (2) To develop a system that can predict diabetes as well as a dashboard visualization of the relationship between the diabetes features, and (3) To evaluate the usability of the system using usability testing. Medical practitioners, individuals working in diabetes research centers, and the government are the target user of this system.

2. Methodology

The problem statement, objective, scope, and project significance are all identified in the first phase of the System Development Methodology, which is the planning phase. Before performing the machine learning workflow, the retrieved dataset is explored and cleaned during the analysis phase. Later, the accuracy scores of the machine learning models are compared, and the model with the highest score is chosen as the system's prediction model. The system design will then be developed in the development phases to perform the actual task of predicting diabetes and displaying all the visualizations in the dashboard. Finally, during the testing phase, the system will be tested using usability testing to obtain feedback on its performance.

3. Results and Discussion

During the testing phases, 22 respondents completed the questionnaire, and their responses were collected and analyzed. 16 questions from the Post-Study System Usability Questionnaire (PSSUQ) were observed, with three main categories evaluated: usefulness, information quality, and interface quality. According to the findings, among the higher-level categories, interface quality received the highest mean score, while information quality received the lowest. It demonstrates that the majority of respondents prefer to use the system interface, while others struggle to understand the information displayed in the system. According to the respondents, the Diabetes Risk Prediction System has a high level of usability. Future research could improve the classifier's accuracy and predictability by employing different algorithms or combining them with other computational techniques such as genetic algorithms or particle swarm optimization.

4. Novelty of Research / Product

Diabetes Risk Prediction System can be used to predict diabetes risk and identify significant risk factors that lead to diabetes at an early stage. As a result, it benefits the healthcare system by improving diabetes management. Furthermore, machine learning techniques are widely used by many researchers for disease prediction at an early stage. However, very few people use visualization techniques to predict diabetes. Rather than visualizing the system, many of the researchers preferred machine learning or a deep learning-based approach. As a result of the combination of diabetes prediction and visualization of the factors that contribute to diabetes in patients, end-users can perform early disease control care, reducing diagnostic times and representing economic savings for the health system and the patient.

5. Conclusion

In conclusion, the Diabetes Risk Prediction System is effective in providing accurate and timely diabetes diagnosis results. The system has the potential to reduce the prevalence of diabetes and its associated risks. As a result, the current healthcare system can be improved to provide a better user experience.

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