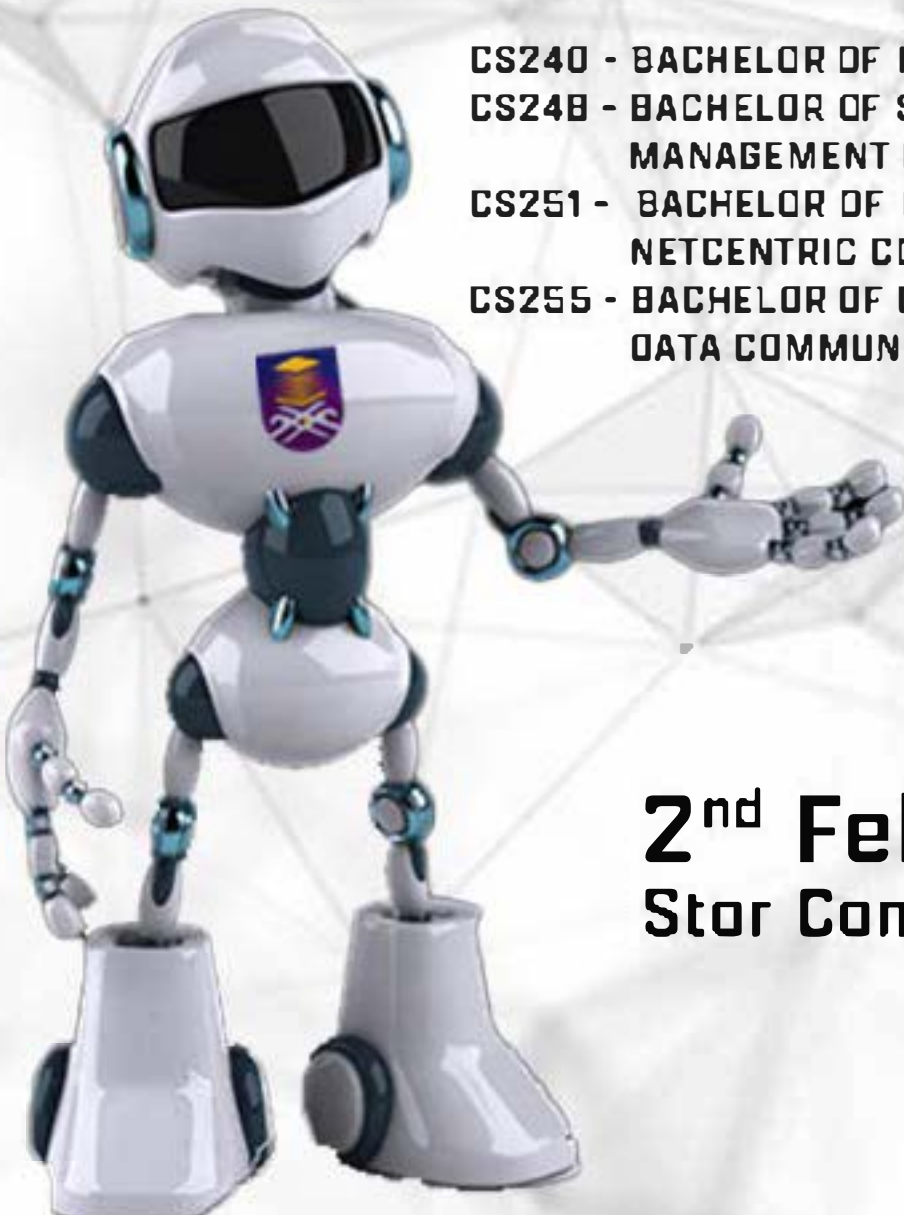

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0

- 
- CS240 - BACHELOR OF INFORMATION TECHNOLOGY [HONS.]**
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2nd February 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)

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Editors

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

e ISBN: 978-629-97934-0-3



Perpustakaan Negara Malaysia

Published by

MOHAMMAD HAFIZ BIN ISMAIL

Universiti Teknologi MARA

02600 Arau, Perlis

Tel: +604 988 2028

<https://fskmpерlis.uitm.edu.my/remacs50/>

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

Ummi Asyiqin Che Muhammad and Muhammad Hasbullah Mohd Razali

College of Computing, Informatics and Media, Universiti Teknologi MARA Perlis Branch, Malaysia

Abstract

In the medical data set, the majority class consist of healthy patients, whereas the minority class consist of a few sick patients. Although many machine learning algorithms have been developed by researchers, the class imbalanced distribution still makes it challenging for classifiers to properly learn and differentiate between the minority and majority classes. This study focused on fitting an imbalanced diabetic data set to a CSForest algorithm. The accuracy of the CSForest was then compared to the RForest. It was found that the accuracy of RForest was 76.70% while the accuracy of the CSForest was 78.72%, indicating that CSForest performs better than the RForest in classifying diabetic patients.

Keywords: Imbalanced class, cost-sensitive forest, random forest, diabetic patients

1. Introduction

The city of Sawahlunto was chosen to represent Indonesia at UNESCO as the world's cultural city in 2016 and this was unforeseen because this city has been declared as a dead city. In order to overcome the social and economic situation, the city's authorities have transformed the city by referring to the city's past as a mining city. This article analyses the meaning-making process in constructing the image of the city by utilizing collective memory, particularly in constructing the name of Lubang Tambang Mbah Soero as a tourism site. The aim is to explore the meaning-making process and the power relation within the process.

2. Methodology

Data were obtained by using a secondary data set collected by Teh et al. (2020), which focused on the imbalanced binary class distribution of diabetic patients. The dataset comprises 158 patients, with 39 of them having diabetes, while the remaining 119 patients are negative. This article used cost-sensitive forest and random forest. The dataset was imported into WEKA before continuing to perform simple binning discretization since the features were continuous. Then, transformed it into Attribute-Relation File Format (ARFF). Next, the data were fitted into a random forest, and the data were split into 70% allocated to training and the remaining 30% for testing. The same steps were repeated for the cost-sensitive forest. The value of accuracy was used to compare both algorithms.

3. Results and Discussion

After the data were fit into both algorithms, the results were obtained and it can be seen that cost-sensitive forest had a greater percentage rate compared to random forest. This article utilized performance measures such as accuracy to evaluate the performance of the classifiers. The result obtained in this article demonstrated the potential of cost-sensitive forest in classifying imbalanced data. These findings lead to the conclusion that both algorithms were effective in classifying diabetic patients with the imbalanced class problem. However, cost-sensitive forest delivered a better outcome due to their significantly greater percentage rate when compared to random forest.

4. Novelty of Research / Product

There have been a number of studies that have used random forest for classifying imbalanced class distribution (Sadeghi et al., 2022); (Wang et al., 2021); (Zhang et al., 2019). There have also been several studies about cost-sensitive forest for classifying imbalanced class distribution (Xiaoli & Qiang, 2019); (Chen et al., 2019). However, there has not been any research about the comparison between these two algorithms, which are random forest and cost-sensitive forest in classifying an imbalanced class. Therefore, the main focus of this study is to fit random forest for the classification and then validate the performance of cost-sensitive forest with conventional random forest. All in all, the research aims to contribute for future research as it can be used as a basic reference and apply it to various additional problems.

5. Conclusion

The main objective of this study is to fit random forest algorithms for the classification of imbalanced class diabetic dataset. 70% of the total sample was used as training data to determine the optimal model parameters and the remaining 30% was used as testing data. The research utilized performance measures such as accuracy to evaluate the performance of the classifiers. The results obtained from cost-sensitive forest accuracy are higher than random forest with 78.72% compared to random's forest 76.60%.

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Research Exhibition in Mathematics and Computer Sciences: REMACS 5.0
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e ISBN 978-629-97934-0-3

