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Perlis Branch
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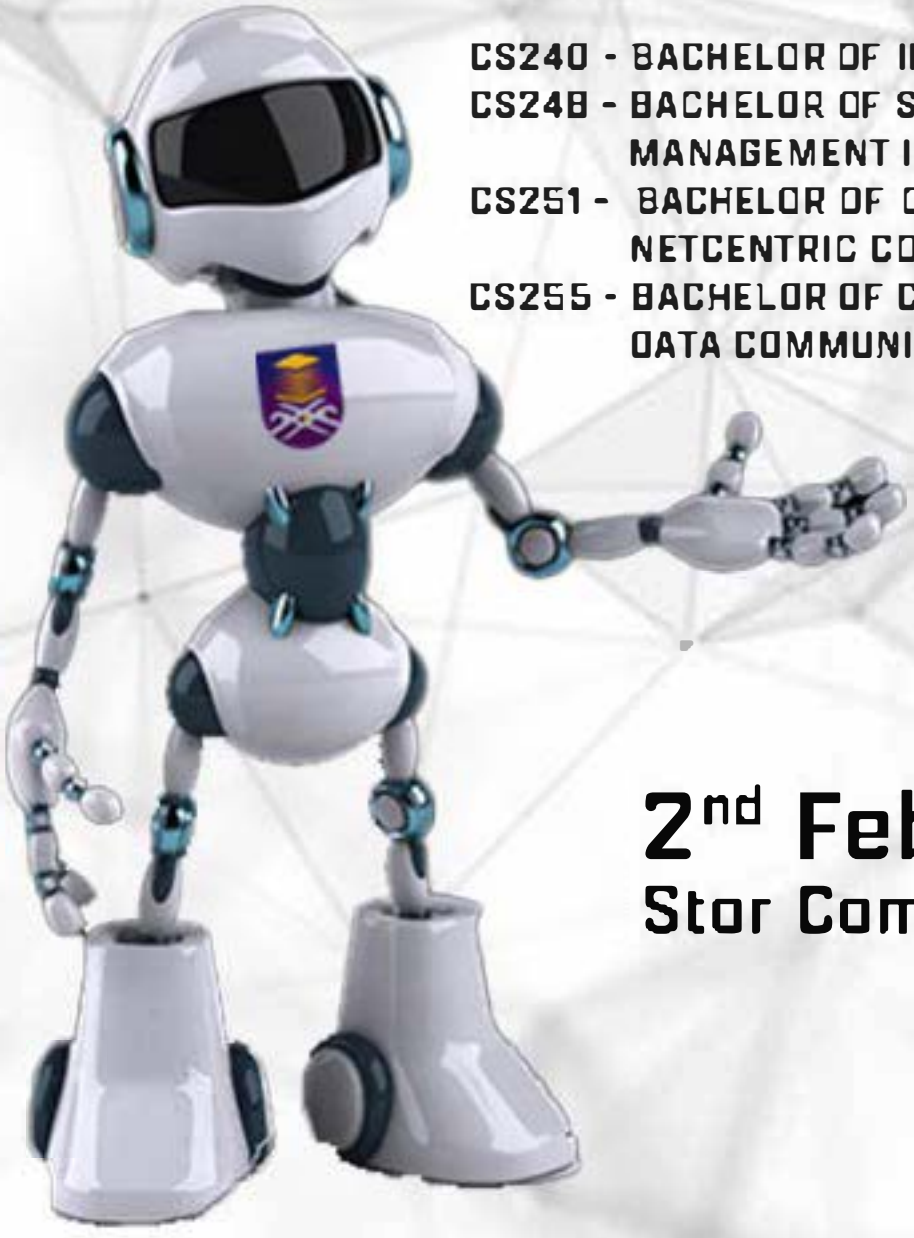
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

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

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CONTENTS

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

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

REMACS 5.0

EXTENDED ABSTRACTS

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

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Abstract

Covid-19 has cause enormous challenge to Malaysia when this pandemic has lowered the tourism demand and cause the number of tourist arrival in Malaysia to decrease from 26.1 million in 2019 to 4.3 million in 2020. Many workers have also been laid off by their company due to the incapabilities of the business to generate revenues to pay their workers. Forecasting the number of tourist arrivals and the number of employed people is studied and correlation between the two figures are calculated in order to overcome the problems. The main objectives this paper aims to achieve are to find the relationship between the number of employed people and the number of tourist arrival in Malaysia and in finding the forecasted values for both data sets. The aim in finding the relationship between these data is to determine whether the number of tourist arrivals affects the number of employed people or otherwise. The data sets used were from the Tourism Malaysia website, CEIC data and Department of Statistics Malaysia (DOSM) dating from January 2018 until September 2022. ARIMA and Fuzzy Time Series methods are chosen to find the forecast value while the correlation regression is to assist in finding the correlation. MSE, RMSE and MAPE were also utilized to compare the error measures gathered between the two methods. The result shows that ARIMA(2,1,0) is the best method to forecast the number of employed people while Fuzzy Time Series is better for the number of tourist arrivals. However, the correlation values calculated suggested strong relationship only during the endemic phase.

Keywords: *ARIMA, Fuzzy Time Series, employed people, tourist arrival, forecast, Covid-19*

1. Introduction

Three main objectives that this study would like to achieve are to determine the relationship between tourist arrival and employed people using correlation regression, to forecast number of employed people and tourist arrival using ARIMA and Fuzzy Time Series model, and to find the best method between ARIMA and FTS using error measures. This paper utilized data of the number of employed people, gathered from Department of Statistics Malaysia (DOSM,) and the number of tourist arrival in Malaysia, gathered from Tourism Malaysia website, dating from January 2018 until September 2022. The data of unemployment rate in Malaysia would not be considered in this study.

2. Methodology

Methods used in this study to forecast the number of tourist arrival and the number of employed people are ARIMA model and Fuzzy Time Series model. For the ARIMA model, the best model is chosen based on few criteria such as the Akaike Info Criterion (AIC), Schwarz Criterion, Hannan-Quinn Criterion, Box Pierce Q Statistics, and MSE. The best model between ARIMA and FTS for both datasets are determine based on the error measure, MSE, RMSE and MAPE. The forecasted values from the best models for both data is used to find its relationship for pre, during and post Covid-19. The relationship is calculated using correlation regression.

3. Results and Discussion

The result obtained in this study for the best model in forecasting the number of employed people in Malaysia is ARIMA(2,1,0) model while Fuzzy Time Series is the better model to forecast the number of tourist arrival. Both models were chosen as it exhibits the lowest values from all the error measures calculated. The forecasted values using ARIMA(2,1,0) for the number of employed people and forecasted value using FTS model for the number of tourist arrival will be divided by phase, which are by pre, during and post pandemic Covid-19 phases. The relationship between the two data is collected for each phase and the results shows that the endemic phase has the strongest correlation values at above 0.8 for the relationship between the actual data and the forecasted values. Meanwhile, other phases indicate a weak to moderate correlation only.

4. Novelty of Research / Product

Research by Nor et al. (2018) & Nur Afiqah Ismail et al. (2022) have been focusing mainly on forecasting the number of employment rates using exponential smoothing methods, ARIMA and ARFIMA models. There is also a study regarding forecasting the tourist arrival but somehow it focuses more on tourist arrival in homestay at Pahang instead of the total number in Malaysia (Maizatul Akhmar Jafridin et al., 2021). Meanwhile, there is a study regarding the relationship between the number of tourist arrival and unemployment in Malaysia that also utilized the regression analysis to attain the result (Tee et al., 2020). However, there is not much study that focuses on the predicting the number of employments in Malaysia. Hence, this paper focus on that matter and finding the relationship of the figure with the number of tourist arrival. Aside from that, this study also divided the data based on the phase of pre, during and post Covid-19 and find the correlation value for each phase.

5. Conclusion

In conclusion, Covid-19 does affect the number of tourist arrival and employed people as both number drops during the pandemic. However, both figures started to gain its momentum back when Malaysia slowly reach the endemic phase. Perhaps in the future, if this pandemic is getting better, the tourism industry and number of employed people might stand in the same way as it did before Covid-19.

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