Universiti Teknologi MARA

Forecasting Air Pollution Index (API) In Balik Pulau, Pulau Pinang Using Chen's Fuzzy Time Series Method

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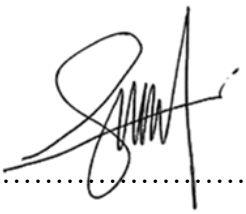
STUDENT'S DECLARATION

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



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ABSTRACT

Balik Pulau, Penang is one of the industrial areas in Malaysia. A lot of heavy industries and factories operate here, thus making air pollution an issue that can no longer be avoided by the residents around the area. Polluted air results in limited daily activities and health problems for the population either in the short or long term. To find out the changes in the air pollution index, the air pollution index forecast is done to analyse the pattern that will form in the future. This will help the community become more aware of air pollution and be prepared for any circumstances in the future. There are various methods to carry out the prediction process; one of it is to use the fuzzy time series method. In this case study, Chen's fuzzy time series method is used to construct a model to forecast the air pollution index in Balik Pulau, Pulau Pinang by using daily historical data from 2020. Chen's method is done by using Sturges method to determine how many intervals are needed to form a certain amount of linguistic values which is later used as a fuzzy set. From the Sturges method, only ten linguistic value were acquired, which is not enough for forecasting purposes. Chen's fuzzy time series method does not depend on the previous data to forecast; thus, the forecasted value is deduced from the intervals of the fuzzy sets obtained. In this study, Chen's method gives Root Mean Squared Error (RMSE) = 9.29 and Mean Absolute Percentage Error (MAPE) = 16.86. This indicates that the model is a suitable method for forecasting purposes.

Keywords: Forecasting, Air Pollution Index (API), Fuzzy Time Series (FTS), Chen’s model.

TABLE OF CONTENTS

CONTENTS			PAGE
SUPERVISOR'S APPROVAL			ii
STUDENTS' DECLARATION			iii
ACKNOWLEDGEMENT			iv
ABSTRACT			v
TABLE OF CONTENT			vi
LIST OF FIGURES			viii
LIST OF TABLES			ix
CHAPTER ONE: INTRODUCTION			
	1.1	Background of the Study	1
	1.2	Problem Statement	2
	1.3	Objective of the Study	4
	1.4	Scope of the Study	4
	1.5	Significance of the Study	5
		1.5.1 Individuals	5
		1.5.2 Students	5
		1.5.3 Governments	5
CHAPTER TWO: LITERATURE REVIEW			
	2.1	Forecasting on the Air Pollution Index	7
	2.2	Forecasting using the Fuzzy Time Series	9
	2.3	Summary	11

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Method of Data Collection 12

3.2 Method of Data Analysis 12

3.2.1 Model Formulation 14

3.2.2 Measurement of Accuracy 16

3.3 Summary 17

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Chen's Fuzzy Time Series (FTS) Method Analysis 18

4.2 Measurement of Accuracy 25

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions 26

5.2 Recommendations 26

REFERENCES 28