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DEVELOPMENT OF CLASSIFICATION MODEL BETWEEN CLEAN WATER AND POLLUTED WATER BASED ON CAPACITANCE PROPERTIES USING LEVENBERG-MARQUARDT (LM) ALGORITHM OF ARTIFICIAL NEURAL NETWORK

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

This project is about using the Levenberg Marquardt algorithm in Artificial Neural Network (ANN) to classified between clean and polluted water. By designing the ANN model system and then trained it, the ANN able to find the best-optimized model that can distinguish between clean and polluted water. 200 samples of clean and polluted water were collected in the process. The sample will then be divided into two cases, which are 100 clean water samples, and another 100 from polluted water samples. All samples were collected from Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang, and Sungai Derhaka, Pulau Pinang. The capacitance value calculation for both cases was carried out using LCR meter with a frequency range of 1kHz. To measure the normal distribution of the data, IBM SPSS Statistical Software were implemented. For both cases, the statistical analysis data show that the p-value is more than 0.05, which indicates that the data are normally distributed. These measurement inputs were then going through the process of classification in ANN to generate the optimized models by using LM algorithm. The model is being trained, tested, and validated to differentiate between clean water and polluted water. There were 1 optimized model selected from the classification process. The accuracy from the selected most optimized models were 100%. The selected most optimized models were then can be used to classify between clean water and polluted water based on capacitance input.

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TABLE OF CONTENTS

		PAGE
AUTHOR'S DECLARATION		**i**
ABSTRACT		**ii**
ACKNOWLEDGEMENT		**iii**
LIST OF TABLES		**vi**
LIST OF FIGURES		**vii**
LIST OF APPENDICES		**viii**
LIST OF SYMBOLS		**ix**
LIST OF ABBREVIATIONS		**x**
CHAPTER 1 INTRODUCTION		**1**
1.1	Research Background	1
1.2	Problem Statement	2
1.3	Objective	4
1.4	Scope of study	4
1.5	Significance of Study	5
1.6	Thesis Organization	5
CHAPTER 2 LITERATURE REVIEW		**7**
2.1	Introduction	7
	2.1.1 Water Quality Classification	8
	2.1.2 Statistical Analysis	9
	2.1.3 Artificial Neural Network	11
2.2	Conclusion	12
CHAPTER 3 RESEARCH METHODOLOGY		**13**
3.1	Introduction	13
3.2	Flow chart	13
	3.2.1 Data Collection	14
	3.2.2 Cylindrical Capacitance Transducer Design.	16
	3.2.3 SolidWorks Software	16

3.2.4 3D printer 19
3.2.5 Capacitance Measurement 21
3.2.6 Statistical Analysis 22
3.2.7 Artificial Neural Network 24
3.2.8 Microsoft Excel 26

CHAPTER 4 RESULT & DISCUSSION 30
4.1 Cylindrical Capacitance Transducer Design. 30
4.2 Statistical Analysis 31
4.3 Classification using ANN 35
4.4 Selecting Optimized Model for ANN 37

CHAPTER 5 CONCLUSION & FUTURE WORK 39
5.1 Conclusion 39
5.2 Future work 39

REFERENCES 41
APPENDICES 45