

UNIVERSITI TEKNOLOGI MARA

**RAINFALL PREDICTION SYSTEM USING
ARTIFICIAL NEURAL NETWORK (ANN)**

IZZAT IZZUDDIN BIN ZULKARNAIN

BACHELOR OF COMPUTER SCIENCE (Hons.)

JANUARY 2024

ACKNOWLEDGEMENT

Because of Allah's greatness and the various gifts, He has given me, I was able to complete this study in the specified time and I praise and thank Him for that. First and foremost, I would like to express my appreciation to my Supervisor, Madam Ummu Fatimah. Without her assistance and guidance, who not only helped me complete my research but also invested her time and effort into doing so, this work would not have been possible. Additionally, I would want to thank her for being my CSP600 and CSP650 instructor and for sharing her knowledge with me as well as for supporting and inspiring me throughout the entire semester.

Also, my family who has been the most significant person in my pursuit of this mission. A special thank you goes out to my much-loved parents for their unwavering emotional and physical support, as well as their encouragement and financial help during my most difficult times. I appreciate having the opportunity to collaborate on this project with everyone. I would want to thank my closest friends for their assistance and emotional support in getting the final year project completed successfully.

ABSTRACT

The Rainfall Prediction System using Artificial Neural Network (ANN) project aimed to develop a model for predicting rainfall based on weather attributes. The background study involved an extensive review of literature, including books, articles, journals, theses, websites, and papers, to explore existing techniques for rainfall prediction. The project identified the need for an accurate and efficient method for predicting rainfall to aid in various applications such as agriculture, water resource management, and disaster preparedness. The problem statement addressed the limitations of current rainfall prediction methods and emphasized the significance of developing a reliable ANN-based model. The objectives of the project were to study the ANN algorithm for rainfall prediction, gather relevant data for training the model, and implement and evaluate the performance of the developed system. The methodology employed a systematic approach, including data collection, pre-processing, prototype architecture design, algorithm implementation, and evaluation. The research utilized the waterfall model, with phases such as preliminary study, data analysis, design and implementation, and evaluation. Key results of the project included the successful implementation of the ANN model for rainfall prediction and the evaluation of its accuracy using different training and testing data splits. The developed system demonstrated promising capabilities in predicting rainfall based on weather attributes, thus offering potential benefits for various sectors reliant on accurate rainfall forecasts. In conclusion, the project provided valuable insights into the application of ANN for rainfall prediction and highlighted the potential for further enhancements and real-world implementation. The findings contribute to the advancement of computer science and offer practical implications for sectors dependent on precise rainfall forecasts.

TABLE OF CONTENT

LIST OF TABLES.....	VIII
LIST OF FIGURES.....	IX
CHAPTER 1: INTRODUCTION.....	1
1.1 Background of Study.....	1
1.2 Problem Statement.....	2
1.3 Objective.....	3
1.4 Project Scope.....	4
1.5 Project significance.....	5
1.6 Research Framework.....	6
1.7 Chapter Summary.....	8
CHAPTER 2: LITERATURE REVIEW.....	10
2.1 Introduction.....	10
2.2 Rainfall Prediction.....	11
2.3 Artificial Neural Network Algorithm.....	12
2.3.1 ANN and How Does It Works.....	12
2.3.2 Advantages and Disadvantages of ANN.....	13
2.3.2 Flowchart of ANN Algorithm.....	15
2.4 Implementation ANN Algorithm in Various Problem.....	18
2.5 Similar Works.....	26
2.6 The Implication of Literature Review.....	38
2.7 Chapter Summary.....	39

CHAPTER 3: METHODOLOGY	40
3.1 Overview of Research Framework Methodology	40
3.1.1 Detailed Research Framework.....	41
3.2 Preliminary Study.....	44
3.2.1 Literature Study	44
3.3 Data Analysis.....	44
3.3.1 Data Collection	44
3.3.2 Data Pre-Processing.....	46
3.4 Design and Implementation Phase	48
3.4.1 Prototype Architecture	48
3.4.2 Flowchart	50
3.4.3 Interface Design.....	51
3.4.4 Pseudocode of Selected Algorithm	51
3.5 Prototype Implementation	52
3.6 Evaluation Phase	53
3.6.1 Accuracy Test.....	53
3.7 Gantt Chart	56
3.8 Chapter Summary	57
 CHAPTER 4: RESULT AND FINDING.....	 58
4.1 Conceptual Framework	58
4.2. Program Codes for Algorithm	61
4.3 Prototype Interfaces.....	71
4.3.1 ANN Implementation.....	73
4.4 Evaluation Result	74