

UNIVERSITI TEKNOLOGI MARA

**HANDWRITTEN CHARACTER
RECOGNITION SYSTEM FOR
ONLINE LEARNING USING
RECURRENT NEURAL NETWORKS
(RNN)**

NUR NABILAH SHAFIQAH BINTI ROSLI

**BACHELOR OF COMPUTER SCIENCE (HONS.)
DATA COMMUNICATION AND NETWORKING**

JULY 2022

Universiti Teknologi MARA

**Handwritten Character Recognition
System for Online Learning Using
Recurrent Neural Networks (RNN)**

Nur Nabilah Shafiqah Binti Rosli

**Thesis submitted in fulfilment of the requirements
for Bachelor of Computer Science (Hons.) Data
Communication and Networking Faculty of
Computer and Mathematical Sciences**

July 2022

SUPERVISOR APPROVAL

HANDWRITTEN CHARACTER RECOGNITION SYSTEM FOR ONLINE LEARNING USING RECURRENT NEURAL NETWORKS (RNN)

By

NUR NABILAH SHAFIQAH BINTI ROSLI

2019268474

This thesis was prepared under the supervision of the project supervisor, Dr. Zulfikri bin Paidi. It was submitted to the Faculty of Computer and Mathematical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Computer Science (Hons.) Data Communication and Networking.

Approved by

Dr. Zulfikri bin Paidi

Project Supervisor

JULY 2022

STUDENT DECLARATION

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

.....

NUR NABILAH SHAFIQAH BINTI ROSLI

2019268474

JULY 2022

ABSTRACT

Each person has special features that lead to his or her individual identifying identity. Since the letter structures or alphabets used to write the writing are unpredictable and difficult to identify and recognise, it is difficult to understand what is being written. Handwritten character recognition is one of the technologies that exist in the field of pattern recognition. In handwritten character recognition, pattern recognition is performed on characters consisting of alphabets or letters written by hand. The purpose of this research to develop handwritten character recognition system by using Recurrent Neural Network (RNN) algorithm. RNN are even used with convolutional layers to extend the effective pixel and achieve good result. Database will be collected from open resource website for research purpose. Next, integrate the trained neural network model into the TensorFlow as the recognition tool. The project's results/findings, which are the Character Error rate and Word Error Rate after training the datasets sample handwriting, are being gathered for analysis. The result of the error rate of the tenth learning of the datasets for sample handwriting is between 0 until 0.3 which is good result. The significance of this study is the project would be able to help community especially to educator and children in their learning aids. Next, it is important for people to save and keeps data and documents well. Handwriting recognition helps to transform the writings in the papers to a text document format which can also be said as readable electronic format. For future work are to build the project for open user. User can download the application on their own smartphone. Next, if there is much time given for this project, researcher or developer need to collect their own sample on handwriting from other people in order to get best result.