UNIVERSITI TEKNOLOGI MARA

MALAYSIAN LICENSE PLATE RECOGNITION SYSTEM USING CONVOLUTIONAL NEURAL NETWORK (CNN) ON WEB APPLICATION

NUR FARAHANA BINTI MAHMUD

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

JULY 2022

Universiti Teknologi MARA

Malaysian License Plate Recognition System using Convolutional Neural Network (CNN) on Web Application

Nur Farahana Binti Mahmud

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

MALAYSIAN LICENSE PLATE RECOGNITION SYSTEM USING CONVOLUTIONAL NEURAL NETWORK (CNN) ON WEB APPLICATION

By

NUR FARAHANA BINTI MAHMUD

2019268034

This thesis was prepared under the supervision of the project supervisor, Dr. Zulfikri Bin Paidi. It was submitted to the Faculty of Computer and Mathemathical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Programme's Name.

Approved by

Dr. Zulfikri Bin Paidi

Project Supervisor

JULY 14, 2022

ABSTRACT

Car License Plate Recognition System (CLPR) is a technology that utilise image processing and computer vision to extract and recognize license plate information from an image or video without the need for human intervention. The purpose of recognition carried out is either for verification or for identification purposes. It is widely utilised in diverse applications, for example, access control and parking management. Nowadays, there are numerous license plate recognition systems that have been developed and analysed effectively by previous researchers using different machine learning algorithms. However, according to a recent study, ANN algorithms require a huge amount of training data while BPFFNN algorithms only have an average success rate of 70% in recognizing all the characters. An improvement is needed on this factor, which could increase the accuracy of the system in the future. The objectives of this research are to develop a Malaysian license plate recognition system using a Convolutional Neural Network (CNN) on a web application and evaluate the performance of the system based on accuracy and loss values. In this research, the methodology that has been used is modest but appropriate. 10 license plate image samples were collected from the internet. The datasets used contain images of alphabets (A-Z) and digits (0-9) and were arranged categorically. Training and validation data are split 80:20. The obtained sample image will first undergo pre-processing and character extraction. 3 layers of a Convolutional Neural Network (CNN) model that contain convolutional, max pooling, flatten and dense were created and further trained. The binary image of the extracted characters was fed to the CNN model for classification. In addition, a simple web application connected to Jupyter Notebook has been developed to perform the testing. Based on the results obtained, the trained CNN model was able to achieve an accuracy of 97.11% for training and 96.76% for validation, respectively. For future work, the researcher may consider expanding the current size of the trained datasets by performing data augmentation to further increase the resilience of the system. A more sophisticated version of this system can be implemented by developing it on a mobile platform.

TABLE OF CONTENTS