UNIVERSITI TEKNOLOGI MARA CAWANGAN PULAU PINANG

SMART CONTROL OF TRAFFIC LIGHT SYSTEM USING IMAGE PROCESSING

MUTMAINNAH RADHIAH BINTI MOHAMAD JEFFERY

BACHELOR OF ENGINEERING (HONS) ELECTRICAL AND ELECTRONIC ENGINEERING

July 2020

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.

Name of Student : Mutmainnah Radhiah binti Mohamad Jeffery

Student I.D. No. : 2016263824

Programme : Bachelor of Degree (Electrical and Electronic Engineering) – EE200

Faculty : Electrical Engineering

Thesis : Smart Control of Traffic Light System using Image Processing

Signature of Student :

Date : July 2020

ABSTRACT

Nowadays, with the growing number of vehicles in Malaysia, traffic congestion at junctions has become a serious issue among motorists. The density of vehicles is increasing day by day, thus, there is a need of adaptive traffic signals which are able to do real time monitoring of traffic density instead of depending on sensors and hardwired at the time of installation. This study describes a system which make used of image processing in controlling the traffic in an effective manner by taking images of each lane at a junction. Basically, more time is allocated for the vehicles on the densest road to pass compared to other less dense road. A step by step of image acquisition and image processing with several methods used in MATLAB is explained in this study. Basically, the processed image is matched with the template image by using feature based image matching technique and the priorities of having green signal is given to the densest lane while the other lanes are given their green signal based on their decreasing priorities. In doing so, the complete flow of image acquisition, image processing, image matching and the allocation of green signal by using four sample of images (lane 1, lane 2, lane 3 and lane 4) with different traffic density is discussed with proper schematics. The Arduino is used as a microcontroller which responsible in controlling the changes of each signal as well as the duration of the traffic lights signal based on the traffic density at each particular lane. The outcome of this study shows that the smart traffic light control system could improve traffic congestion at junction and avoid the time of green light being wasted on an empty road. This could benefit the motorists from wasting their time on the road waiting for their green signal.

ACKNOWLEDGEMENT

First and foremost, I would like to express my utmost gratefulness to God Almighty Allah for giving me strength, wisdom and perseverance to successfully complete this Final Year Project thesis for this course. I wish to express my gratitude to all the people who has given me their moral support and knowledge during this period of writing this thesis.

I would like to express my deep gratitude to Dr. Belinda Chong Chiew Meng, my final year project supervisor, for her patient guidance, enthusiastic encouragement and useful critiques of this proposed work. I would also like to thank her, for advising and assisting me to keep my progress on track.

I would also like to thank to any anonymous reviewers including my friends for their comments which are very useful in improving the quality and presentation of this thesis. Last but not least, I wish to express my love and gratitude to my beloved parents and families for their moral support and encouragement throughout my study.

TABLE OF CONTENTS