

UNIVERSITI TEKNOLOGI MARA

**IOT BASED REAL TIME TRAFFIC
LIGHT MANAGEMENT SYSTEM
FOR CONGESTION CONTROL**

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Thesis submitted in fulfillment
of the requirements for the degree of
Diploma of Electrical Engineering
(Electronic)

Centre for Electrical Engineering Studies
College of Engineering

FEBRUARY 2024

ABSTRACT

This project aims to improve the efficiency of the traffic light management system by incorporating various smart city components and concepts. The system is intended to save time and electricity by improving key elements such as replacing traditional traffic lights with RGB lights, adding barricades to zebra crossings for pedestrian safety. Therefore, there are several sensors included in this project to ensure the aims are achieved. The sensor is DHT11 to determine the temperature and humidity for the weather forecast purposes. IR Sensor to detect the presence of vehicles on the platform. These inputs will be present in the output LCD. With this initiative, possibilities of human error can be eliminated, and it will also utilize the functionality of the traffic lights. This project utilizes both hardware and software part to achieve full efficiency. The software used for this project is Proteus 8. This part is the most crucial because it can help to reduce the errors and still give the chance to troubleshoot all the errors before applying to the hardware. This system will help to improve traffic management and improve overall efficiency in urban environments by implementing these enhancements and technologies, aligning with the vision of smart cities. There are few stages of completing this project, first is the design and development of the traffic light junction, the integration of the sensors and wireless technologies including the Internet of Things (IoT) component (NodeMCU), finally the testing and evaluation of the system's functionality.

ACKNOWLEDGEMENT

In the Name of Allah, the Most Gracious and Merciful. All praises to Allah SWT upon His Blessings, I have finally completed this Final Year Project (FYP) report. First and foremost, I would like to address my utmost gratitude and appreciation to our supervisor, Ts. Rozi Bin Rifin, for all his contributions, ideas, motivations, and support throughout completing this project. I hereby grab the opportunity to thank everybody who has helped me either directly or indirectly from the very beginning of this project until the end of this project completion.

I owed so much appreciation to my parents and all family members for their love, care, and support throughout the wonderful journey as a student in Centre for Electrical Engineering Studies, College of Engineering. Also, I would like to give my credit to my beloved lecturers and all faculty members because without their guidance, support and attention, this valuable project would not be able to come in one piece.

Lastly, lots of love and gratitude to my classmates, friends, and colleagues for your help, support, and moral motivation. Words cannot picture this appreciation for all the good times together UiTM Pasir Gudang. May all the hard work and efforts on completing this project will contribute to the better society.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Traffic congestion nowadays is increasing because the infrastructure growth is slow compared to growth in the number of vehicles. Traffic lights are sometimes centrally controlled by monitors or by computers to allow them to be coordinated in real time to deal with changing traffic patterns. Video cameras, or sensors buried in the pavement can be used to monitor traffic patterns across a city. Traffic congestion poses significant challenges in urban areas, impacting economic productivity, environmental sustainability, and overall quality of life. Traditional traffic light systems often struggle to adapt to dynamic traffic conditions, necessitating innovative solutions. The advent of the Internet of Things (IoT) has opened new avenues for smarter traffic management. IoT technologies, leveraging sensors like cameras, radar, and LiDAR, enable real-time data collection and communication between devices. Existing smart city initiatives showcase successful implementations of IoT in traffic control, emphasizing the potential for improved efficiency and congestion mitigation. However, security and privacy concerns must be carefully addressed. However, this system did not apply to all areas which leads to inefficient electricity usage. With the technology innovations and development, IoT can be used to solve this problem. The authority's role in managing the traffic flow during peak hours or occurrence of accident. This thesis proposes an IoT-based traffic light management system designed to dynamically regulate traffic flow. By integrating advanced sensors, communication protocols, and smart algorithms, the system aims to enhance congestion control, reduce environmental impact, and contribute to the evolution of intelligent urban transportation systems.

1.2 Problem Statement

Most of the traffic lights used in Malaysia still using the traditional method which the duration for the green light to lights up is same for all situation which leads to congestion. And if the traffic lights are break down or in maintenance, the traffic started getting busier because it controlled manually by police traffic. This project provides IoT that allow authorities to