

UNIVERSITI TEKNOLOGI MARA

**SMART TRAFFIC LIGHTS
PROTOTYPE SYSTEM FOR
PEDESTRIANS**

NOR DAYANA ATHIRA BT MOHAMAD TOEL

BACHELOR OF COMPUTER SCIENCE (Hons.)

JANUARY 2022

DECLARATION

I certify that this report and the research to which it refers are the product of my work and that any ideas or quotations from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



.....
NOR DAYANA ATHIRA BT MOHAMAD TOEL
2020964013

JANUARY 31, 2022

ABSTRACT

Recently, many deaths among pedestrians while crossing the road have increased drastically. This is due to their lack of awareness while crossing the street, mainly while waiting for the traffic light to turn green. Traffic lights that do not work properly are one of the many reasons for a pedestrian accident. This project aims to develop a system to reduce pedestrians death. The objectives consist of studying the existing project related to the smart traffic lights system, developing a prototype system based on Wireless Sensor Network, and evaluating the usability of a prototype system using PSSUQ. The preliminary survey was conducted to gather information about the study. 30 respondents were selected to answer all the questionnaires. The waterfall model was used to develop the prototype system. The Arduino platform and NodeMCU microcontroller were used when developing the prototype system for the Smart Traffic Lights Prototype System for Pedestrians. In order to evaluate the usability, the Post-Study System Usability Questionnaire was conducted to evaluate the usability based on 3 respondents. In order to evaluate the usability, the Post-Study System Usability Questionnaire results show that respondents were satisfied using the Smart Traffic Lights Prototype System for Pedestrians. In conclusion, the Smart Traffic Prototype System for Pedestrians was developed to send notifications to pedestrians while waiting for traffic lights to turn green and reduce pedestrians' death.

TABLE OF CONTENTS

CONTENTS	PAGE
SUPERVISOR’S APPROVAL	iii
DECLARATION	iv
ACKNOWLEDGEMENT	v
ABSTRACT	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	xi
LIST OF TABLES	xiii
LIST OF ABBREVIATIONS	xiv

CHAPTER ONE: INTRODUCTION

1.1	Background of Study	1
1.2	Problem Statement	3
1.3	Research Questions	3
1.4	Research Objectives	4
1.5	Project Scope	4
1.6	Significance	5
1.7	Summary	6

CHAPTER TWO: LITERATURE REVIEW

2.0	Introduction	7
2.1	Traffic Lights	8
2.2	Internet of Things (IoT)	8
2.3	Wireless Sensor Network (WSN)	9
2.3.1	Terrestrial Wireless Sensor Network	10
2.3.2	Underground Wireless Sensor Network	11
2.3.3	Mobile Wireless Sensor Network	12

2.3.3.1	Wi-Fi Technology	12
2.3.4	Advantages and Disadvantages of WSN	14
2.4	Microcontrollers	15
2.4.1	NodeMCU	17
2.4.2	Raspberry Pi	18
2.4.3	Differences between Microcontrollers	18
2.5	Studies of The Current Smart Traffic Lights System	19
2.5.1	Design and Implementation of Portable Smart Wireless Pedestrian Crossing Control System	19
2.5.2	Development of a Smart Traffic Light Control System with Real-Time Monitoring	21
2.5.3	Infrared Sensor based Self-Adaptive Traffic Signal System Using Arduino Board	22
2.5.4	Summary of The Current Smart Traffic Lights System	23
2.6	Summary	23

CHAPTER THREE: METHODOLOGY

3.0	Introduction	24
3.1	Phase 1: Study The Existing Project That Is Related To Smart Traffic Lights System	25
3.1.1	Literature Review	25
3.1.2	Preliminary Survey	25
3.1.2.1	Preliminary Survey: Questionnaire Design	26
3.1.3	Software Tool for Data Analysis in Phases 1: Preliminary Survey	26
3.2	Phase 2: Development of Prototype System Based on WSN	27
3.2.1	STLPS Development	27
3.2.2	System Development Life Cycle (SDLC)	27
3.2.3	Waterfall Model	28
3.2.3.1	Analysis	29
3.2.3.2	Design	29
3.2.3.3	Implementation	30
3.2.3.4	Testing	31