

**Universiti Teknologi MARA**

**IoT Based – Smart Garbage Monitoring  
System using Arduino and Blynk**

**Muhammad Amirul Rosyad bin Mohd Halim**

**Thesis submitted in fulfilment of the requirements  
for Bachelor of Information Technology (Hons.)  
Faculty of Computer and Mathematical Sciences**

**JULY 2020**

## STUDENT DECLARATION

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



.....  
MUHAMMAD AMIRUL ROSYAD BIN MOHD HALIM  
2018402064

JULY 17, 2020

## **ABSTRACT**

Smart Garbage Monitoring System using Arduino and Blynk is an IoT-based project that is integrated with cloud computing service. It was developed specifically to help cleaners and residential college representative committee or known as Jawatankuasa Perwakilan Kolej (JPK) in monitoring the level of garbage in the dustbin through Blynk application, which makes it easy to empty the dustbin and reduce their time. This project uses ultrasonic sensor in order to measure the level of garbage in the dustbin and the data can be viewed by user through mobile application, Blynk. It will also notify user through email once the garbage bin is full. Other than notification function, Smart Garbage Monitoring System also consists of automatic open and close lid, track dustbin location and humidity level. The objectives of this project are to design the IoT based - 'Smart Garbage Monitoring System' that detects the level of the garbage displayed in an LCD attached to the dustbin and to validate the user acceptance test and functionality testing for a garbage monitoring system. The development of Smart Garbage Monitoring System used the System Development Life Cycle (SDLC) by implementing the agile model as the methodology. A user acceptance and functionality testing was conducted with 20 respondents who are the Jawatankuasa Perwakilan Kolej (JPK) and contracted cleaners to determine the effectiveness of the project by evaluating the questionnaires that were divided into four categories respectively. Results of the system evaluation showed that most of the participant were satisfied with all categories provided. Therefore, based on the features and functionality offered by the Smart Garbage Monitoring System, it will be beneficial to all users, especially contracted cleaners and JPK in UiTM Perlis.

## **TABLE OF CONTENTS**

<b>CONTENT</b>	<b>PAGE</b>
<b>SUPERVISOR APPROVAL</b>	ii
<b>STUDENT DECLARATION</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>ABSTRACT</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF FIGURES</b>	x
<b>LIST OF TABLES</b>	xiii

### **CHAPTER ONE: INTRODUCTION**

1.0	Introduction	1
1.1	Background of Study	1
1.2	Problem Statement	3
1.3	Objectives	4
1.4	Scope	4
1.5	Research Significance	5
1.6	Summary	5

### **CHAPTER TWO: LITERATURE REVIEW**

2.0	Introduction	6
2.1.	Waste	6
2.2	Waste Management in Malaysia	7

3.2.1	Prototype Visualization	32
3.2.2	System Framework	33
3.2.3	Wiring Diagram	35
3.3	Development Phase	37
3.4	Testing Phase	39
3.5	Evaluation Phase	41
3.7	Summary	43

## **CHAPTER FOUR: CONSTRUCTION**

4.0	Introduction	44
4.1	Hardware Development	44
4.1.1	Arduino UNO	45
4.1.2	Ultrasonic Sensor	46
4.1.3	NodeMCU board	47
4.1.4	LCD Display	48
4.1.5	Humidity Sensor	49
4.2	Hardware and Software Integration	50
4.2.1	Automatic open and close lid	50
4.2.2	Smart Garbage Monitoring System	58
4.3	Smart Garbage Monitoring Architecture	73
4.4	Summary	74

## **CHAPTER FIVE: RESULTS AND ANALYSIS**

5.0	Introduction	75
5.1	Functionality Testing	75