

**Universiti Teknologi MARA**

**UTILIZING SMS TECHNOLOGY TO  
FACILITATE BUS PASSENGER  
DETECTION**

**Mohamad Shafiq bin Ismail**

**Report submitted in fulfilment of the requirements for  
Bachelor of Computer Science (Hons.)  
Faculty of Computer and Mathematical Sciences**

**January 2017**

## **ACKNOWLEDGEMENT**

Alhamdulillah, praises and thanks to Allah because of His Almighty and His utmost blessings, I was able to finish this research within the time duration given. Firstly, my special thanks goes to my super supervisor because she is my backbone and guide throughout this project. She always give me an advice and guidance to teach the right way on how to complete this thesis.

Special appreciation also goes to my beloved parents whose financial support and passionate encouragement made it possible for me to complete the degree in Computer Science especially to finish my final year project. My greatest appreciation to them for giving an advice while I am losing an idea for my project.

Last but not least, I would like to give my gratitude to my dearest friend for always support me behind while I stuck to complete my project development and also when I am doing a research and also helping me develop my ideas.

## ABSTRACT

Most of the parents lack of control for their children who self-travelling to school. This problem make the parents worry about the safety of the children, thus bus passenger detection using SMS technology is proposed. The implementation of estimate time arrival (ETA) using a linear equation represent a mathematical formula that calculate the ETA by using historical data which is a real collected data from the observation. The ETA and information about the student will be blast using SMS alert to the parents. SMS will be sent to the parent by using GSM module that connected to the computer system. The system work when a children enter a school bus and scan a barcode contain of student id which it will check in the student database. Then the system will calculate the ETA by using historical data which is intersection time, travelling time and dwell time at bus stop. The ETA result then embedded into the SMS details which is contain of time of their children scanned and the ETA to school. The result of the project are evaluated using a survey to the user for usability testing and then the accuracy of ETA evaluate by an expert evaluation. The result shows that it is slightly accurate to the system result with the different of 1 minutes. For the future work it will be enhanced by completing the system using real time data that will use a special device to collect the data from the school bus.

# 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>	ix
<b>LIST OF TABLES</b>	x
<b>LIST OF ABBREVIATIONS</b>	xi
<b>CHAPTER ONE: INTRODUCTION</b>	
1.1 Background Study	2
1.2 Problem Statement	3
1.3 Project Objective	4
1.4 Project Scope	4
1.5 Project Significance	5
1.6 Summary	5
<b>CHAPTER TWO: LITERATURE REVIEW</b>	
2.1 Introduction	6
2.2 School Bus Transportation Service	7
2.2.1 Estimate Time Arrival (ETA)	8
2.2.2 Technique	8
2.3 Notification System	10
2.3.1 Short Messaging Service (SMS)	10
2.3.2 Global System for Mobile Communication (GSM)	12
2.4 Barcode System	13
2.4.1 Barcode Reader	13

2.4.2	Barcode	15
2.4.2	QR Code	18
2.4.3	Comparison between Barcode and QR Code	21
2.5	Comparison of Related Work	21
2.5.1	Bus ETA and Tracking System	22
2.5.2	SMS Alert Notification	22
2.5.3	Attendance Scanning System	23
2.6	Summary	25

### **CHAPTER THREE: RESEARCH METHODOLOGY**

3.1	Introduction	26
3.2	Project Development Methodology	26
3.3	Knowledge Acquisition	29
3.3.1	Data Collection	29
3.3.2	Hardware and Software Requirement	30
3.4	System Design and Implementation	32
3.4.1	Scanning Data and ETA Process	32
3.4.2	Alert System	35
3.4.3	Implementation	36
3.5	Result Analysis	37
3.6	Conclusion	38

### **CHAPTER FOUR: RESULT AND FINDINGS**

4.1	Introduction	39
4.2	Framework of SMS Technology to Facilitate Bus Passenger Detection	39
4.3	Data Description for Representation	41
4.3.1	Data Representation	41
4.4	Implementation Result	43
4.4.1	User Interface Result	43
4.5	Result Evaluation	45
4.5.1	Evaluation Analysis	45
4.6	Conclusion and Recommendation	48