



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**KINDERGARTEN SECURITY SYSTEM USING RFID AND GSM
SYSTEM**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology
(Telecommunications) with Honours

by

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DECLARATION

I hereby, declared this report entitled “Kindergarten Security System Using RFID and GSM System” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering (Telecommunication) with Honours. The member of the supervisory is as follow:

.....

(Project Supervisor)

ABSTRAK

Sudah menjadi kebiasaan ibu dan ayah bekerja untuk mencari sumber pendapatan yang lebih untuk menyara hidup harian mereka dalam keadaan ekonomi yang semakin pesat meningkat. Ibu bapa akan memastikan anak mereka dalam keadaan yang selamat sekiranya mereka bekerja dan untuk memastikan perkara berikut, mereka akan menghantar anak mereka ke tadika. Adalah perkara biasa sekiranya ibu bapa risau akan keadaan anak mereka walaupun mereka berada di bawah jagaan tadika. Kajian ini bertujuan mencipta satu sistem keselamatan yang akan di aplikasikan di tadika bertujuan untuk meningkatkan keselamatan anak mereka jauh dari ibu bapa. Selain dari itu, ibu bapa juga akan menerima notifikasi tentang masa keluar dan masuk anak mereka melalui telefon mudah alih. Sistem projek ini adalah kombinasi antara system RFID, GSM dan Arduino yang bertindak sebagai pengawal utama atau komponen utama dalam projek ini. Dengan adanya sistem RFID, masa kanak-kanak keluar atau masuk dari tadika boleh dikesan dan sistem GSM akan menghantar satu teks dalam bentuk pesanan ringkas kepada telefon mudah alih ibu bapa tentang masa keluar atau masuk anak mereka.

ABSTRACT

Nowadays, most of families will earn double income to support their daily lifestyle. It is normal if parents send their children to a safe place such as kindergarten to ensure their children under guarded. Anxious feeling among parent is common even though the children are at the guarded place. This paper aims at developing a security system that will be implemented in the kindergarten that will increase the children's safety when they are away from the parents. In addition, a security system is built to inform the parents the time of their children entering or leaving the kindergarten by notifying the parent through a mobile phone. The project is the combination of technology using RFID, GSM and the main controller is the Arduino. By using RFID system, the system able to trace the children entering and leaving time the kindergarten and by having a GSM system, parents will be notified about their children entering and leaving time the kindergarten in text form via SMS.

DEDICATIONS

Special dedicated to
My beloved father and mother,
To my family, lecturers and friends.
Thanks for all the encouragement and supports.

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Thank you for Allah for providing me with everything that I required in completing this project. I wish to express my sincere gratitude to my supervisor Mr. Abdul Halim bin Dahalan and my co-supervisor Mr. Wanorhisyam bin Abd Rashid for their guidance, encouragement and non-stop supervision in carrying this project report within the limited period.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

3G	-	Third Generation mobile phone network
AREF	-	Analogue Reference
BSS	-	Base Sub-System
CEPT	-	Conference of European Posts and Telegraph
EEPROM	-	Electrically Erasable Programmable Read-only Memory
ETSI	-	The European Telecommunications Standards Institute
FDMA	-	Frequency Division Multiple Access
GMSC	-	Getaway Short Message Centre
GSM	-	Global System for Mobile Communications
HLR	-	Home Location Register
IC	-	Integrated Circuit
ID	-	Identification
IDE	-	Integrated Development Environment
LED	-	Light Emitting Diode
MoU	-	Memorandum of Understanding
MS	-	Mobile Station
MSN	-	Microsoft Network
NSS	-	Switching Sub-System
OSS	-	Operation Support Subsystem
Php	-	Hypertext Preprocessor
PIC	-	Programable Interface Controller
PWM	-	Pulse-Width Modulation
RF	-	Radio Frequency
RFID	-	Radio Frequency Identification
Rx	-	Receiver
SIM	-	Subscriber Identity Module
SMC	-	Short Message Centre
SME	-	Short Message Entity

SMS	-	Short Message Services
TDMA	-	Code Division Multiple Access
Tx	-	Transmitter
USB	-	Universal Serial Bus
VB	-	Visual Basic
VLR	-	Visitor Location Register
WAP	-	Wireless Application Protocol
Wi-Fi	-	Wireless fidelity
WORM	-	Write-once read-many

CHAPTER 1

INTRODUCTION

1.0 Background

Nowadays, families with double incomes are more and more than ever. Therefore, parents have to send their children under six years old to kindergarten for a better care. The good and safety management is required in the kindergarten while parents are away from their child. This proposal paper aims at designing a safety management system to increase the safety of the children while they are under their kindergarten teacher's eye and they are away from their parents. This project basically based on RFID system where RFID is stand for Radio Frequency Identification. This proposed safety system used RFID tag, RFID reader and GSM (Global System for Mobile) module. Further elaboration about RFID system and GSM modem will be explain in Literature Review section. All parents are provided with a tag embedded with an RFID tag which this application work for informing their partner about the kid's arrival and leaving time as they have picked up or send the children. Farther will receive all the arrival and leaving information in the form of text through the GSM module system if the mother have touched the RFID tag to the reader at the kindergarten and on the other hand.

1.1 Problem Statement

Nowadays, most of married couples with double income has to send their children to the safer place such as kindergarten to keep an eye on their children when they at work. The crime over kid such as kidnapping is possible even the children is at the kindergarten. As a parent, the anxiety among the parent is normal. For that reason, this project proposed a system that can reduce the anxiety feeling where parents can receive an information about the children arrival and leaving time the kindergarten through SMS. Further elaboration will be explained in thesis analysis.

1.2 Project Objectives

The main objectives of this research are concentrated on aspect as listed below:

- i. To increase the children's safety when they are away from their parent.
- ii. To develop a system that can notify the parents when the children are entering and leaving the kindergarten using RFID system and GSM.
- iii. To evaluate and analyse the performances of the developed system

1.3 Project Scope and Limitations

The scope of this project to focus on children safety. This study to develop a security system which is it will be implemented in the kindergarten. Parents are provided with a tag embedded with an RFID tag for each of them. An RFID system and GSM system must perform well to develop a system that will provide a desired system. An RFID system composed of three main components; the RFID antenna, RFID tag and RFID reader while GSM is used in this project to allow the communication happen and able to notify the receiver. All the project detailed will be stated in the next chapter.

1.4 Project Significance

This importance of this project to provide a security for the kid at the kindergarten. The operation of this security system is based on RFID concept. RFID concept required some element; RFID tag, RFID antenna and RFID reader. A Radio signal is transmitted by the antenna to activate the RFID tag and let the RFID read the detail of the tag. Not only that, all the information is sent to the parent's mobile phone in the form of text message (SMS) through the GSM system once the reader read the tag. This SMS notification informs the parent about children arrival and leaving time.

1.5 Summary

In a nutshell, this kindergarten security system uses RFID and GSM system that will help in fulfilling the objectives of the project. The purpose of doing this security system to reduce parent's anxiety when they leave their children at the kindergarten because recently there are too many cases about the crime over the children.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

For every project that has been done successfully, studies and reference have been done as guidelines. All the guidelines come from various sources and references such as books, articles, journals, and internet sources. All of these sources play a vital role in making this project successful. All of the information highlights major areas that are related and will be used in the software and hardware for this project.

2.1 Literature Review of Current Existing Project

2.1.1 Smart Ration Card using RFID and GSM Technique

This project is applied in India. A ration card is a very important document for each of the citizen in that country. Mohit Agarwal, Manish Sharma, Bhupendra Singh and Shantanu have developed a ration card that used an RFID technique to avoid the ration forgery as there are chances that the shopkeeper may sell the material to someone else and take the profit and may put some false amount in their records. All the detail family member details are carried in the RFID tag and the customer have to show this tag to the RFID reader and the microcontroller that connected to the reader will check the authentication of the user. If the user is found authentic, the quantity of ration to be given to the customer according to the number of family members will be displayed on the display device. The government office and the registered number will be notified about the delivered ration through the GSM system (Agarwal, 2014).



Figure 2.1: Manual Ration Card (Agarwal,2014)

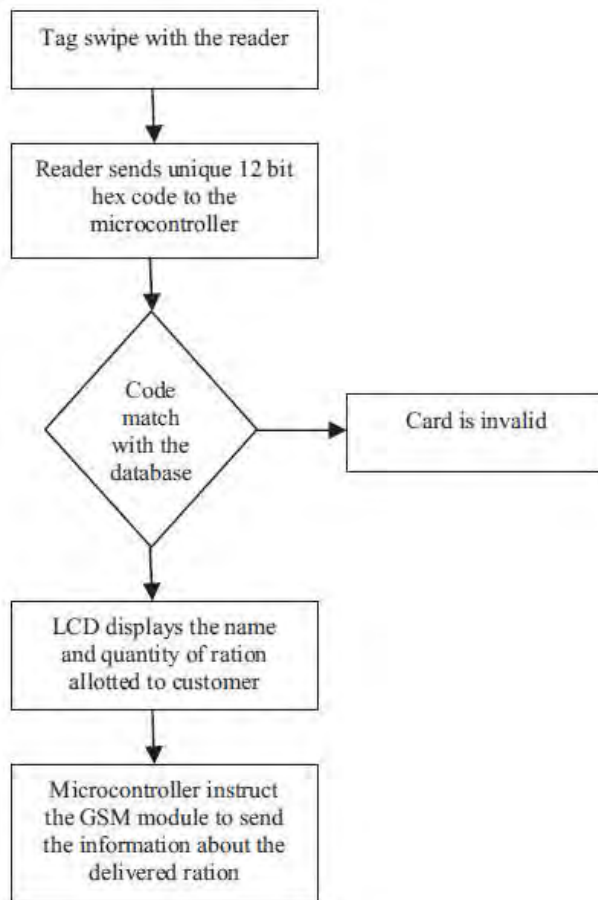


Figure 2.2: Flow chart of a Smart Ration Card (Agarwal, 2014)



Figure 2.3: Swapping of Ration Card (Agarwal, 2014)



Figure 2.4: Display of Customer name (Agarwal, 2014)



Figure 2.5: Monthly quota of customer (Agarwal, 2014)



Figure 2.6: Message received by customer (Agarwal, 2014)

2.1.2 Intelligent Wireless Safety Management System for Children in Kindergarten

This research article is studied by Hou Tsan Lee and this article is published on March 2014. This projects combine three wireless systems; Wi-Fi/3G communication system, Zigbee positioning system and RFID system. Wi-Fi/3G communication system purposed to communicate between kindergarten while Zigbee positioning system to locate kids in the kindergarten to prevent kids from dangerous zone such as a kitchen. This security system starts on the school bus when the kids entering into the bus and the kid's status change when they entering kindergarten with the help of RFID system. Not only that, only the teachers are allow to open the kindergarten gate and teachers are responsible to escort the kids from the bus to enter the kindergarten. Instead of RFID system, the Zigbee positioning system also activated to avoid the kids get into the dangerous zone. The Zigbee module that is worn by the children will be detected if they are in dangerous zone which is the dangerous zone is defined first in the system. The Wi-Fi system or 3G are required to allow the users and the information system in the kindergarten is connected and allowing the database to keep on updating the database for parents and the kindergarten. All the kids daily activities ins kindergarten from the beginning and the end of the school are informed to their parents mobile phone via MSN/3G mobile system (Hou Tsan Lee, 2014).

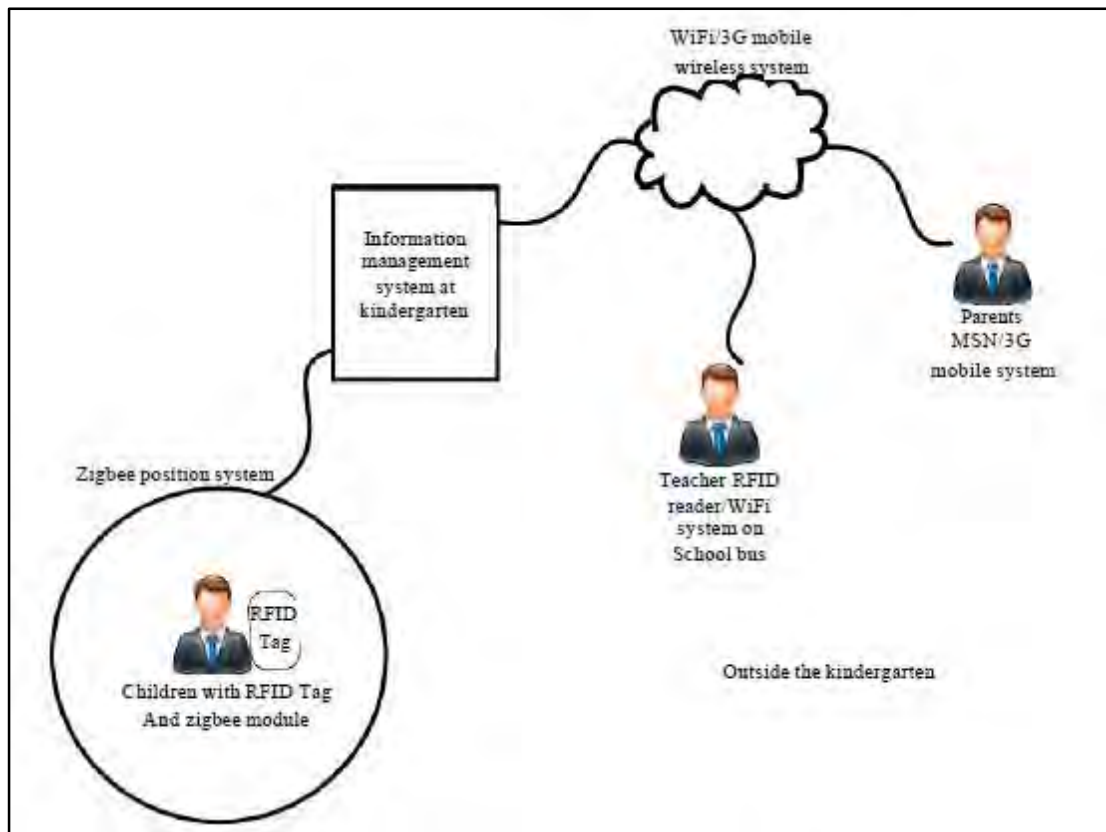


Figure 2.7: Sketch of overall system

(Source <http://scialert.net> 21/3/14>

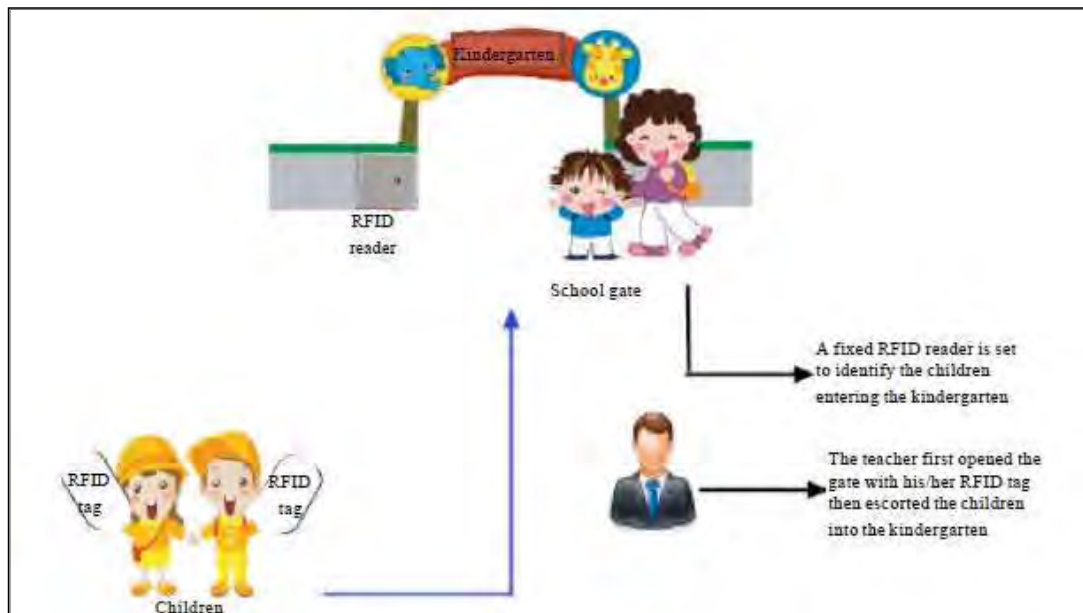


Figure 2.8: Sketch of RFID system at the school gate

(Source <http://scialert.net> 21/3/14>