UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF FLOOD WARNING SYSTEM TO RESIDENTS BASED ON DATABASE

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

by

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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 Bachelor of Computer Engineering Technology (Computer Systems) with Honours. The members of the supervisory committee are as follow:

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ABSTRAK

Malaysia mempunyai hujan paling berhargai dalam setahun. Ia menjadi lebih buruk apabila musim tengkujuh membawa hujan. Ini berlaku setiap tahun dan akan menyebabkan banjir di kawasan-kawasan rendah di Malaysia timur dan utara. Banjir yang sama fenomena alam sejagat yang berlaku di kebanyakan tempat di dunia dan ia juga adalah pemusnah dari segala malapetaka semula jadi. Terdapat beberapa isu yang sering dibincangkan apabila banjir. Masalah utama apabila banjir berlaku adalah banjir boleh menyebabkan kerugian besar jika tidak ada amaran awal banjir daripada pihak berkuasa yang sepatutnya untuk memberi maklumat tentang banjir forecasting. Penekanan utama projek ini adalah bagaimana untuk membangunkan sistem untuk memberi amaran tentang banjir untuk penduduk berdasarkan pangkalan data. Amaran banjir akan dihantar kepada penduduk apabila paras air meningkat pada risiko banjir melalui SMS melalui telefon mudah alih mereka. Memandangkan hakikat bahawa telefon bimbit adalah alat yang paling hampir dengan kita sepanjang masa, ia telah menjadi alat yang sesuai untuk semua jenis sistem amaran dan menyediakan kaedah pengagihan amaran cepat kepada orang ramai. Satu pangkalan data akan membangunkan untuk menyimpan maklumat penduduk dengan menggunakan phpMyAdmin. Sistem ini akan dilaksanakan menggunakan mikropengawal Arduino.

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ABSTRACT

Malaysia has the most rainfall in a year. It becomes worse when the monsoon brings the rain. This happens every year and will cause flooding in low-lying areas in eastern and northern Malaysia. Flood is common universal natural phenomenon taking place in most parts of the world and it is also destructive from all natural disaster. There are some issues that are often discussed when flooding. The main problem when the flood occurs is flooding can cause huge losses if there are no early flood warnings from the authorities which are supposed to provide information on flood forecasting. The main emphasize of this project is to develop the system to alert flood to residents based on database. Flood warning will be send to residents when the water level increased at risk of flooding via SMS through their mobile phone. Considering the fact that mobile phone is a device which we keep close to us at almost all time, it has become a perfect tool for all sort of alert systems and provides method of quick alert distribution to the public. One database will be develop to store information of residents by using phpMyadmin. This system will be implemented using Arduino microcontroller.

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DEDICATIONS

I dedicate this thesis report to my beloved parents. There is no doubt that without their continued support and love I would not have completed this project.

I would like to take this opportunity to acknowledge the advice and guidance given by my supervisor, Madam Nurliyana Binti Abd Mutalib and co-supervisor, Mr. Saifullah Bin Salam.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

AT	-	ATtension
ADC	-	Analog-to-Digital Converter
AUC	-	Authentication Center
CSS	-	Cascading Style Sheets
DBMS	-	Database Management System
DC	-	Direct Current
DDL	-	Data Definition Language
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
EDGE	-	Enhanced Data GSM Environment
GPRS	-	General Packet Radio Service
GSM	-	Global System for Mobile Communication
GUI	-	Graphical User Interfacer
HSPA	-	High Speed Packet Access
HTML	-	HyperText Markup Language
IDE	-	Integrated Development Environment
MySQL	-	My Structured Query Language
PHP	-	Hypertext Preprocessor
USB	-	Universal Serial Bus
kb	-	kilobyte
RAM	-	Random Access Memory
IDE	-	Integrated Development Environment
MMS	-	Multimedia Message Service
OSS	-	Operation and Support System
PC	-	Personal Computer
RF	-	Radio Frequency
SIM	-	Subscriber Identity Module

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SMS	-	Short Message Service
TCP/IP	-	Transmission Control Protocol/ Internet Protocol
VPN	-	Virtual Private Network
XAMPP	-	Any operating system, Apache, MySQL, PHP/Perl
Wi-Fi	-	Wireless Fidelity
3D	-	3 Dimensional
2D	-	2 Dimensional

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CHAPTER 1
INTRODUCTION

1.0 Introduction

In this chapter explained about the introduction of the project background, problem statements and the objectives of the project being done. Next, in this chapter also briefly explain scope of the project, project significance and also the summary of the introduction part.

1.1 Project Background

Floods are a common universal natural phenomenon taking place in most parts of the world and it is also destructive from all natural disaster. In Malaysia, floods occur nearly every year during the monsoon season and are considered as a regular natural disaster in the country. The flood will become too much strain to the affected communities. The flood will cause damages to the infrastructures, properties and life. Flood also will affect to the economy activities (Kuantama et al. 2012). Thus, to resolve the existing problem that causes by flood one system to alert about flood to residents based on database will be developed.

The database is a collection of information organized so that can easily be accessed, managed, and updated. According to one view, the database can be sorted by

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content type: bibliographic, full-text and image-digit (Coronel 2012). A database management system (DBMS) is a computer software application that interacts with the user, other applications, and the database itself to capture and analyze data. One database will be develop to store information of residents.

The main emphasize of this project is how to develop the system to alert about flood to residents based on database. Flood warning will be send to residents when the water level increased at risk of flooding via SMS through their mobile phone. Given the fact that the mobile phone is the tool that we have around us almost every time, it has become the perfect tool for all kinds of warning systems and provide a method for the rapid exchange of distribution to the public. This SMS contains a warning about the risk of flood in the area. Residents information such as names, phone numbers and addresses are obtained from the data that stored in the database. One database will be develop to store information of residents by using phpMyadmin. This system will be implemented using Arduino microcontroller. The Arduino microcontroller will get signal from the water sensor, and then it will extract the information of residents from the database to sends the warning to the residents in SMS format through GSM.

1.2 Problem Statements

Malaysia has the most rainfall in a year. It becomes worse when the monsoon brings the rain. This happens every year and will cause flooding in low-lying areas in eastern and northern Malaysia. There are some issues that are often discussed when flooding.

The main problem when the flood occurs is flooding can cause huge losses if there are no early flood warnings from the authorities which are supposed to provide information on flood forecasting. Flood gave some bad effects on all living things that can lead to death. Among the huge losses caused by the floods is the destruction of property.

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Flood can submerge homes and washed away and damaged other items such as electrical goods, cars and so on. It brings great harm to the population. Flood often damaging public property such as roads, buildings and cause various diseases. The worst flooding effects are the human health. The floods will cause the filth out of the reservoir along the overflow. This filth scattered all over the place, causing a variety of diseases such as cholera and malaria. All of this will be borne by the government to fix the damage and pay for medical equipment. All of this requires high maintenance costs. The government also had to provide basic needs such as food and beverages, medicines as well as providing temporary shelter for flood victims.

Next, the issues that are often discussed when flooding there is no system that stored the database about information of residents. A database is an organized collection of data. Data of residents constitute important information in the event of an emergency. With information about residents, it can find out the background of residents at once and can interact with each other. This is very crucial in the event of an emergency or disaster such as a flood. If there is no system for storing information of the residents, it will cause big problems for the community. In the absence of information about the population, it will be difficult for the authorities at the area to get information of residents. It will get worse in the event of emergencies or disasters such as floods.

1.3 Objectives

The objectives of this project are:

1. To develop residents information system database.
2. To design the system about flood warning to residents based on database.
3. To send a warning message to the residents via Short Message Service (SMS) format.

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For the first objective, this project sets out to develop resident's information system database. One database will be developed to store information of residents by using phpMyadmin. In database, information of residents such as name, address and phone number can be update edit and delete.

Besides that, for the second objective, this project focuses on designing the system about flood warning to residents based on database. For this objective, it is to design the system which enable the Arduino microcontroller to get signal from the water sensor. In this objective, also to integrate Arduino microcontroller with database, and then extract the information of residents from the database to sends the warning to the residents in SMS format through GSM.

For the third objective, the project highlights on how to send a warning message to the residents via Short Message Service (SMS) format. The warning message will be send to residents after the process extracted the phone number information of residents from the database. The message will send via Short Message Service (SMS) format through GSM.

1.4 Project Scope

This project can be divided into two parts. The first part is registration module. This module is to allow user to register the information of residents in the database. For this part, data that stored in database will be read by Arduino to get information like phone number then sends it flood warning to the residents in SMS format. The database created phpMyadmin using MySQL language.

The second part is SMS system module. This module will send alerts about the flood to the registered residents via Short Message Service (SMS). For this part, the Arduino microcontroller will get input from water sensor and then retrieve the information

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of residents from the database and finally sends it warning to the residents in SMS format through GSM. Figure 1.1 show the block diagram based on flood warning to the residents.

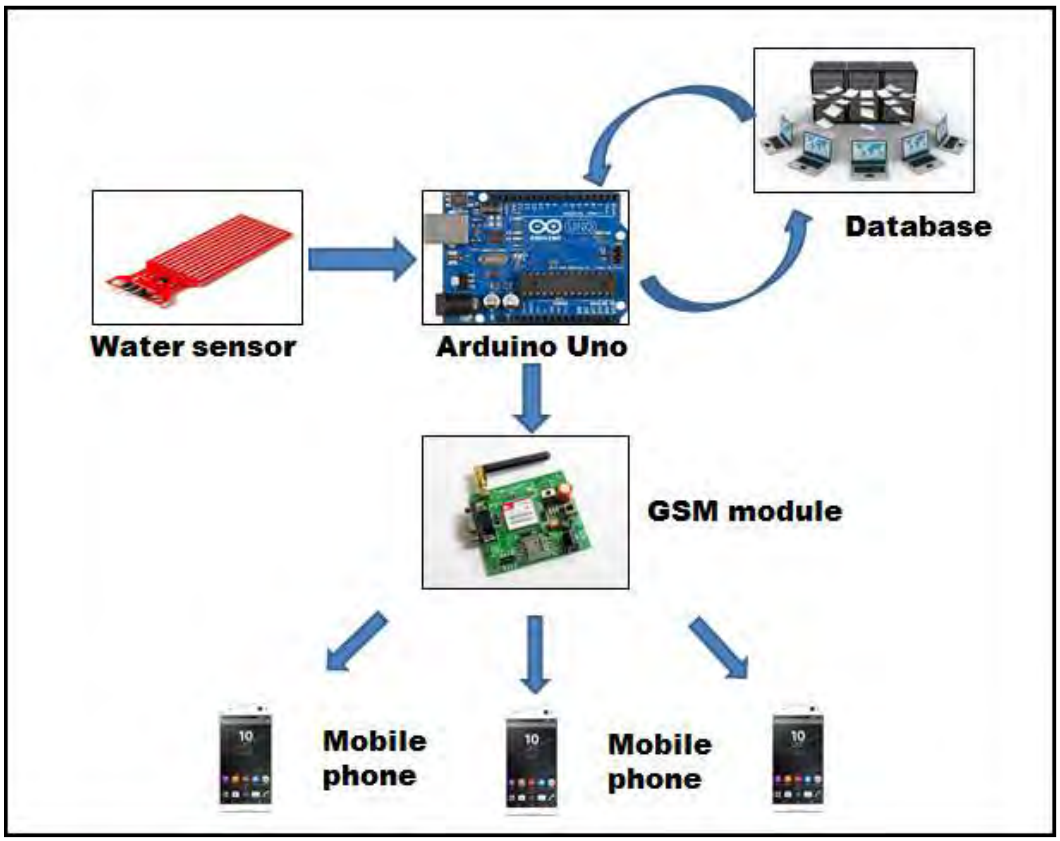

Figure 1.1: Block diagram system of flood warning to residents based on database.

1.5 Project Significance

The system will be helping the community to have better preparation to face disaster like flood. The flood will give huge impact in terms of cost and environment to the communities and country. So with this system, the costs will be reduced and many people can survived.

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This system will communicate with the SMS provider to send alerts to the residents. The reasons of using the SMS as a medium communication between application and the residents are its easy to use and more effective way compared to email services or mass media announcements.

1.6 Thesis Outline

This thesis is divided into five chapters to provide clear understanding about this whole project. It also shows the logical steps involved in understanding and gaining an appreciation of the methodology used to produce the prototype of the project

Chapter 1: For the first chapter it introduced brief idea of the project. It will cover the overview of the project. This chapter will be including the synopsis of the project, the project objective, and scope of the project, the problem statement and outcome of the project.

Chapter 2: This part is the medium to get information in order to develop the project. The information will classify by a journal, articles, and books.

Chapter 3: It will cover up all the methodology and a project implementation process to make the goal achieved. The hardware and software technical details are also explained in this chapter.

Chapter 4: This chapter will contain the development and implementation of the whole project. This chapter also gives a critical analysis of the system; a determination is made on whether the project objectives have been met. This chapter will include theoretical and actual findings and circuit simulation result.

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Chapter 5: This chapter is the whole contents of this project and thesis. At the end of this chapter, some references, discussions and attachment will be includes for future references.

1.7 Summary

As conclusion, the System of Flood Warning to Residents Based on Database will be developed to make some changes to reduce costs, many people can be survived and avoid huge damage because of flood. This application will be implemented to some areas that have risks to floods. From this chapter, the problem statement, objectives, project scope, and project significance are being identified in order to develop the application that will be used by the target users. After finish this chapter, it will bring to the next chapter that is the literature review and project methodology.

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