

## BORANG PENGESAHAN STATUS TESIS

JUDUL: Flood Alert System via SMS (FASvSMS)

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Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

**FLOOD ALERT SYSTEM via SMS  
(FASvSMS)**

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**This report is submitted in partial fulfillment of the requirements for the  
Bachelor of Computer Science (Computer Networking)**


**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
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2007**

## DECLARATION

I hereby declare that this project report entitled  
**FLOOD ALERT SYSTEM via SMS (FASvSMS)**

is written by me and is my own effort and that no part has been plagiarized without  
citations.

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## **DEDICATION**

Specially dedicated to  
My beloved family members who have  
encouraged, guided and inspired me throughout my journey of education  
my friends, and my colleagues.

## **ACKNOWLEDGEMENT**

In the name of Allah the Almighty and most Merciful

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## **ABSTRACT**

Flood Alert System via SMS (FASvSMS) is a real-time system that is developed to provide SMS alert to residents whom living in flood-risks areas. FASvSMS require the administrator to register all the residents whom living in the flood-risks areas and make reports for future references. The user must press the button to send an alert to residents while the resident can register their application using SMS technology for immediate registration. The system will determine the received SMS and registration will be done the user. Residents will receive an alert if the flood may happen in their areas.

## ABSTRAK

*Flood Alert System via SMS (FASvSMS)* adalah satu sistem yang berjalan mengikut masa sebenar akan dibangunkan untuk menyampaikan mesej berjaga-jaga dalam bentuk khidmat pesanan ringkas (SMS) kepada penduduk yang menetap di kawasan berlakunya bencana banjir. *FASvSMS* memerlukan pentadbir sistem untuk mendaftar semua penduduk tersebut dan membuat laporan untuk rujukan di masa hadapan. Para penduduk boleh mendaftarkan permohonan mereka untuk menerima peringatan dari sistem melalui SMS. Sistem akan mengenalpasti samada SMS itu boleh didaftarkan ataupun tidak. Jika permohonan tidak berjaya, sistem akan menghantar SMS untuk memaklumkan penduduk bahawa mereka tersalah maklumat yang diperlukan. Penduduk akan menerima peringatan dari sistem jika di kawasan itu menunjukkan tanda-tanda banjir.

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**LIST OF ABBREVIATIONS**

FASvSMS	-	Flood Alert System via SMS
SMS	-	Short Message Service
GIS	-	Geography Information System
SDLC	-	System Development Life Circle
SMS	-	Short Message Service
UTeM	-	Universiti Teknikal Malaysia Melaka
GSM	-	Group Special Mobile
GUI	-	Graphical User Interface
PC	-	Personal Computer
PSM I	-	Projek Sarjana Muda I
PSM II	-	Projek Sarjana Muda II
RAM	-	Random Access Memory
URL	-	Uniform Resource Locator

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## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Project Background**

The deadly tsunami and recent floods has showed how important it is to alert public about natural disaster threats. 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. Overall this technology has such a huge potential, that it is very quickly adopted in many countries. A GSM operator in Sri Lanka was already able to provide ongoing emergency information to its subscribers, to give news updates, to direct people to supply and distribution centers and even to arrange donation collections. Benefiting on a wide coverage of GSM networks, a lot of things can be done. In Japan, cellular phone companies provide immediate notification of earthquakes and other natural disasters to their customers and in the event of an emergency, disaster response crews can locate trapped or injured people using the signals from their mobile phones. In New Zealand employees of an electricity distribution company receive alerts about fire threats to power lines via SMS. Dutch government uses cell broadcast to alert public about floods while for IT administrators worldwide are using SMS to alert them about problems with their systems, hacking attempts, virus attacks and helping them to quickly know about the problem and immediately take actions.



## 1.2 Problem Statement(s)

There are several issues that always discuss from the street-wise people to politicians. The problems that issues are:

- The flood may costs hugely without any alert warning from the Authority that suppose to provide information about prediction of flooding.
- There is no system that stored the database of residents.
- The method of alerting residents not too practical to implement in some of places and sometimes the device that could be used may not affordable to some of person.

## 1.3 Objectives

The objectives of this project are:

- To develop an alert system that could be used to residents who living in the flood-risk areas.
- To create a report based on the level of flood warnings.
- To send a warning message to the residents via Short Message Service (SMS).

## 1.4 Scope

- Login module

This module is to verify the user before use. The login module will determine only the authorized personnel can access into the system.

- **Registration module**  
This module is to allow user to register the resident and the user of system. The resident also can register their account using SMS.
- **Report module**  
This module will provide the spaces for new reports based on the real-time system and provide the form for printed document.
- **SMS system module**  
This module will send alerts about the flood warning to the registered residents via Short Message Service (SMS) and it can send the confirmation, receive the SMS for resident registration and responses to the resident if their application successful or not.

## **1.5 Project Significance**

The system will be going to help the community to have better preparation to face disaster like flood. The flood will costs hugely to the communities and country. So with this application, the costs will reduced and many lifers can survived.

This application 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 Expected Output**

The expected outputs from this application are the alerts via SMS and the reports which are provided by the officer in charge. The alerts have 3 level of flood warning which is Alert, Beware and Danger.

This application may help the residents to have better preparations to face flood while the authorities will get ready with an emergency situations and the medical helps.

## **1.7 Conclusion**

As conclusion, the Flood Alert System via SMS will be developed to make some changes to reduce costs, save lifers 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, scope, project significance and expected output are being identified in order to develop the application that will be used by the target users.

After finishing this chapter, it will bring to the second chapter that is the literature review and project methodology.

## **CHAPTER II**

### **LITERATURE REVIEW AND PROJECT METHODOLOGY**

#### **2.1 Introduction**

This chapter will discuss about literature review and project methodology of the related project. Literature review is a collecting related data, analyze business processes, identify underlying patterns and create the conclusion. The project methodology means technique and type use to complete the project.

In order to develop a successful project, the current systems are collected. Three related of Flood Alert System are searched and analyzed which are LISTFLOOD ALERT, Flood Control District of Maricopa County and CASA Flood Alert System for Houston Using NETRAD. Studies of these systems are significant to develop a valid, reliable and efficient system.

Flood Alert System will be using is a System Development Life Circle (SDLC). Methodology is very important in developing the web based system. Choosing a right methodology will help to produce a better quality product, in terms of documentation standard, acceptability to the user, maintainability and consistency of software.

## **2.2 Facts and findings**

This section will be discussing about the domain of this project, the existing system and finally the other techniques that applicable used in to develop this project.

### **2.2.1 Domain**

The domain of this application is new networking and security alerts that can benefit the community who's living at the flooding area-risks. This application will connect to the device for water measurement and it will analyze which level that the risk is.

This application will be designed to fulfill the needs because of many reasons. Therefore, the system may save many lifers, properties, businesses and reduce of costs that caused by the flood disaster.

The SMS will be used as the human-machine interaction because of efficiency and well-known technology that can be used widely. The community will received the alerts via SMS which is more practical than e-mail. Generally, the community may have own mobile phone, so they will get the updates from the application.

The SMS text messaging offers an accessible and cost effective facility for the general public to communicate with the council. The list of benefits to adding the technology to send and receive SMS into the public is endless.

## 2.2.2 Existing System

The examples of existing systems are LISTFLOOD ALERT, Flood Control District of Maricopa County and CASA Flood Alert System for Houston using NETRAD. The details about the function and features are as:-

### 2.2.2.1 LISTFLOOD ALERT

This application will be complete by 2008 and it will be used at certain areas in Europe. This application needs some changes that can relate to the latest technology such as SMS and email to alert communities and the Authority Officer to take actions. This system will involve the following four stages:

- **Data Collection:** The National and Regional Public Water Authorities will feed structured data to a central notification management system or digital database, located at the Global Runoff Data Centre in Koblenz, Germany. The Joint Research Centre will also be given access to the management system.
- **Data Exchange:** The National and Regional Public Water Authorities will transfer near real-time structured data electronically. The data will be processed locally and converted to an agreed business message format.
- **Compressed Data Dissemination:** The dissemination of structured hydrological data will take place on demand from the Public Water Authorities, via normal security sharing. There will be no shared areas for collaborative editing or similar. Once the data is collected and/or exchanged, a plausibility check will be run by the GRDC. The resulting data could be disseminated again to the original senders (Public Water Authorities) upon request.
- **Alerts:** Email-based flood alerts will be sent out with moderate or high urgency to the Public Water Authorities and DG Environment, according to an agreed structured message and digitally signed by the sender. In the case of a potential flood being predicted, secured alert messages will be sent to

DG Environment and the relevant National and/or Regional Public Water Authorities in the Member States.

#### **2.2.2.2 Flood Control District of Maricopa County**

The Flood Control District of Maricopa County operates a 24-hour rain, stream and weather gage network, which provides "real time" information to the County and many other agencies about rainfall, storm water runoff and weather conditions in Maricopa County

- **Data collection:** The ALERT system uses "automatic" telemetry gages for data collection. This means that the gages transmit their information to the District base computers via VHF radio. The computers then quickly compile the information and display it on video screens. The automatic gages are powered by 12-volt batteries, which are recharged using small solar panels attached to the top or sides of the gages.
- **Water Detection:** The information provided by the ALERT system is important to the District because occasional heavy rainfall can generate stream flows which significantly impact flood control facilities such as dams and channels. Each gage is programmed with an alarm setting. The alarm is sounded when the measurements reach a certain threshold and the on-call hydrologist evaluates and monitors the situation.
- **Alerts:** Flood warnings are provided to District observation teams, other County departments, city emergency management departments, and the National Weather Service. Public flood warnings and other weather advisories are issued by the National Weather Service. Emergencies are declared by the County Emergency Management Agency. The agency will send alerts to the mass media to inform all the residents to take actions.

### 2.2.2.3 Flood Alert System in Poyang Lake, East China.

This system developed to fight against the flood losses which are 400 buildings surrounding the lake were inundated, leaving more than 1 million people homeless and causing economic losses of more than 30 billion yuan (3.6 billion US dollars) during the devastating 1998 floods.

- **Detector devices:** The latest optic-fibre and satellite communication technology and facilities will be used for the system.
- **Data Processing:** The system would automatically collect information regarding rainfall, water level, danger situations and possible disasters, and then analyze the data in reference to past cases to offer proposals to effectively prevent flooding.
- **Alerts:** The system will send alerts to the authorities to take actions and announce to public.

### 2.2.3 Technique

GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. A geographic information system (GIS) is to locate a data, such as people to addresses, buildings to parcels, or streets within a network.

GIS can integrate and relate any data with a spatial component, regardless of the source of the data. For example, the combination the location of mobile workers, located in real-time by GPS devices, in relation to customers' homes, located by address and derived from the database. GIS maps this data, giving dispatchers a visual tool to plan the best