FLOOD DETECTOR EMERGENCY WARNING

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Dedicated with deepest love to:

My beloved family for their support, guidance and love.

My dearest friends for being there whenever I needed them.

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ABSTRACT

The system called 'Flood DetectorEmergency Warning' is invented to solve the traffic congestion problem. This system will be functioned if the water along the road is over the limit of water level sensor. The system is also usingthe short message service from mobile and microcontroller PIC16F877a to send the data from the sensor to the control center. At the same time,the LCD Display and Visual Basic.6software will be used to display the output.

ABSTRAK

"Flood Detector Emergency Warning"dicipta untuk mengatasi masalah kesesakan jalan raya. Sistem ini berfungsi apabila air disepanjang jalan tersebut melepasi tahap pengesan banjir tersebut. Sistem pesanan ringkas telefon bimbitdan mikropengawal PIC16F877a digunakan untuk menghantar isyarat kepada pusat kawalan. Sistem ini juga menggunakan perisian Visual Basic.6 dan "Liquid Crystal Display" (LCD) untuk memaparkan keluaran.

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LIST OF ABBREVIATION

CPU	-	Central Processing Unit
FTP	-	File Transfer Protocol
GSM	-	Global System For Mobile Communication
GPRS	-	General Packet Radio Service
IEEE	-	Institute of Electrical And Electronics Engineer
LCD	-	Liquid Crystal Display
PIC	–	Programmable Integrated Circuit
PCB	–	Printed Circuit Board
RF	-	Radio Frequency
LED	-	Light Emitting Diode
Mbps	-	Megabits per Second
QoS	-	Quality of Service
RISC	-	Reduce Instruction Set Computer
SMS	-	Short Message Service
WSN	-	Wireless Signal Network

CHAPTER 1

1.0 INTRODUCTION

1.1 Project Review

Floods occur most commonly when water from heavy rainfall, from melting ice and snow in the country that having cold weather, or from a combination of these exceeds the carrying capacity of the river system, lake, or ocean into which it runs. Usually the combined flow of several water-swollen tributaries causes flooding along a river bank or shoreline. The geographical location also one of the factors that caused flood occur, where the cyclical monsoons during the local tropical wet season. Due to the floods, many lives and the property are found destroyed.

The flood make a traffic jam, an accident and any dangerous to road user. For this reason, the 'Flood Detector Emergency' is been created, to help the road user to avoid this problems happened. It was invented based on problem faced by road user when flood occurred. This will avoid the traffic jam because the users have a time to find an alternative road before they are going to be stuck at the flood area.

This system will function when the water along the road is passing over the water level sensor. This water level sensor then will sent a signal to the control center via the GSM Mobile. Actually, the GSM Mobile will be put in the two different places, one at the sensor and the other one at the control center. When the flood occur, this sensor will sent signal to the microprocessor circuit and activate the Visual basic interface at control center and LCD display.

This system use to detect the flood around the road. This system will give information to the consumer that has still not passing through the flooded areas also the control center for the next action.

The devices that will be used in this system are rise detector water, microcontroller, Global System for Mobile communication (GSM) and Liquid Crystal Display (LCD's) Display. After study carried out, formula obtainable base objective is flood often occurs in the lowland.

1.2 THE OBJECTIVES

The objective is expressed the total result or effect of the project and aim of the project when it is complete. The objectives of this project are

i. To match the software (Visual Basic.6) with the system that will be invented.

ii. To design the circuit and create a programming code using the microcontroller PIC16F877a.

iii. To apply the GSM Mobile in transmitting the data from one place to another place.

iv. To detect the level of the flood where the system sensor will be divided into three levels. This information is important to make sure the condition of the road is under control.

v. To make sure the information will be sent to the control center and also to the user.

1.3 PROBLEMS STATEMENT

The flood make a traffic jam, an accident and any dangerous to user road. Because of this flood, this area always has a traffic jam. Although the government have repaired drainage in this area and enlarge road, yet fixed congestion occur when heavy rain happened. Therefore this project is designed to tackle this problem.

Besides that, lots of time will be wasted if the flood occurs. It will cause the road user cannot go anyway because had stuck in the middle of the road.

The other problem that will be faced by road user, many vehicles will be damaged where the water will slowly enter into the engine especially the car and motorcycle.

A system called 'Flood Detector Emergency Warning' is invented and will be functioned or detected if the water along the road is over the limit of water level sensor. This water level sensor then will transmit a signal to the microcontroller. At the same time, this microcontroller will transmit the signal to the control center via the GSM Mobile system and activate Liquid Crystal Display (LCD) display.

1.4 SCOPE OF THE PROJECT

This project will focus on the networking of the GSM Mobile system, water level sensor, microcontroller PIC16F877a and the Visual Basic Software. Other aspects such as the production the 'Flood Detector Emergency Warning' and marketing of the system will not be covered in this project. These research projects are divided into two parts.

The first part, the project will focus on the 'Hardware Development'. Firstly, the literature study will be on the concept of water level and the GSM Mobile will also be revised. All the function and connection of the circuit for both things will be studied. The main component in this system is PIC16F877a, where it will control all the connection of the system also will cover in this part.

The second part will be focus on 'Software Development'. On this project the Visual Basic.6 software will be chosen as the interface for control center and sensorto display the information. All connection between hardware and coding will be studied to make sure the connection is achieved. The source code of the PIC16F877a will also been done in this part.

1.5 THESIS OUTLINE

The organization of this report is as follows: Chapter 1 describes the background, objectives and scope. This chapter will introduce the 'Flood Detector Emergency Warning'. These include the operation of the system, the objectives and the scope of the project.

The literature review is in the Chapter 2. The literature review actually will discuss about the comparison of the previous or another project with this invented project. The main component and the circuit that been involved with the project will also be discussed in this chapter.

In chapter 3, it will cover the methodology of the project system and explain the implementation to achieve the goal. This chapter also will show the flow chart of the project and the steps that will be followed.

Chapter 4 will focus on the result and discussion of the project. In this chapter, it is more on the progress of the project, where the picture and the analysis that been created to the project will be showed.

Chapter 5 will be focused on the conclusion and the suggestion to the project. For the conclusion part it will discuss more on the achievement of the project's objectives. Then, for the suggestion part, the recommendation for upgrading the project is being suggested for the future.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1.1 Case 1 (Flood Detector) [3]

This project is invented to detect the depth of water when it is over the standard level of sensor. This project will be placed in the lowland or the place that always occur a flood.

This system is completed with the warning light, to tell the user road about the flood and also will tell the control center the information via the microcontroller Atmel 89S51. The water level sensor for this system will be divided into three levels.

This system used Radio Frequency (RF) as Transmitter and Receiver to send the signal to microcontroller (Atmel 89S51). The Microcontroller than activated the LED at the road and told the control centers the information of flood's level. This project will be used the LED Display as output signal to the user road. The other components that been used in the system is encoder, decoder and opto-coupler.

As a result, the user will know the flood is occurred when they see the warning light that been placed in the road. This warning light acted as a sign of the flood, where it is divided into three colors, every color is represented the each level. In the same time, the information of the flood will be sent to the control center to make sure the further action will be taken by the authorities.

There are many lacks that been seen in this system, where the user have to be neared to the flood area to get the information, so the information will late to be known by the user. Another problem that occurred, not all user maybe alert with the warning light sign that been placed in the flood area. Finally, the time will be wasted and also caused a trouble to user, where they have to find an alternative road for the last minutes.

2.1.2 Case 2 (A Low-Cost Wireless System for Autonomous Generation of Road Safety Alerts) [2]

This project describes an autonomous wireless system that generates road safety alerts, in the form of SMS and email messages, and sends them to motorists subscribed to the service. Drivers who regularly traverse a particular route are the main beneficiaries of the proposed system, which is intended for sparsely populated rural areas, where information available to drivers about road safety, especially bridge conditions, is very limited. At the heart of this system is the SmartBricka wireless system for remote structural health monitoring that has been presented in the previous work. Sensors on the SmartBrick network regularly collect data on water level, temperature, strain, and other parameters important to safety of a bridge.

This information is stored on the device, and reported to a remote server over the GSM cellular infrastructure. The system generates alerts indicating hazardous road conditions when the data exceeds thresholds that can be remotely changed. The remote server and any number of designated authorities can be noticed by email, FTP, and SMS. Drivers can view road conditions and subscribe to SMS and or email alerts through a web page. The subscription-only form of alert generation has been deliberately selected to mitigate privacy concerns. The proposed system can significantly increase the safety of travel through rural areas. Real-time availability of information to transportation authorities and law enforcement officials facilitates early or proactive reaction to road hazards. Direct notification of drivers further increases the utility of the system in increasing the safety of the traveling public.

The diversity of road hazards complicates the design of related alert systems, especially where autonomy is concerned. Safety hazards on roadways can be attributed to two main sources, which are motorist error or vehicle malfunction, and natural phenomena or infrastructure failure. The safety alert system proposed in this paper seeks to mitigate hazards arising from the second category, which includes phenomena such as flooding and bridge collapse.

The system is autonomous, which is particularly beneficial in sparsely populated rural areas with scarce resources available for monitoring road conditions. Structural and environmental monitoring, with the means of connecting to the cellular network, plays the instrumental roles in the safety alert system. This paper describes an autonomous, wireless system which generates safety alerts to motorists. The system utilizes a wireless sensor network to collect data about certain key parameters of a bridge and its surroundings, including: tilt, vibration, acoustic emissions, temperature, and water level. The data from the sensor network is relayed to the SmartBrick, a structural health monitoring device developed by the authors and presented in previous publications.

The SmartBrick serves as the base station and data sink for the sensor network, and is responsible for processing and reporting of the collected data. The device has an onboard quad band modem, which allows it to connect to the cellular network for regular communication of data reports and alerts to multiple recipients. Earlier prototypes of the system could be configured to report by one or more of FTP, text messaging, and email. The recipients of these reports were a remote server, the system administrators, and any authorities responsible for carrying out safety measures such as closing a bridge during flash flooding.

The utility of the proposed system isincreased to multi-span bridges through the use of a wireless sensor network. Multiple sensor nodes are deployed on the bridge and surrounding area, and communicate wirelessly with a single SmartBrick that serves as the base station and gateway for longrange communication over the cellular phone infrastructure.3 Short-range communication among the sensor nodes, and between the sensor nodes and the base station is implemented using the Zigbee protocol.

This low-cost and unobtrusive method for monitoring alarge area is particularly well-suited for sparsely populated rural areas, where information available to drivers about road safety, especially bridge conditions, is very limited. This paper details the design and implementation of the resulting alert generation system, which carries the promise of increased safety for the traveling public.

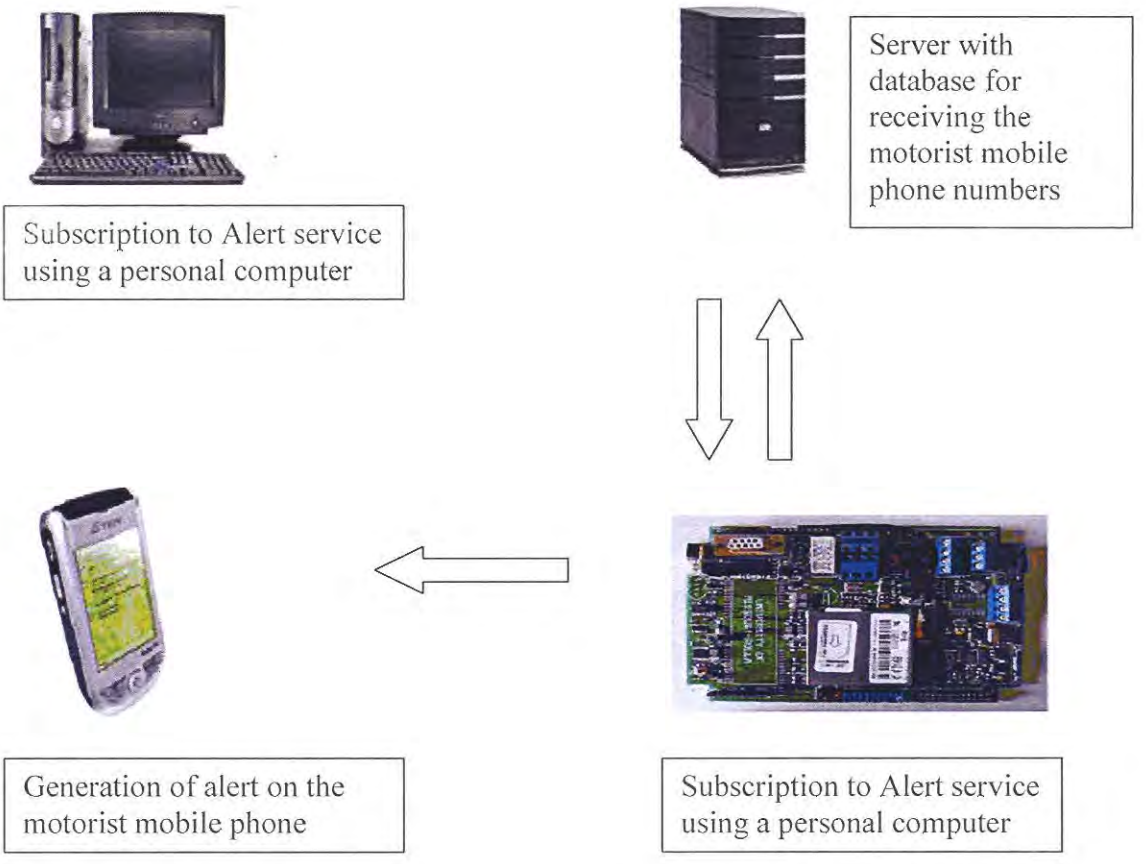

Figure 2.0: The Block diagram of proposed road safety alert system.

There are several different that been seen from this system firstly, the uses of the system; where this system is been used more widely not specific at one place. Secondly, the cost of this system is more costly than the current system because it is use the special gadget (SmartBrick) for a long distance communication. Even though this gadget has a great function, but it is not available in this country. There a lot of money will be spent to buy this gadget to put in the system.