Intelligent real flood monitoring system using android application

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ABSTRACT

Flooding is a great treat towards mankind as it is also considered one of the most devastating natural disasters in the world.Flooding is not any abnormal scenario worldwide,since flooding results in great damages to agriculture land, residential area and even cities with high cost in lives and towards the economy of the country. The government has to spend tons of money in flood mitigation plans in afford to help the victims and also to reduce the number in the long run. Most of the flood mitigating plans has high cost and only can be implemented base on priority. Baring the cost and safety measures, this paper highlights the Flood Observatory System (FOS) as a warning and alert system to efficiently monitor the critical flood prone areas in real time basis. FOS can be deployed in flood prone areas in afford to create a well-used standard for remote flood observation systems. The ability to receive real time information on flood level empowers both government and private organizations to react to imminent danger in an effective manner. With the real time flood information, allows public safety organizations and other emergency managers to effectively plan their resource deployment within the limited time of alert. Warning as flood rises could be used to save life's and properties in many ways can help such organization and government to spend sufficient amount of money in restoration process. The simple and practicality of a system should be useful in all means towards mankind

KEYWORDS: **-** *Flood Observatory System, flood mitigation plans, sensor, gsm module,* LCD display

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1. INTRODUCTION:-

Natural disasters are a worldwide phenomenon and require significant cooperation to address. Recent hurricanes, floods, and other events have illustrated this along with the differences of the effects of disasters on developed compared to developing countries. In the recent US flooding due to storms in the Midwest, loss of life and property damage were minimized due to emergency systems available in the highly developed US, while a storm that ravaged approximately seven states caused twenty deaths and $30 million dollars in damage with only a few left homeless or hungry [1]. On the opposite side, over a much smaller geographic area, North Korea struggled to deal with the displacement of over 300,000 people, approximately 221 deaths, and a cost of $6 million, most to feed those made homeless by the disaster [2] that resulted in part from the lack of development of warning systems and information at the community level of the impending flooding. From this, the struggle with flooding that faces developing countries presents a pressing issue that we cannot ignore while promising a solution that is globally applicable. Warning communities of the incoming flood, however, is an expensive proposal given the limited resources of the countries. Current methods add to the difficulty with the need for expensive equipment and centralized, computationally difficult flood detection schemes. This presents an opportunity to use the latest work in information communication technology and sensor networks to solve this problem in a way that balances the minimal cost requirement and limited computational power with the need for high reliability of both the system and computation.

The problem of early warning rapidly grows in complexity upon close inspection and the addition of work within adeveloping country only increases that complexity. Many other requirements affect the system in addition to those listed above including those related to the devastating effect of the event in question. The problem then encompasses those requirements resulting from both very low activity times when maintenance and attention drop, and highly important times when a flood occurs and the system must continue operation. To properly work, the system also becomes not simply a technical problem, but one of cooperation between government, relief agencies, and the communities to create, maintain, and use the system. These more social and political problems define the success of the system, and ensuring their solutions involves a different approach than the technical issues. In our work, we examine the problem of flooding on the Agu´an River in north-eastern Honduras. This river basin covers a geographic area of 10,000 km2 and contains at least 25 highly threatened communities of approximately 35,000 people total. The project began after the devastation caused by Hurricane Mitch in 1998 where a wall of water passing down the river during the night caused approximately 5,000 deaths with an additional 8,000 missing, and 12,000 injured [3]. While considering Mitch a significant disaster in the region, people do not view it as an isolated event. The river experiences annual flooding due to both heavy rain and hurricanes, and, within the intense hurricane period of 2005, the government declared Hurricanes Beta, Gamma, and Stan national disasters. Many lives and property could be saved if people knew the flood was coming and, after flooding occurred, could monitor the river to understand how to best focus relief efforts. With saving Honduran lives through flood warnings as our goal, this paper proposes a high-level solution to the early warning system problem. We have been working on this problem since January 2004 and have performed several prototype experiments toward our solution. This paper discusses some of those experiments and extracts a set of lessons learned from them that can aid others working on this issue along with similar large-scale technology for developing regions. This paper describes the problem of disaster warning, a solution to the problem in the case of river flooding, a series of experiments towards this solution, and a set of lessons learned through our work in rural Honduras

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2. PROPOSED SYSTEM ARCHITECTURE

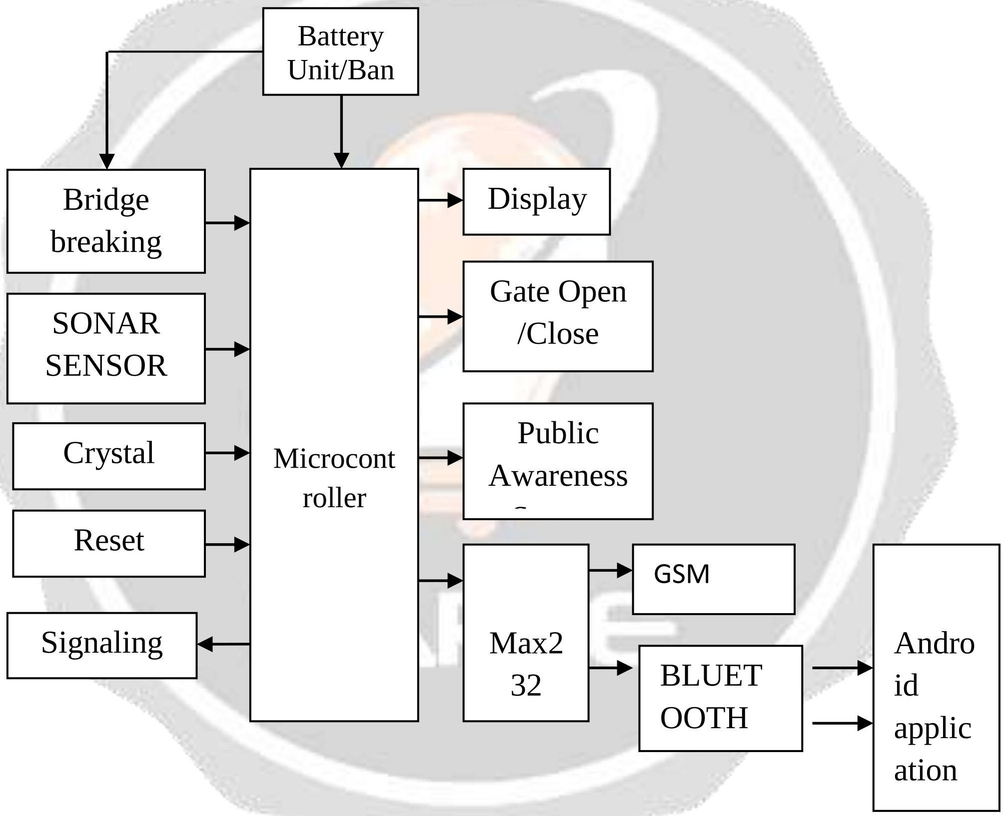


Figure - Block Diagram

2.1 MICROCONTROLLER:

The signals from the Sensor are given to the Microcontroller. Microcontroller processes all these signals and gives data to LCD display. Microcontroller is also perform action depends upon sensor output.

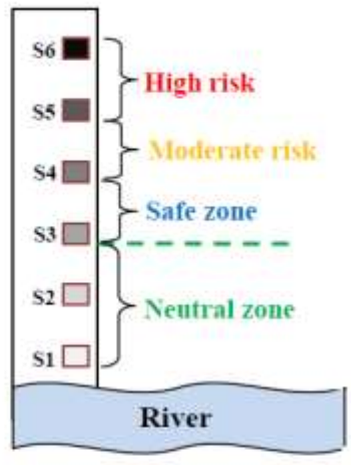
2.2 Flood Level Sensor:

A flood is an overflow of water that submerges land which is usually dry. Water overflow is a common problem which leads to the flood. Sonar Sensor is very useful to indicate the water levels in a river. Sound Navigation and Ranging—SONAR—is used to find and identify objects in water. It is also used determine water depth (bathymetry). Each driver converts TTL/COMS levels into TIA/EIA-232-E levels

Fig 1 :Sensor

Sonar is applied to water-based activities because sound waves attenuate (taper off) less in water as they travel than do radar and light waves. Sonar was first used during World War I to detect submarines. Wheneverlevel gets filled, we get alerts on particular levels. Here we have created high levels, we can create alarms for more levels. When maximum level gets filled completely we get beep sound from Buzzer. Also close enter ,exit point at bridge on the river.

The water detection sensors are positioned at a certain location where water level measurement can best be obtained. One of the factors considered when positioning the sensor are weather conditions. During dry seasons the water level will remain at low level or at the safe zone and during rainy seasons the water level will rise drastically to high risk level. The water level changes will be detected by the water detection sensors and the information will be instantly transmitted to the centralized control unit via RF. The output of the RF receiver is connected to the main control unit to update the system in real time.



Sensor position of the Flood Observatory System with the various level of risk zone

Fig 2

Table 1 shows an example of flooding zone with alert/warning information.

Table 1. The risk zone in a flood event

Zone	Description
Netural zone	**All type of vehicle can use the road**
Safe zone	**All type of vehicle can use the road**
Low risk zone	**Heavy and light vehicle can use the road**
Moderate risk zone	**Only heavy vehicle can use the road**
High risk zone	**Road is closed for all vehicle**

2.3 GSM Module:-

Global System for Mobile Communication. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz.

It requires a **SIM (Subscriber Identity Module)** card just like mobile phones to activate communication with the network. Also they have **IMEI** (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

2.4 Controller unit.

The controller unit for the Flood Observatorydetects the information from the sensors wirelessly if there are any changes in the water level.Wireless communications is established via an RF transmitter and receiver in real time based on thedetection, a programmable logic controller (PLC) process the data. The control unit will then send the information to the monitoring station via the SMS.

The communication between the Flood Observatory System and the monitoring station is established by using a GSM modem to send real time water level information and to receive special commands from the monitoring station [6 ,14, 15]. The PLC is connected with a GSM modem thru a communication interface to perform communication as programmed in the system [4].

The control unit is also programmed to perform basic calculations on the next water level prediction based on real time sensor detection. The water rise prediction time can then be transmitted to the monitoring station as programmed. The water rise prediction is the comparison from one level to another level. The water rise time prediction message will be instantly transmitted once the water level increases from one level to another. The number of zones is determined by the management in the monitoring system is based on the frequency of water rise in a monitored location

2.5 LCD DISPLAY:

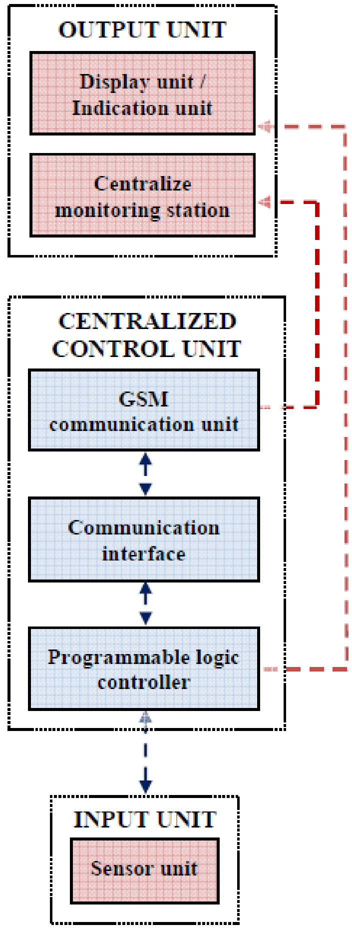
It is used for the displaying the information for the user. The display unit will display a few sets of information which are very useful to avoid damage to their vehicles. The display system is designed to be placed at a distance of approximately 100 meters in radius from the control unit. Apart from the text display unit, the control unit can also be connected to a nearby traffic light as a warning system for road uses approaching flood prone locations. The traffic light system can be used to indicate the road conditions during flood. The system is capable of determining whether the road is safe for users as the water level changes.

2.6 MOTOR: Motor is used to barrigates opening and closing mechanism

3. FLOW MEASUREMENT TECHNIQUE

Measure water Flow using Flow measurement techniques.

1. Display the project name on LCD display" Natural Disaster Management SYSTEM "
2. We store amount of water and quantity level water using Flow measurement technique in Microcontroller.
3. If amount of water and quantity level reached then start Motor for barrigates mechanism .
4. If the amount of water and quantity level is deceased then stop Motor for barrigates mechanism.



Conceptual Block Diagram

4. CONCLUSIONS:-

The conclusion of this research work is to develop a real-time flood monitoring and warning system for a selected area. The system employs the use of advance sensing technology in performing real-time monitoring of water information. The developed system is composed of three major components: 1) sensor network, 2) processing and transmitting modules, and 3) application server Natural hazards are not likely to decrease in the foreseeable future. Though geological events may occur independently of any human control, available data suggest that mankind plays a role in global climate. Technological hazards may also increase rapidly as a result of the unregulated development of industries in most countries and possibly the use of weapons-grade hazardous substances against civilian populations. An increase in the number of hazards should not mean that the resulting health burden will also increase. A sustained effort is needed to minimize risk, both by reducing vulnerability through prevention and mitigation and by increasing capacity through preparedness measures.

The flood alert information's can be displayed on LED display boards for road users and for safety reasons could be placed at strategic locations. Such information's should be in real time and transmitted wirelessly from the measured location.

5. REFERENCES:-

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