

IoT Based Flood Monitoring and Alert System

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Abstract: *Flood is one of the natural disasters that cannot be avoided. It happens so often that it affects so many lives and properties. Before this most of the existing systems that have been developed are only focused on certain areas. Other than that, majority of the public cannot monitor and have no idea when the flood is going to happen since they do not have any information and data about the weather condition. This system is suitable for cities and village areas. Furthermore, if the public has an internet access, they can monitor what is happening and predict if there is any upcoming flood at the web server. This project will update the water level at the web server and the system will issue an alert signal to the citizens for evacuation so that fast necessary actions can be taken.*

Cayenne IOT Platform accelerates the development of IOT-based solutions, including quick design, prototyping and other commercialized projects. It is a drag-and-drop IOT project builder that can help developers build complete, ready-to-use IOT solutions with little to no coding.

Keywords: Arduino Mega, DHT11 Sensor, GSM Module, Thing Speak, Water level Sensor, Web Application, Battery

I. INTRODUCTION

Flood occurs when water overflows from the river, lake or from heavy rainfall and it can happen at any time of the year. Flooding can be very dangerous, when floods happen in an area that people live, the water carries along objects like houses, cars, furniture and even people. It can wipe away property, trees and many more heavy items. For years, flooded roads have been a problem in Metro Mumbai. It causes heavy flow of traffic. Both motorists and commuters are getting stuck in a flooded area and getting lost in finding possible routes just to go to their destinations.

When traffic happened, people's money, time and effort are wasted. Through the local government unit flood control has been extending their efforts to inform the commuters regarding the situation in flooded areas during rainy season, still the dissemination of information to the locals are not enough. For this reason, the "Arduino Flood Detector System" is being developed, to help the road user to avoid this problem happening.

It was invented based on the problem faced by motorists and commuters when flood occurred. This will avoid the traffic jam because the users have a time to find a possible route before they are going to be stuck at the flood area. The system will function when the admin

activates the system and when water along the road is detected by distance over ultrasonic sensor. When the flood occurs, the ultrasonic sensor will send a signal to the microprocessor circuit and the sense water level will be displayed in the user interface and it will automatically send a Short Message Service (SMS) to those recognized residents and it will continue to update until the water level detected returns to normal.

II. LITERATURE SURVEY

Flood Monitoring system presents a forecasting model designed using WSNs (Wireless Sensor Networks). This model helps to predict flood in rivers using simple and fast calculations to provide real-time results and save the lives of people who may be affected by the flood by ringing an alarm. The flow of work can be shown by them as in the flow diagram given below. The process flow diagram of Here the author used multiple variable robust linear regression which is easy to understand and simple and cost effective in implementation, is speed efficient. It has low resources

utilization and yet provides real time predictions with reliable accuracy, thus having features which are desirable in any real world algorithm. The model is independent of the number of parameters, i.e. any kind and any number of parameters may be added or removed based on the on- site requirements. The rise in water level is represented by using a polynomial from which the exceeding of the flood line in the near future can be determined. In this paper a time multiplier function is used only to decide the time interval between two successive readings. The central node is mentioned in this model but it is not taken into account. This model is only predicting the flooding situation and warning people about flood by ringing the alarm but it has no role in preventing the flooding situation. In this paper they have kept the efficient energy consumption part for future work.Honduras.

III. PROPOSED SYSTEM

The purpose of this project is to sense the water level in river beds and check if they are in normal condition. If they reach beyond the limit, then it alerts people through LED signals with buzzer sounds as well as internet application. Here we are using the Ultrasonic HC-SR04 sensor sense the river level and NodeMCU ESP8266 Microcontroller for the processing. We have developed a low cost, reliable And real time flood detection and predicting system utilizing Wireless sensor networking technology in IOT environment. This project highlights the possibility to provide an alert system that will

overcome the risk of flood. As the project is enabled with IOT technology and hence the sensor data can be monitored from anywhere in the world. More sensors can be integrated into the system in order to create more accurate and efficient flood detection system. It can also contribute to multiple government agencies or authority that ultimately help the society and mankind about the flood like hazardous natural disaster. It will monitor each and every aspect that can lead to flood. If the water level rises along with the speed, it will send an alert immediately. It also ensures increased accessibility in dealing and reverting to this catastrophic incident. In summary, it will help the community in taking quick decisions and planning against this disaster mankind about the flood like hazardous natural disaster.

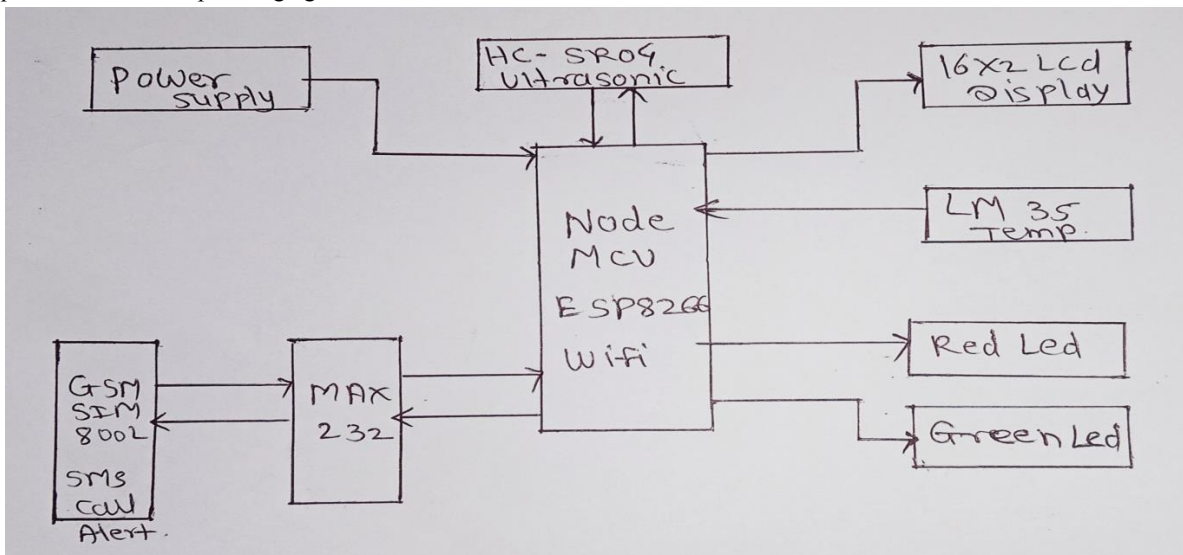


Fig 1. Block Diagram of Proposed System

IV. DESIGN AND ARCHITECTURE

In this project we are using Ultrasonic Sensor, DHT11 Sensor, Flow Sensor, Raindrop Sensor, Turbidity Sensor to measure the parameters like water environmental temperature and humidity, Flow rate, level of water, rain intensity of the environment, how much amount of water is been contaminated in rivers.

If any of the value exceeded message on the values will be uploaded using GSM Module and the exceeded values will be displayed in LCD screen and also it gives indication using LED's and alert will be given using voice sensor and also through SMS notification.

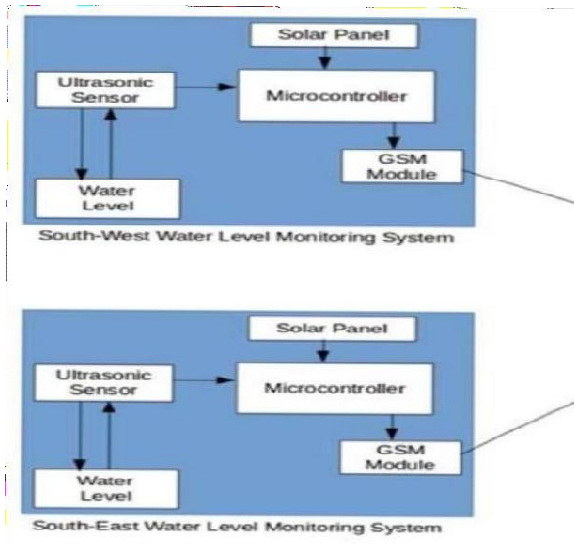


Fig. 2 System Architecture

V. METHODOLOGY

The ultimate aim is to build a water level detection using ultrasonic sensor to monitor the rivers in the south-east and south-west portion of the province of Isabela and developed web and SMS applications a nearly warning system that provide essential information to the local communities and concern agencies. An SMS approach was used for transmitting data from the monitoring system to the computer server and for sending notification to the concern stakeholders. The SMS application was installed in the computer server to process the received data and make proper action. The implication so implement fuzzy logic algorithm for decision making. The inputs of the algorithm are the water level status coming from the two monitoring systems sent through SMS. A threshold value was set in that system to ring system as basis for the Arduino to trigger the GSM module to send an SMS to the computer server. Then the developed program installed in the computer server send an SMS notification to the concern stakeholders and uploads an update posting the developed web-based monitoring system. After the development of the prototype, the model had undergone several tests and experimentations to check the effectiveness of the system.

VI. ADVANTAGES

- Accurate and real information about real risks.
- The system can help prevent excessive damage and loss as a result of flooding and possibly save lives.
- System performance can be monitored through internet.
- At emergency conditions necessary action can be taken.

VII. FUTURE SCOPE

This study is conducted to solve the problems brought about by floods. The device shall contain with the following features: It has ultrasonic sensor to sense the distance of water level of flood on the road. The system provided a camera that will display the real-time image of the flood that can view via live stream. It includes Serial Communication to send warning text message with the content of date, time, water level and road accessibility. The system has three (3) modules which are Users, Logs, and Contact Numbers. It can be modified by the admin. The unit containing the sensor is suggested to be placed in front of our system. The position of the sensor must be placed perpendicular to the flood water; otherwise, there will be an imperfect reflection of ultrasonic waves and cause measurement errors. The sensor is suggested to be placed on a pole with a height of about 3 to 3.5 meters. The flood sensors and microcontrollers will be powered by a Solar Power Bank with 80,000 Ampere Ampere-Hour (mAh) for the benefit of continuous operation of water flood height detection and network data transmission.

VIII. CONCLUSION

This project highlights the possibility to provide an alert system that will overcome the risk of flood. As the project is enabled with IOT technology and hence the sensor data can be monitored in the world. More sensors can be integrated into the system in order to create more accurate and efficient flood detection system. It can also contribute to multiple government agencies or authority that ultimately help the society and mankind about the flood like hazardous natural disaster. It will monitor each and every aspect that can lead to flood. If the water level rises along with the speed, it will send an alert immediately. It also ensures increased accessibility in dealing and reverting to this catastrophic incident. In summary, it will help the community in taking quick decisions and planning against this disaster in a kind about the flood like hazardous natural disaster.

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