

FLASH FLOOD INTIMATION OVER IOT

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ABSTRACT

The main objective of the project is to detect rising water level in a river and intimate that information to the consulting department through IOT. A programmable Microcontroller is interfaced with a water flow sensor. The water flow sensor is used to sense the water pressure in the rivers and that sensor will send an interrupt to the microcontroller indicating that the water level in the river has crossed the danger point. So, whenever there is an occurrence of such flood the sensor sends a logic signal to the microcontroller that is programmed in such a way that it will update the data in the IOT app using inbuilt Wi-Fi Module in the Node-MCU controller. The related departments like weather forecasting, police department, emergency rescue teams etc., to avoid different problems caused by floods.

INTRODUCTION

The entire IoT process starts with the devices themselves like smartphones, smartwatches, electronic appliances like TV, Washing Machine which helps you to communicate with the IoT platform.

Now in this IoT tutorial, we will learn about four fundamental components of an IoT system:

1) Sensors/Devices: Sensors or devices are a key component that helps you to collect live data from the surrounding environment. All this data may have various levels of complexities. It could be a simple temperature monitoring sensor, or it may be in the form of the video feed.

A device may have various types of sensors which performs multiple tasks apart from sensing. Example, A mobile phone is a device which has multiple sensors like GPS, camera but your smartphone is not able to sense these things.

2) Connectivity: All the collected data is sent to a cloud infrastructure. The sensors should be connected to the cloud using various mediums of communications. These communication mediums include mobile or satellite networks, Bluetooth, WI-FI, WAN, etc.

3) Data Processing: Once that data is collected, and it gets to the cloud, the software performs processing on the gathered data. This process can be just

checking the temperature, reading on devices like AC or heaters. However, it can sometimes also be very complex like identifying objects, using computer vision on video.

4)User Interface: The information needs to be available to the end-user in some way which can be achieved by triggering alarms on their phones or sending them notification through email or text message. The user sometimes might need an interface which actively checks their IoT system. For example, the user has a camera installed in his home. He wants to access video recording and all the feeds with the help of a web server.

However, it's not always one-way communication. Depending on the IoT application and complexity of the system, the user may also be able to perform an action which may create cascading effects.

For example, if a user detects any changes in the temperature of the refrigerator, with the help of IoT technology the user should be able to adjust the temperature with the help of their mobile phone.

Natural calamities happen everywhere in the world, and which affects the human life and economy of the country. Economy and growth of any country depends upon the agriculture; hence the proper alert makes the

farmers vigilant to protect the crop from flooding.

In order to detect and avoid flood like disastrous calamities in a timely manner, current world technology plays a vital role. We can prevent natural disaster caused by flood, with the aid of an IOT based early flood related parameter monitoring and detection system and its avoidance using the Arduino project, is proposed as a solution to the mentioned problem.

The proposed model is very much utilized for monitoring of the water level, flow variations, humidity and temperature variation in the river and the same can be used at dam or reservoirs. The measured values are regularly updated on the web server which is very much useful to send flood alerts to authority and people for faster action.

The entire system consists of five different Arduino compatible sensors which are temperature, humidity, water level, flow sensors. Also, it consists of an Arduino controller, a Wi-Fi module, and an IOT remote server-based platform.

In this advanced system the initial stage indicates the level of water and the other parameters like flow rate temperature and humidity. Then this information is passed to the web server or the IOT via a Wi-Fi

module, here the ESP8266 is used as Wi-Fi module. In this paper the main objective is implement a system which covers both the IOT based system and the sensor network interfaced with both ESP8266 and the Arduino Uno R3 board for detecting floods and for sending alert to organizations and the society. The buzzer act as alerting system when there is rise in the water level and the associating parameters.

Nowadays at most of the times the ordinary system notifies only the respective governed registered organizations, result in the slowdown of the process in rescuing citizens and also most of their belongings cannot be stored. In present condition it is necessary to develop the design of accurate smart flood monitoring system using sensors and IOT thus the system efficiency can be increased and can be imposed as the real time monitoring system. In this paper the main objectives are to implement a system which covers both the ESP8266- based technology, sensor network components, IOT and web applications for detecting the floods for sending an alert to the organization.

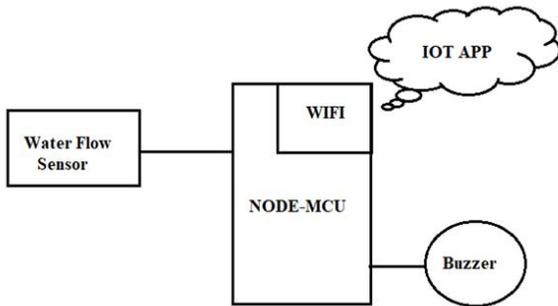
Literature Review

According to previous related works, there are several methods used to develop the system. Based on this research paper [2] the web based IoT 'Thing speak' platform is

used which has an open API service that store and retrieve the data from the sensor and the sensed data output is displayed in graphical form. In this project, sensors are used to implement the IoT Operation for sensing and monitoring the heat, humidity, temperature, light intensity, rain sensing, air quality, barometric pressure and sea level pressure of the surroundings. Figure 1 shows Thing Speak platform.

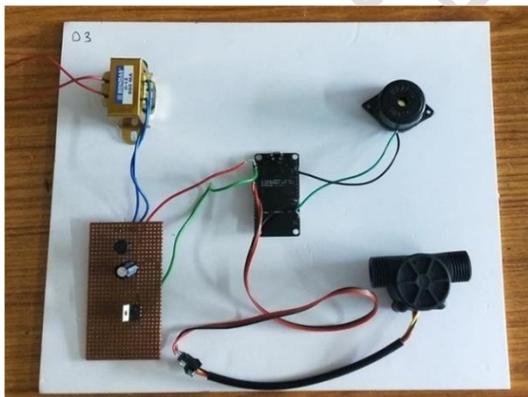
Then, the proposed system in [4], an Arduino was used to control the entire system. It is interfaced to GSM modem and pressure sensor. The pressure sensor is used to measure the water level and the Arduino is used to calculate the height value of the water using Pascal's Law. The level of water is calculated then will be equated with the threshold value that have been set. If the water level is exceeded than the threshold value, the microcontroller will alert the residence by sending SMS. Arduino family have their own pros and cons features. For the Arduino family, they are all almost slow with small memories and limited functionality meanwhile the Mbed platform uses ARM Cortex microcontroller which are generally have more memory spaces, much faster and more functionality. Therefore, any projects that require more memory or processing speed are recommended to use

ARM platform. Figure 2 shows ARM Mbed LPC1768 microcontroller.



Ultrasonic HC-SR04 module sensor will be used to detect the water level of river. The mbed NXP LPC1768 is a microcontroller that will collect all the data in this system. Buzzer will act as an alarm to alert the public and authority when there is upcoming flood and data will be updated to web server. The function of LCD and LED are to display and indicate the level of water.

RESULTS



Smart IoT Flood Monitoring System is developed to alert the public closest to the area when there is upcoming flood. The process is starting when ultrasonic sensor measures level of water in the river. The

collected data from the sensor are gathered and will be forwarded to microcontroller and data will be displayed at web server. Then, data will be analysed and compared. As a user, he/she can control the stepper motor and buzzer wirelessly. Flood status dangerous will be determined based on that collected data. Thus, water level status will display on LCD and web server. LED will be turn on to indicate the water level. Furthermore, the stepper motor will be turn on for the passage of excessive flood when it reached at the highest threshold value and the alarm will be triggered immediately to alert the public. Hence, the citizens will be well prepared for evacuation before the flood occurred.

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 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. In summary, it will help the community in taking quick decisions and planning against this disaster mankind about the flood like hazardous natural disaster.

FUTURE SCOPE

The Future scope of the project is, flood can also be related to the intensity of rainfall, which is the height of the water layer covering the ground in a period of time. Hence the development of a rainfall forecasting sensor eventually turn up to the early flood monitoring and detection, Scholarly studies are ongoing and can be implemented to our existing system in future.

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