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A Study on IoT Based Flood Detection Management System

C.K. Gomathy, G.G.Lasya Priya, Hemanth Kumar K.N

Abstract: ***Over the past few years we can see there is an occurrence of floods at different parts of the world almost every year. The technical advancements in recent years have made it easier to get a solution for these natural disasters. One of such technologies which takes us much closer to the internet is the "Internet of Things". This paper consists of flood detection and avoidance system using the iot technology. The sensors present in this are used to estimate the water levels, humidity, and temperature and send the real-time data to the cloud and the users can access the data via the mobile app. This model is widely used to alarm the people before a flood occurs and necessary precautions could be taken.***

Keywords: NODEMCU, Ultrasonic sensor, Buzzer, Dht11, Jumper wires.

I. INTRODUCTION

Due to an increase in the pollution and also the greenhouse gases there has been a huge increase in the occurrence of natural calamities like Earthquake, floods, tsunami etc., across different parts of the world. At some places like USA due to the advanced technology they could reduce the casualties. But in countries which are technically and economically backward countries could not do this. But the current situations demand for a costly equipment. This model therefore solves the problem and supports in minimal cost with limited computational power and high reliability which helps in detecting the arriving flood with the help of sensor networks. This is where IOT plays a major role as it is the most efficient approach. It is actually the network system of embedded electronics, software and sensors which send and receive the data remotely via the internet.

II. LITERATURE SURVEY

Thinagaran Perumal, MdNasir Suleiman, C. Y. Leong.

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* Correspondence Author
Dr. C.K.Gomathy*, Assistant Professor, Department of CSE, SCSVMV Deemed to be University, Kanchipuram (Tamil Nadu), India.
Ms. G G Lasya Priya, UG Scholar CSE Department, SCSVMV Deemed to be University, Kanchipuram (Tamil Nadu), India.
Mr. Hemanth Kumar K N, UG Scholar CSE Department, CSVMV Deemed to be University, Kanchipuram (Tamil Nadu), India.

IoT Enabled Water Monitoring System IEEE Explore In this paper proposed an IoT based water monitoring system that measure water level in real time. The prototype is based on idea that the level of water can be very important parameter when it comes to the flood occurrences especially in disaster prone area. A water level sensor is used to detect the desired parameter and if the water level reaches the parameter the signal will be freed in real time to social network like Twitter. A cloud server was configured as data repository. The measurement of water level is displayed in remote dashboard. The proposed solution with integrated sensory system that allows inner monitoring of water quality. Alerts and relevant data are transmitted over the internet to a cloud server and can be received by user terminal owned by consumer. The outcome of water measurement is displayed in web based remote dashboard. Syed NazmusSakib ; TanjeaAne ; NafisaMatin ; M. Shamim Kaiser This paper sensor network. The distributed sensor nodes use IEEE 802.15.4 protocol, also called low rate wireless personal area network, to collect the sensor information such as water level data from the river, rainfall, wind speed and air pressure data from a selected site. In order to validate the proposed flood monitoring system, Chadpur, a flood prone district of Bangladesh, has been considered as selected site. The sensors information is sent to the distributed alert center via Arduino microcontroller and the XBee Transceivers. At the distributed alert center, XBee Transceiver and a Raspberry Pi microcomputer are used to generate flood alert based on sensor information and two decade flood data and these data are stored in a database. Sensor information is analyzed by the intelligent neuro-fuzzy controller used in Raspberry Pi microcomputer to announce the flood alerts. The wireless sensor network is connected as mesh topology which can send signals over far distance. The performance evaluation reveals that the proposed system accurately detects flood alert compared to the existing flood alert system.

III. PROPOSED SYSTEM & FUNCTIONALITY METHODS

An IOT early flood detection and alert system using the Arduino is thus, a proposed solution to this problem. The system consists of various sensors which are temperature, humidity, water level, flow and ultrasonic sensors and also includes an Arduino controller, a Wi-Fi module, an LCD, an IoT remote server-based platform and an android application with constructed user friendly GUI relaying all the vital information involved in the picture in a visual format.

This model set up the NODEMCU board near the dam and DHT sensor and ultrasonic sensor, float sensor are connected to it.DHT sensor gives the Humidity and Temperature in the air and Ultrasonic sensor gives the water level. Based on this and some other parameters we may decide if the flood is going to occur or not. We connect them to the cloud from where we connect this to the mobile application and we can see the output in our application too.

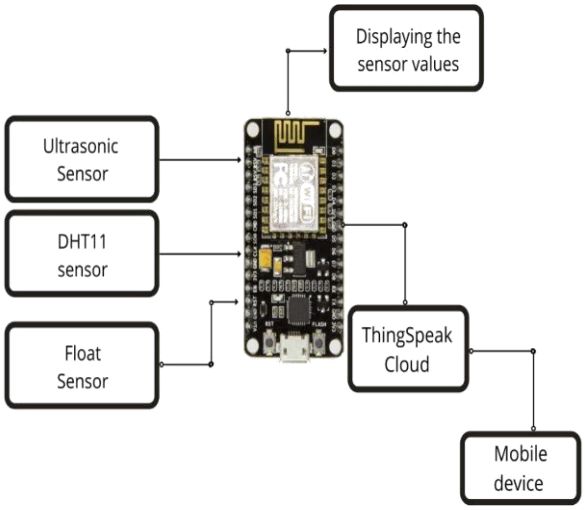


Fig 1: System Architecture

The systems have given connections in breadboard as follows, are will fix DHT11 and Buzzer on Breadboard and we will give connections, We will give connection DHT11, Buzzer and Ultrasonic Sensor to NODEMCU.

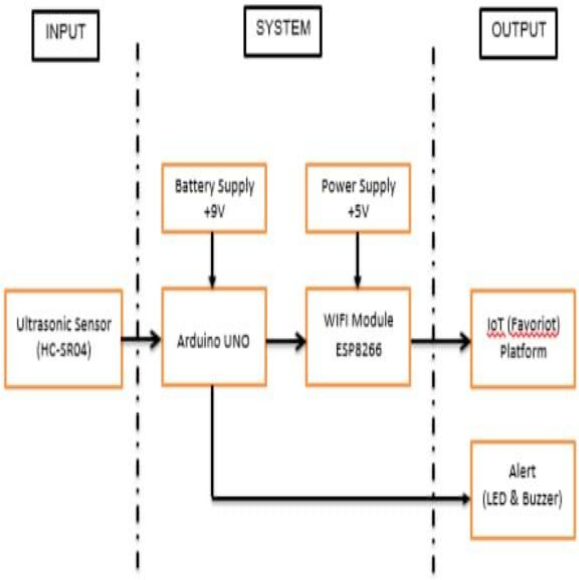


Fig 2: Working Functionality System

First of all the sensors connected to nodemcu controller will get the humidity, temperature and Water level of the dam. Our code will collect all these values and upload it to Things peak cloud which we initialized before using WiFi module and from there our data will be retrieved into the mobile application created using MIT App inventor.

IV COMPONENTS REQUIRED

NODEMCU: It is a microcontroller board on which all the sensors are connected with built-in Wi-Fi module.
Ultrasonic sensor: It measures the water quantity in the dam.
Dht11 sensor: It measures the humidity and the temperature in the area.
Float Sensor: It acts like a switch, when the water level hits the float sensor it sends an alarming signal.

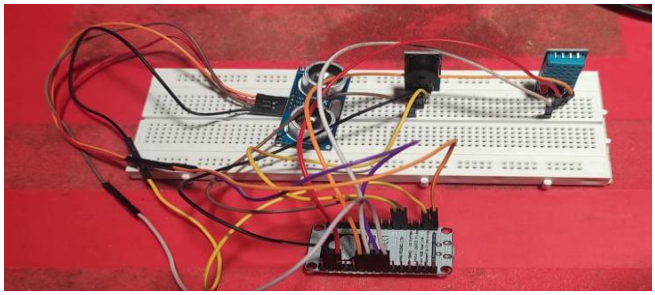


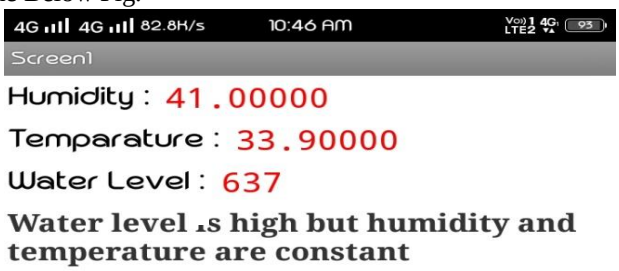
Fig 3 : Flood Detection System Using IOT

V RESULTS

➢ **When Water is High**

Fig 4 : Filled with Water

Here We have Fully Filled the Tank with Water and fixed Ultrasonic Sensor Near the Tank and we got Alaram Through Buzzer and we can see the Result of the Project as shown in the Below Fig.

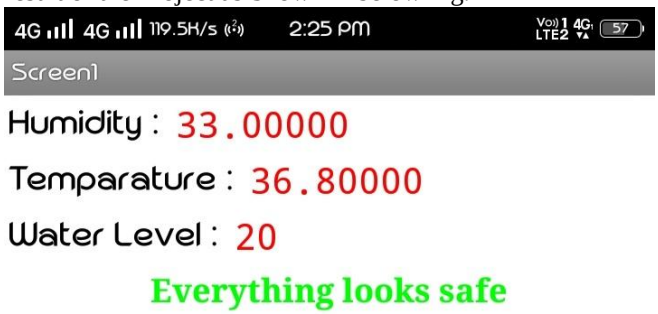


When Water level is High we will get this output and Humidity and Temperature are Constant.

➢ **When Water is Medium**

Fig 5 : Half Filled Tank with Water

We can see here the Tank is Half Filled with Water and we can see Ultrasonic Sensor Near the Water Tank . Here water Level is not High so that No alaram From Buzzer. We can the result of the Project as Shown in below Fig.



When everything looks good we will get this,Output Readings On Mobile Screen Through Wi-Fi.

VI CONCLUSION

Disasters, as the name suggests, brings about great havoc on lives and property indiscriminately across the globe. As India is Developing country gets More Distruction Than the Developed Countries like (U.S.A ,U.K). This paper has tried to propose a potential and economic solution to the problem of floods. Floods cannot be predicted easily, but we are trying to develop a process which helps us to know the Early Flood Detection and Intimates us to know the necessary Precautions . The IoT based flood detection and alert system may prove to save the lives of people by reducing the human quick out during emergency situations. Development of a wireless sensor network has been successfully carried out, with considerations on area of deployment and efficiency. So far, we have built a micro-model through a prototype; the sensors utilized were fundamental in obtaining the required data necessary for monitoring and detecting flood events, and a live feed has also been actualized for end users. The proposed system can later be used to provide solutions to real-life challenges, thereby bringing relief to people in communities ravaged by persistent flood occurrences.

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AUTHORS PROFILE

Dr C. K. Gomathy, is Assistant Professor in CSE at Sri Chandrashekarendra Saraswathi Viswa Mahavidyalaya deemed to be university,Enathur,Kanchipuram,India. Her area of Intrest is Software Engineering Web Services, Knowledge Management and IOT.

Hemanth Kumar K.N, student, B.E. Computer Science and Engineering, Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya Demmed to be University ,Enathur,Kanchipuram,India.
His are of Interest in IOT and System Software.

G G Lasya Priya, student, B.E. Computer Science and Engineering, Sri Chandrasekharendra SaraswathiViswa Mahavidyalaya deemed to be university,Enathur,Kanchipuram,India Her Area of Interest in IoT and System Software.

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