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Real Time Flood Management and Warning System

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Abstract - *The natural calamities have recently opened their doors to disasters which in turn have affected various regions of the world. Disasters work as an eye opener as they are either natural or manmade such as earthquakes, wildfires, terrorist attacks etc. Flood is a natural disaster that occurs in a region within a country. Some major things are responsible to cause flooding for e.g., high rainfall, blockage of the drainage system, improper environmental damage, insufficient water pump capacity in flood prone areas. However, research is going on in this field. Whatever research has been taken place it is with the help of IoT applications. A prototype IoT system is decided with hardware and software.*

***Key Words*: Node MCU, Ultrasonic Sensors, Waterflow Sensor, Rain Gauge, Solenoid Valve, Tank, IoT, Web Page, MYSQL.**

1. INTRODUCTION

Disasters are extreme environmental events that affect all areas in the world. When a disaster happens, it interrupts all the essential services such as healthcare, electricity, water, transportation and communication. Among many types of disaster, the flood is common in many countries. According to the world meteorological organization flooding remains the third biggest disaster in the world. Until now various research projects are been taken in to consideration and these are been aiming to minimize the impact of flood disaster through early prediction. Recent developments in information and internet technologies provide a greater opportunity to enhance disaster management activities. The internet is currently evolved in several directions and technologies such as IOT. Presently 'Internet of Things' is one of the technologies that is been widely used to improve the area of disaster management focusing on floods.

1.1 LITERATURE REVIEW

K.Vinothini, Dr.S.Jayanthy proposed to monitor the flood condition and send alert notification if there is an occurrence of risk of flood. The proposed system uses decision tree algorithm for classification process and to analysis the level of flood data to notify if the level of water is normal or risk condition[1].

Anton Prafanto,Edy Budiman proposed an alert notification message about water level via Global Communication and Mobile System for flood detection with a focus on determining the current water level using sensors technology[2].

A Yovan Felix, T.Sasipraba proposed and designed a water level detection sensor-based wireless network that works automatically by reading the height of the water using sensor and then the elevation data is sent to a website so that the public can monitor the height of the river in real time[3].

Dola Sheeba Rani, Dr. Jayalakshmi G N, Dr. Vishwanath P Baligar designed and implement IoT based flood monitoring and alerting system and calculate the time it would take for the flood to reach them approximately[4].

Sai Sreekar Siddula, P.C. Jain, Madhur Deo Upadhayay proposed the use of Ultrasonic Sensors, Arduino, XBee modules, ESP8266 modules, Thing speak server and Servo motor in this system to completely automate the process of dam control with the use of wireless sensor networks and Internet of Things (IoT)[5].

2. DIAGRAM & DESCRIPTION

The proposed block diagram consists of microcontroller(Node MCU) that works with different sensors as the main target of the proposed system.

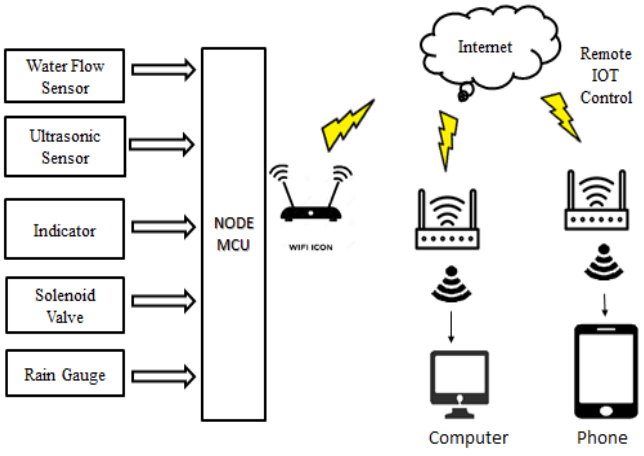


FIG.1 DIAGRAM AND DESCRIPTION

Fig.1 shows the system is to monitor the data on the communication devices. This data will be sent by different sensors that will be collected by the microcontroller. Microcontroller will send the data to the respective network through the WIFI module and the concerned data will be stored in the database and this real time data can be

visualized in any device irrespective of area or place with the help of the webpage which would work like a bridge between the microcontroller and the internet server , and from the server it will be put up on different devices like computers or mobile phones from where it could be read, monitored, and send ahead for the proper execution of the system.

The block diagram shows the proposed set up of the entire system, all the devices which can be used and even the connections of each device with the other, its technicalities and also the way of getting the final outcome in a more relevant way is also being shown.

3. SYSTEM IMPLEMENTATION

Micro-controller will be used to capture the data send by the different sensors that will be useful in getting real time data which will help in monitoring of the floods.

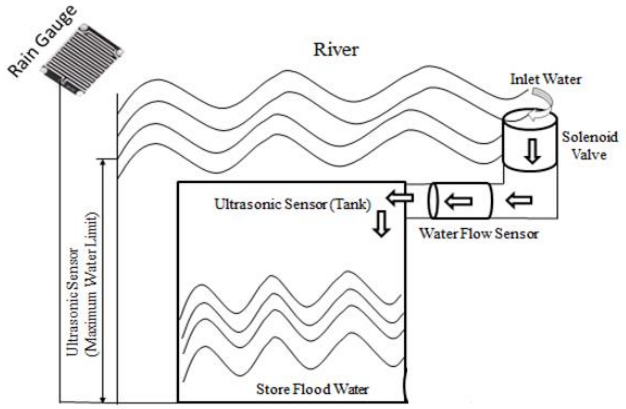


Fig.2 System Implementation

The diagram of proposed system deals with the river as the water body. Whenever there is heavy rainfall river shows the presence of maximum water in it. There is certain natural limit to accept the water of each water body. If the water crosses the natural limit there are chances of overflowing of the water, coming out of the water from its original position and turning into a natural disaster called as Floods. In order to avoid this the proposed system shows the presence of different devices working together on the same mechanism. The system shows the presence of solenoid valve which will work as inlet that will help the water to pass through water flow sensor into the tanks. The system shows the presence of tank, fitted under the water body. The proposed system also has the presence of an alarm signal system when the capacity of the tank of water filling is exhausted and also lots of water in the water body is still on the verge of overflowing. The alarm system will help the humans to sense the danger of floods and water overflowing prior to the disaster. The stored water can be reused as and when needed because the proposed system also shows the presence of motor pump as precise location which will work to lift the water out of the tanks wherever and whenever needed through outlet. The proposed system also has an additional working mechanism which deals with the automatic closer of the solenoid valve along with its inlet when the comes to its original water capacity so that there is always the presence of expected water limit in it.

4. PROPOSED METHODOLOGY

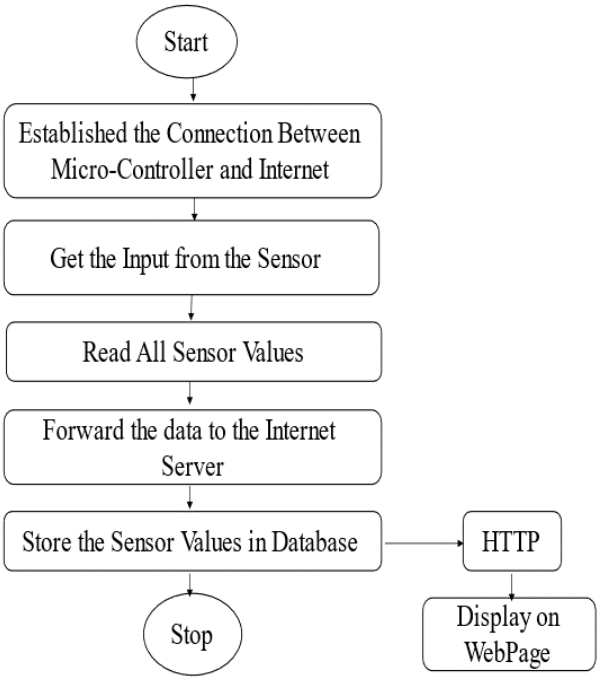


FIG.3 Proposed Methodology

5. EXPERIMENTAL RESULT

The experimental result is being depicted by two figures.

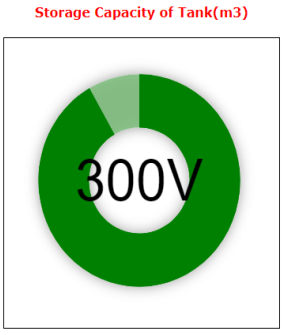


FIG.4.1 WATER TANK

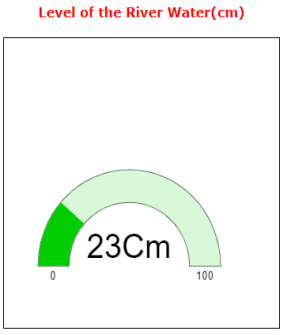
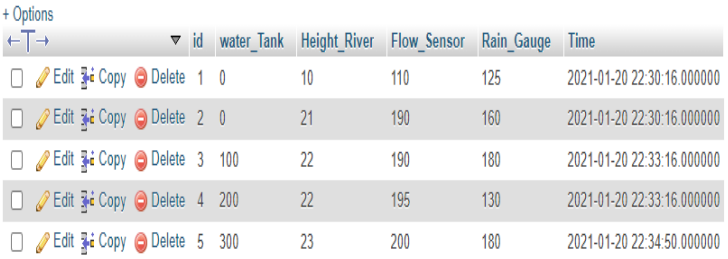


FIG.4.2 MAX. HEIGHT OF RIVER



+ Options

	id	water_Tank	Height_River	Flow_Sensor	Rain_Gauge	Time
Edit Copy Delete	1	0	10	110	125	2021-01-20 22:30:16.000000
Edit Copy Delete	2	0	21	190	160	2021-01-20 22:30:16.000000
Edit Copy Delete	3	100	22	190	180	2021-01-20 22:33:16.000000
Edit Copy Delete	4	200	22	195	130	2021-01-20 22:33:16.000000
Edit Copy Delete	5	300	23	200	180	2021-01-20 22:34:50.000000

Fig. 4.3 MYSqL Database

Fig .4.1 showing the water storage capacity of the tank. As per the system implemented design model ideally real time water storage capacity of the tank is being taken into consideration. As a result (Fig 4.1) successfully shows the real time water storage capacity of the tank and in the fig, it is seen about 300 m3 water in it. This proves that the designed model and the outcome of the result is considerably giving the proper result and implementation.

(Fig 4.2) successfully depicts the height of the river and also the level of the river water as it was expected in the designed model of the system and also accurately helps to know the value in real time management.

The real time data which is taken from MySQL database(Fig.4.3) is been catched by the sensors and then proceeded accordingly. With such type of the system implementation, it is possible to view these results anywhere in the world.

6. CONCLUSIONS

The following experimental set up and result helps to predict the real time management of the flood and also helps in detection of the alarming system whenever the quantity of the water rises at a higher level and also shows the storage capacity of the water when it is overflowed.

It also helps to store the extra amount of rain water which can be harvested again and reused as and when required at proper place and proper time.

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