# Flood Detection And Alerting System Using IoT

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***Abstract-*** *This paper proposes architecture for an early warning floods system to alert people against flood disasters happens in the places. Here early warning system must be developed with linkages between four elements, which is used to collect the data accurately to undertake the following risk assessments, they are development of hazard& monitoring services, communication about risk related information and existence of community response capabilities. Our project focuses on water level monitoring remotely using wireless sensor network. It also utilizes the Global System for Mobile communication (GSM),Internet of Things (IoT) and short message service (SMS) to relay the data from sensors to computers or we can give direct alert to the respective person through their mobile phone. It is hope that the architecture we have proposed can be further develop into a functioning system, which would be more beneficial to the community and act as a preventive measure to save the lives of many human beings in the case of flood disaster occurs.*

***Keywords***- Early warning system, Water Level Monitoring, GSM, IOT.

## I. INTRODUCTION

Generally flood happens due to improper irrigation method in a housing area or happens due to sudden increase of water level.. Flood disaster often causes loss of property, damages and life. Since this disaster is very dangerous to human life, so that we have to implement alert system in order to notify people in the early stage so that safety measures can be taken to avoid any mishaps. This paper proposes a plan for an early warning floods system to aware the people against dangerous flood disasters. Here early warning system must be developed with linkages between four elements, which is used to collect the data accurately to undertake the following risk assessments, they are development of hazard& monitoring services, communication about risk related information and existence of community response capabilities.. This project utilizes the Global System for Mobile communication (GSM), Internet of Things (IOT) and short message service (SMS) which is used to relay the data from sensors to computers or directly can be used to alert the respective person through their mobile phone.It is hope that the architecture we have proposed can be further develop into a functioning system, which would be more beneficial to the community and act as a precautionto save the lives of many people's in case of flood happens.

## II. LITERATURE REVIEW

1. Flood Monitoring (Lin, Yung Bin; Lai, Jihn Sung; Lu Sheng (01-12- 2006) ) The field results show that this system can function well and survive a typhoon flood.
2. Flood Monitoring and Early Warning System Using Ultrasonic Sensor ( Natividad, J. G; Mendez, J.M (01-03-2018) ) The paper envisions helping flood-prone areas which are common in the Philippines particularly to the local communities in the province.
3. GSM and Web Based Flood Monitoring System ( Pagatpat, J C; Arellano, A C; Gerasta, O J (01-01-2015) ) The purpose of this project is to develop a local real-time river flood monitoring and warning system for the selected communities near Mandulog River.
4. Real Time Flood Monitoring and Warning System(JiraponSunkpho (01- 04-2011) ) The developed system has demonstrated the applicability of today sensors in wireless monitor real-time water conditions.

## III. EXISTING SYSTEM

The existing system consists of two microcontrollers and one sensor. The microcontroller used here is node mcu and the sensor used is an ultrasonic sensor which senses the amount. The ultrasonic sensor continuously monitors the huge amount of water each time when it reaches the certain defined level. It records the data through ultrasonic sensor and these data will sent to node MCU from time to time. Two node MCU are used here, the first one acts as transmitter and second as a receiver. Initially, the first Node MCU attached with an ultrasonic sensor will detects the flood level. Then ,it can display the info on the LCD screen. The data are sent to the Blynk app via wireless communicaton. This data will alert the federal agency for further action once the level reaches warning and significant level which triggers the buzzer and LED. Though this method sends the alert messages to authority and displays it in LCD but this can be done only the water reaches the critical level. It cannot predict the

possibilities of flood prior so it are often prevented in the first place.

## IV. PROPOSED SYSTEM

This node is independent flood monitoring node equipped with necessary sensors and connectivity modules. It has three major stages, Including Sensors, Controller, wifi interface to upload The collection of information on server. Data from various sensors are collected by a ESP and is uploaded on the server. The info uploaded on server is stored on the database. The stored data is then routed to the forepart web applications and mobile applications. This data will alert the federal agency for further action once the level reaches warning and demanding level which triggers the buzzer and LED. This system sends the alert message notification to the authority though GSM.

## V. BLOCK DIAGRAM&DESCRIPTION

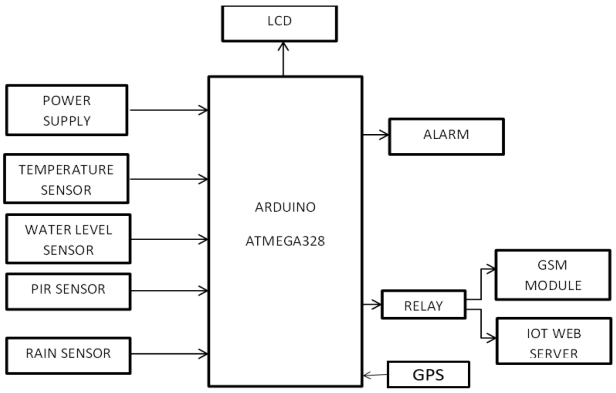


Fig1:Block Diagram of the Proposed System

### A )HARDWARE DESCRIPTION

The four different sensors measure the various environmental and weather related parameters and monitor them constantly. In these data from the sensors is constantly fed to be an Arduino controller. The Sensor measurements in Arduino program checks for any irregularities constantly and also based on the sensor data estimates the weather conditions. A GSM module is also connected to the Arduino controller. The Arduino sends the sensor data to the IOT server platform using the IOT protocols over the Wi-Fi connection. The Liquid Crystal Display (LCD) is used to display the real-time values of all the sensors. A buzzer is also connected to the output system of the Arduino. If any value of sensor crosses over than a certain threshold value, then the buzzer is turned on. A GSM Module sends a message to the certain person. A Graphic User Interface is constructed on the remote server IOT platform in order to display the sensor data in a visual format. The flood-related parameters can be monitored from anywhere remotely by using this project.

### 1) POWER SUPPLY UNIT

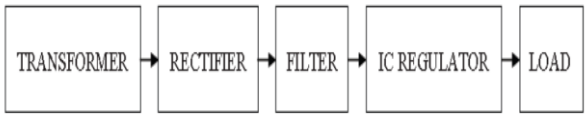


Fig2. Power Supply Unit

Typically 220V Rms, The ac voltage is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier that provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage in a power supply. Thus the result of the dc voltage usually has some ripple or ac voltage variation. Regulator circuit will remove the ripples and also remains the same dc value even if the input dc voltage get varies. This voltage regulation is usually gained using one of the popular voltage regulator IC units.

### 2)LCD (LIQUID CRYSTL DISPLAY)

It denoted as Electronic visual display otherwise a flat-panel display that uses the light-modulating properties of liquid crystals. Liquid crystals will not emit the light directly.


Fig 3:LCD DISPLAY

### 3) TEMPERATURE SENSOR:

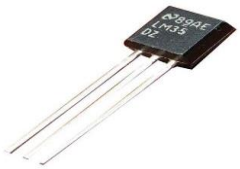

Fig 4:LM 35 SENSOR

This unit of change of resistance is sensed by the circuit and it calculates the temperature. When the voltage increases then the temperature also increases. We can also see this operation by using a diode. Microprocessor Input unit directly connected to temperature sensors and thus capable of direct and reliable communication with microprocessors. The sensor unit can be communicate effectively with low-cost processors without the any need for A/D converters. A good

example of a temperature sensor is LM35. In LM35 series, which are precision integrated-circuit temperature sensors which are used here, the LM35 series were output voltage is linearly proportional to the Celsius temperature. The LM35 series operates at the -55˚ to +120˚Celsius.

4) **RAIN SENSOR**

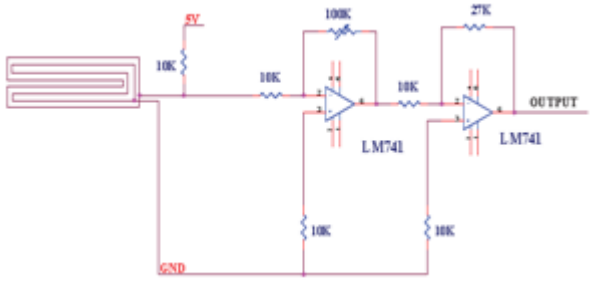


Fig5:SCHEMATIC DIAGRAM OF RAIN SENSOR

In this circuit the rain sensor is used to find the rain or water content. rain sensor is nothing but sensitive variable resistor. Here we are using rain sensor which the resistance value is decreased when the water particles are increased.

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**5)GSM MODULE:**


Fig 6:SIM800 Module

The above fig depicts plug and play GSM Modem with serial interface. It is used to send the SMS, used to make and as well as receive calls, to do other GSM operations by controlling it through AT commands from micro controllers and computers. It uses SIM800 module for all its operations. Standard RS232 interface can be used for interfacing the modem to micro controllers and to computers.

6)**PIR SENSOR (PASSIVE INFRARED SENSOR)**

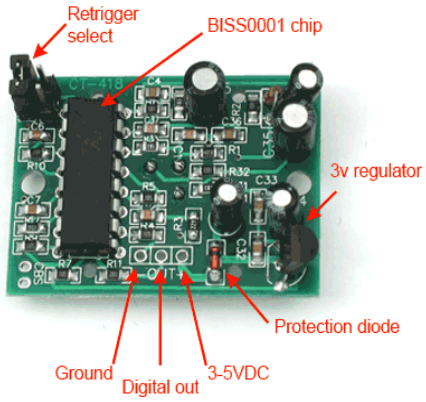


Fig 7:PIR SENSOR

The above illustrated fig itself has two slots in it, each slot is made up of a special material that is concerned to IR. The lens which is used here is not really doing much so that we can see that the two slots can 'watch' out past some distance in this sensor (basically the sensitivity of the sensor). When the sensor is idle, both the slot will detect the same amount of IR, the system of ambient amount radiated from the room or walls or outdoors. If a warm body like a human or animal passes by, it first intercepts with a one half of the PIR sensor, which causes apositive differential change between the two halves available in the PIR sensors. When the warm body leaves the sensing area in that particular area , the system has reverse happens, whereby the sensor generates a with negative differential change of the system. These change pulses occurs what is detected.

7)RELAY:

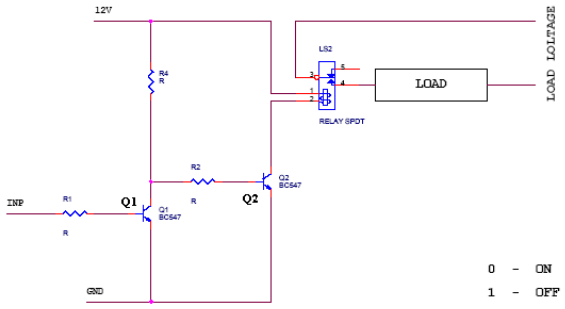


Fig8:SCHEMATIC DIAGRAM OF RELAY

In relay common pin is connected to the supply voltage. The normally open (NO) pin connected to load. When high (5 Volt) pulse signal is given to that base of the Q1 transistors, then the system of the transistor is conducting and shorts the collector and emitter terminal and zero terminal of the (0 Volt) signals is given to base of the Q2 transistor. So the relay pin is turned OFF state. When a low pulse is given to the base of transistor Q1 transistor, then the transistor is turned

OFF. Now (12v) is given to base of Q2 transistor so that the transistor is conducting terminal and relay is turned ON. Hence the system of the common terminal and NO terminal of relay are shorted. Now load gets the supply voltage through relay.

8)GPS MODULE

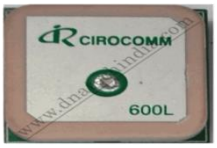


Fig 9:GPS 600L

This GPS module provides current time, date, latitude, longitude, speed, altitude and travel direction / heading among other data. It can be used as a host of applications like navigation, tracking systems, fleet management, mapping and robotics.

9) **BUZZER**

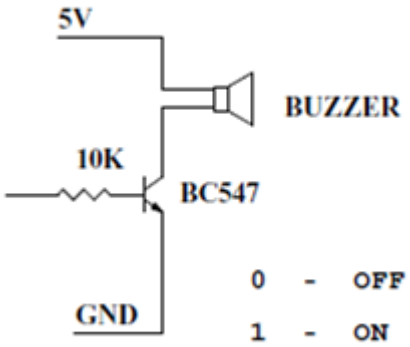


Fig:10 Circuit Diagram of Buzzer

High pulse (5 Volt) signal is given to base of the transistor, the transistor is start to conduct and it will close the collector and emitter terminal. Hence the buzzer is, already getting a volt supply in the positive terminal. At that time the buzzer is getting negative supply. So that the circuit will close and the Buzzer will ON automatically.

Next, low pulse is given to base of transistor, it will turn OFF. So buzzer will OFF because it doesn't get any negative power supply. This type of transistor arrangement is Said to be driver circuit. So we can't connect any load to Micro-controller output terminals. That is why we need a driver circuit.

**B) SOFTWARE DESCRIPTION:**

Software we used for programming is ARDUINO IDE.

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

## XI. CIRCUIT DIAGRAM OF PROJECT

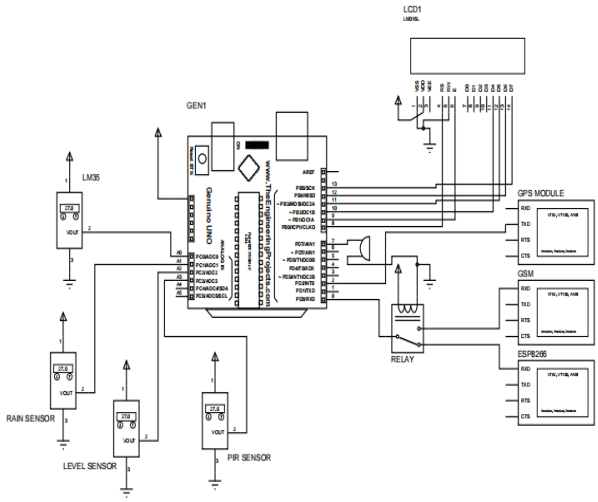


**Fig 11:CIRCUIT DIAGRAM OF PROJECT**

The project 'IOT based flood monitoring and control system' is useful to avoid collateral damage due to flood. To overcome from this natural disasters called flood we demonstrated as:- Our system basically works on three basic parts i.e Reservoir / dam ,gate and cannel. The water level of a reservoir is sensed with the help of waer level sensor. A water level sensor and Rain sensor used to monitor the water level of reservoir continuously monitors the level and display it on the web page on a graph. When the gate is opened by the authority once to the desired values then our system will detects the level of gate and sends an alert message. In our system the gate opening is controlled by potential meter manually. When the water flows through the cannel the ultrasonic sensor will sense the water level of cannel, when the water level of that cannel comes to the predetermined level then it will shows the notification of alert message on web page and SMS along with this it will blow the buzzer of the village 1for 30 seconds. When the water flows through the cannel the ultrasonic sensor will sense the water level of cannel, when the water level of that cannel comes to predetermined level then it will show the notification of alert message on web page and SMS on the numbers along with this it will blow the buzzer for 30 seconds for village 2.

## XII. PHOTOGRAPHY OF HARDWARE

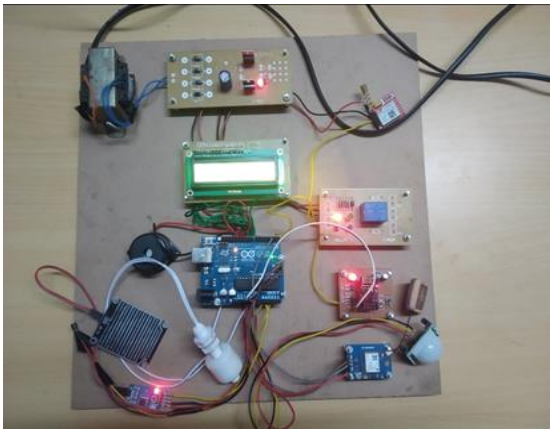

Fig12:circuit in ON condition

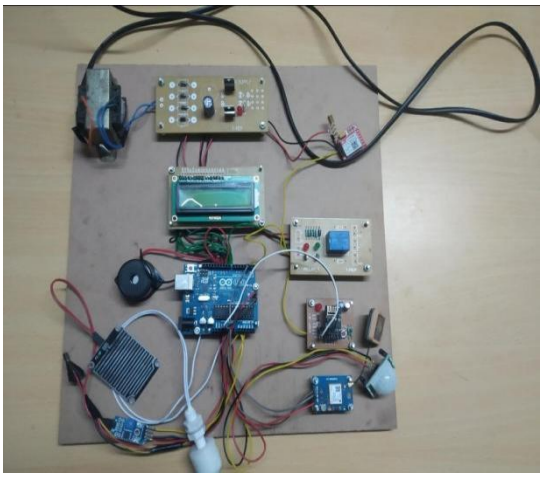

Fig 13:circuit in OFF condition

## XIII.OUTPUT

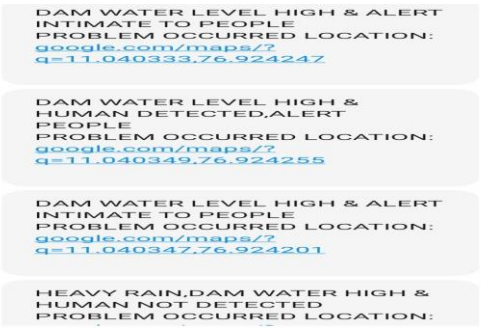


Fig 14:Message of water level

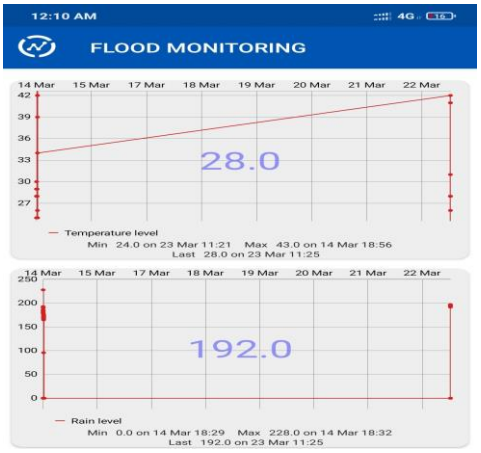


Fig 15:Graph of flood monitoting

## XIV. CONCLUSION

The project 'IOT based flood monitoring and control system' is useful to avoid collateral damage due to flood. To overcome from this natural disasters called flood we demonstrated as: Our system basically works on three basic parts i.e Reservoir / dam ,gate and cannel. The water level of a reservoir is sensed with the help of waer level sensor. A water level sensor and Rain sensor used to monitor the water level of reservoir continuously monitors the level and display it on the web page on a graph. When the gate is opened by the authority once to the desired values then our system will detects the level of gate and sends an alert message. In our system the gate opening is controlled by potential meter manually. When the water flows through the cannel the ultrasonic sensor will sense the water level of cannel, when the water level of that cannel comes to the predetermined level then it will shows the notification of alert message on web page and SMS along with this it will blow the buzzer of the village 1for 30 seconds. When the water flows through the cannel the ultrasonic sensor will sense the water level of cannel, when the water level of that cannel comes to predetermined level then it will show the notification of alert message on web page and SMS on the numbers along with this it will blow the buzzer for 30 seconds for village 2.

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