# IoT BASED FLOOD DETECTION AND ALERT SYSTEM

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**Abstract:***There are some places that are more prone to flooding than other places, the implementation of flood alert systems near any major water area or body of water provides critical information that can protect property and save lives. Of course, the most effective flood warning methods are very costly and requires high maintenance and also requires highly qualified employee to operate it. Nowadays, there is no idea about when flood will occur so there is need to prewar people who are near the flooded area. Hence we are design this system to inform the people about the upcoming flood through notification and alert messages. For that purpose we are going to use float and rain sensors which will helpful to give information about the flood. This system sends alert message to authority person through GSM module. Also data is processed and can be checked on webpage through Wi-Fi module.*

*Key Words: Flood, IoT, Arduino Controller, Float Sensor, Rain Sensor, Wi-Fi, GSM.*

## 1. INTRODUCTION

IN RECENT YEARS FLOODING BECAME ONE OF THE MAJOR NATURAL DISASTERS OCCURRING IN INDIA. INDIA IS AMONG THE TOP 10 IN THE WORLD'S MOST FOOD-THREATENED COUNTRY. THERE ARE MANY EFFECTS OF FLOODS WHERE THE MATERIAL, HUMAN, ECONOMIC AND SOCIAL LOSSES ARE CONSIDERED AS SOME OF THE MAIN EFFECTS OF FLOODS. HEAVY RAINS ARE ALSO ONE OF THE MAJOR ASPECTS FOR THE CAUSES OF FLASH FLOODS. IN ORDER TO REDUCE THE HUMAN AND ECONOMIC LOSSES THERE ARE SOME NECESSARY STEPS TO BE FOLLOWED. ONE OF THE MOST AND THE PRELIMINARY STEP IS TO ALERT THE PEOPLE BEFORE THE OCCURRENCE OF THE DISASTER. THERE ARE SOME PLACES WITH EARLY FLOOD ALERT SYSTEMS BUT MOST OF THEM ARE NOT MOST EFFICIENT AS THEY CAN USUALLY SEND THE INFORMATION TO ONLY SOME RESPECTIVE ORGANIZATIONS WITH LIMITING DISTANCES. SO, IN CASE OF FLOODS IT IS TAKING MORE TIME FOR PASSING THE MESSAGE TO THE PEOPLE LIVING IN THE NEARBY AREAS SO THAT THE PEOPLE COULD NOT SAVE MOST OF THEIR BELONGINGS AS WATER RISES RAPIDLY WITHIN LESS TIME. USUALLY, THE FLOODING CANNOT BE ABANDONED BUT THE EARLY DETECTIONS CAN BE MADE I.E., EARLY ALERTING SYSTEM WITH HELP OF CONTINUOUS MONITORING CAN BE USED TO REDUCE THE LOSSES FACED BY THE SOCIETY.

THE SENSOR IN THIS UTILIZES THE GSM COMMUNICATIONS FOR TRANSMISSION OF DATA TO THE SERVER. IT ALSO UTILIZED TO DETECT THE MONITOR TIMELY AND SENDS THE LOCATION STATUS OF THE CONTROL UNIT USING FLOAT AND RAIN SENSOR WHICH INDICATES THE FLOOD CONDITIONS WHOSE DATA IS GATHERED BY THE SENSORS. THE ALERT SYSTEM AND FLOOD MONITORING SYSTEM UPDATES THE CONDITION OF THE FLOODS AND SENDS THE INFORMATION OR NOTIFICATIONS IN THE FORM OF SMS TO THE AFFECTED ZONES FOR THE FURTHER STEPS. THERE IS ALSO AN IMPLEMENTATION OF SENSOR NETWORK USING FLOOD MONITORING SYSTEM BASED ON THE WI-FI MODULE. IN THIS WHEN THE WATER LEVEL RISE TO THE PRIMARY LEVEL AN ELECTROMAGNETIC WATER LEVEL SENSOR WILL SENSE THE RISING IN THE WATER LEVEL AND PROCESS THE SIGNALS TO THE CENTRAL PROCESSING UNIT AND TRIGGERS GLOBAL SYSTEM FOR MOBILE MODEM WHICH IN TURN SENDS AN ALERT SMS.
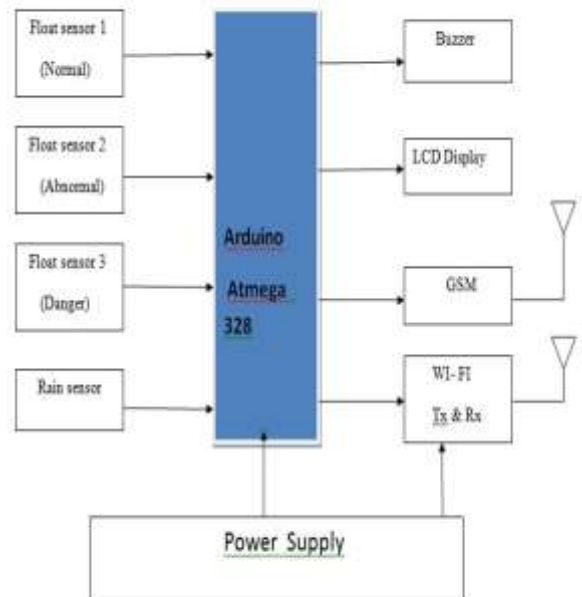
## 2. BLOCK DIAGRAM



**Fig 1. Block Diagram**

### 2.1 Block diagram description-

### 2.1 ATMEGA 328:

The Atmega328 is a very popular microcontroller chip produced by Atmel. It is an 8-bit microcontroller that has 32K of flash memory, 1K of EEPROM, and 2K of internal SRAM. The Atmega328 has 28 pins. It has 14 digital I/O pins, of which 6 can be used as PWM outputs and 6 analog input pins. These I/O pins account for 20 of the pins

### 2.2 GSM Module:

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.



Fig -2: GSM Module

### 2.3 Wi-Fi Module:

The Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The module is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.



Fig -3: Wi-Fi Module

### 2.4 Float Sensor:

Float switch is type of level sensor . A device is use to detect level of liquid. The switch may be used in pump ,an indicator an alarm or other device. It help to sense level of water present in over head tank. Float sensor is an electrical sensor which operate automatically when liquid level goes up or down with respect to specified level.



fig 4. Float Sensor

### 2.4 Rain Sensor:

Rain Sensor is a switching device activated by rainfall. It can be used as switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, rain board and control board is separate for mode convenience, power indicator LED and an adjustable sensitivity through potentiometer.



Fig 5. Float Sensor

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## 2.5 Webpage:

The proposed system can be used to display information regarding rain and flood conditions. Every user would be able to access the information from anywhere on the earth. Thingspeak.com is one such webpage which takes the help of the Math Works MATLAB analytics to present the device information in a more detailed analysis in both description and visualization. Thingspeak.com provides the user the ability to add any number of channels to one account and in each account information can be fed into 8 fields . An account can be assigned to one division of an area and n channels can be created to a suite of n meters in the locality. The analytics can be viewed by both the consumer and service provider.

## 3. CONCLUSION:

The system provides a real world application of internet of things and offer services like accurate level monitoring directly are indirectly benefited by the system Sensors are important elements in the Flood Observatory System. Further studies on sensor technology will be best to replace the current sensors. Precise and accurate detection of water level will improve the data collection system for the monitoring station. The flood alert information's can be displayed on LED display boards for road users and for safety reasons could be placed at strategic locations. Such information's should be in real time and transmitted wirelessly from the measured location. A possible means of power supply for the sensors and centralized control unit is via solar cells. The Flood Observatory System will be easy to install and maintained if it is powered by solar cells.

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