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# Early Flood Detection and Avoidance using IOT and GSM Module

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**ABSTRACT:** Flood is an inevitable natural calamity all over the globe, causing the hefty flow of water and also critical destruction to properties and lives. For this cause, we need to build a flood detection system to monitor rising water in residential areas. This can be achieved through the emerging technologies GSM and the Internet of Things which we can monitor floods and get early information in abnormal conditions and take necessary action like open the dam gates automatically. Normally, flooding can't be stopped and inevitable, but early detection or warning system can be used to minimize the losses faced by the resident and administration. For this reason, we require to build flood level sensing devices that will detect the water level in the dam. The project makes use of the Arduino Uno atmega328p microcontroller it is the main controlling device of the whole project. By using ultrasonic sensors we can measure the distance of surface water. By using a water level sensor we can measure the maximum level of water. a dam gate. Using IoT, GSM technology to send the alert intimation to the respective authorities. The status of the project is display on LCD. This system is integrated into the microcontroller board. To measure the water flow using a flow sensor. DC motor along with motor driver as WATER LEVEL SENSOR, SR04 ULTRASONIC SENSOR, WATER FLOW SENSOR, GSM, and ESP8266 WI-FI module is interfaced to the ARDUINO. Arduino continuously monitors the data from sensors. If the sensor data crosses the threshold value the system sends the alert intimation to the respective person through Wi-Fi and sends the SMS through GSM and also opens the dam gates automatically. And as well as monitor the sensor data on the LCD. This system can also predict the possibility of flooding before flooding takes place.

**KEYWORDS :** Arduino Uno, Ultrasonic sensor, Water level sensor, Water flow sensor, ESP8266 WI-FI Module, LCD Display, GSM, DC Motor

## I. INTRODUCTION

Early Flood Detection & Avoidance System is an intelligent system that keeps close watch various natural factors to predict a flood, so we will embrace ourselves for caution, to attenuate the damage caused by the flood. Natural disasters sort of a flood can be devastating resulting in property damage and loss of lives. To eliminate or lessen the impacts of the flood, the system uses various natural factors to detect floods [1]. The system features Wi-Fi connectivity, thus its collected data are often accessed from anywhere from the govt authority quite easily using IoT[2]. To detect a flood the system observes various natural factors, which incorporate rainfall, water level, and low level. to gather data of mentioned natural factors the system consists of different sensors which collect data for individual parameters[3]. The water level and water flow sensors are located at different locations of the river and dam, which collects the info of water level and water flow data from the dam and rivers[4]. According to this data, the flood occurrence is predicted. the most purpose of this work is to style and develop a flood monitoring and detection system using the web of things. The scope of the work is to develop and style an early flood detection system that will detect the flood automatically and send data to the government Unit and residents. the precise objective of the work is to detect the present level of water in rivers at different locations,[5]. Prediction of water level of rivers, Warning residents about a flood and Informing Government authority about flood situation.

## II. LITERATURE SURVEY

**H.N.Do** have proposed a flood cautioning structure has been examined and created. The structure contains an early flood forewarning station which is charged by solar energy. The flood-advised station is provided with a water level sensor. The data, which is gotten from sensors are been stored and transmitted to observing focus by GPRS convention. The observing focus can collect, research data from the stations, and send results to notification focus where alerts are often created to the considered nearby areas and notification is additionally send through SMS from client-server. an internet site page was made to demonstrate the water level, and therefore the foreseen information for persistent activity. the difficulty with this framework is fixing the conditions for testing within the lab takes a short time to possess the test results as a general rule[6].

**Sakib** have suggested a flood observing framework utilizing remote sensor organize. The framework utilizes IEEE 802.15.4 convention as a conveyed hub to collect the sensor data, for instance, water level information from the waterway, precipitation, and wind speed information from a selected site. to endorse the flood checking structure, Chandpur, a flood slanted area of Bangladesh, has been considered as a picked site. The sensor information is sent to the disseminated alarm focus from the main control unit by using the Zigbee module. Sensor information is researched by the controller. The sensor data are processed using an Arduino controller for warning conditions. The remote sensor is included for sending detected data to a particular location instantaneously. it's incompetent to regulate moving procedure with time delays and alteration within the MF can require a change in the rules. And it undergoes a multi-parameter optimization problem[7].

**Mousa** have planned a new detecting gadget that will consistently screen urban flash floods and traffic blockage for flood watch. This recognizing gadget relies upon the combination of IoT Based Flood Detection and Notification System using Decision Tree Algorithm Proceedings of the International Conference on Intelligent Computing and Control Systems. ultrasonic distance measurement for detecting temperature, using a blend of L1-regularized recreation. Second, watching counts are executed on a foreign sensor platform. And artificial neural systems to process estimation data. [8].

**Khalaf** have developed a portrayal of an alarm-making structure for flood identification with an accentuation on choosing momentum water level using sensors. The framework by then gives cautioning message about water level using Global Communication and Mobile System modem to explicit individual. Also, the Short Message Service is provided for the framework to rapidly exchanges and convey information through web base open framework. AI calculations were directed to play out the classification process. The tests were done to characterize flood information from typical and in peril conditions during which arrangement precision was accomplished utilizing the Random Forest algorithm. The calculation experiences complexity and tedious to develop than decision trees[9].

**Dashpute** have proposed a flood detection system to screen rising water in local locations. Utilizing an ultrasonic sensor they made a flood level detecting device which is connected to Node MCU controller to process the sensor's analog signal into a usable advanced estimation of separation. The client can get real-time data on observing overflowed streets over SMS-based administration. the extent of the flood is going to be partitioned into four. The flood sensor and microcontroller are going to be controlled by solar-based energy to help the constant activity of water flood height identification and system information transmission. The Arduino Flood Detector System is made to screen floods that will support drivers or street clients to remain far away from issues when a flood happened. [10]

## III. PROPOSED SYSTEM

In our proposed system, This system is integrated into the microcontroller board. WATER LEVEL SENSOR, SR04 ULTRASONIC SENSOR, WATER FLOW SENSOR, GSM, and ESP8266 WI-FI module is interfaced to the ARDUINO. Arduino continuously monitors the data from sensors. If the sensor data crosses the threshold value the system sends the alert intimation to the respective person through Wi-Fi and sends the SMS through GSM and also opens the dam gate automatically. And as well as monitor the sensor data on an LCD display. This system can also predict the possibility of flooding before flooding takes place. IOT is an emerging technology through which we can connect many devices via

internet. So Monitoring floods through IOT will be easier to get early information and take necessary measure. GSM is used to send the alert message it works from anywhere in the world. .

### 3.1 Block Diagram

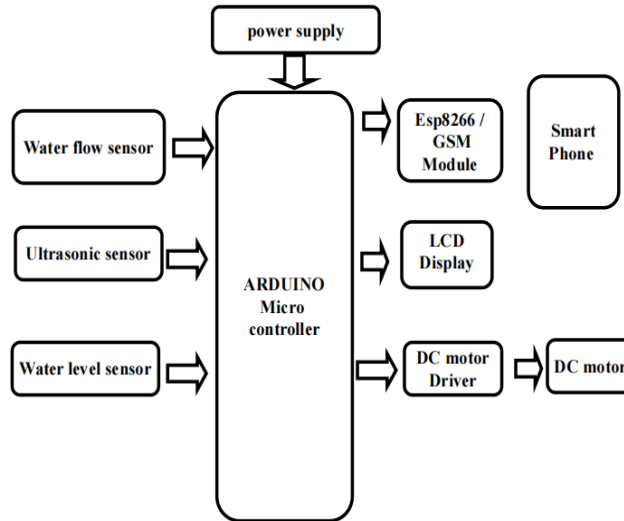


Figure 1: Block Diagram

### 3.2 Flow Chart

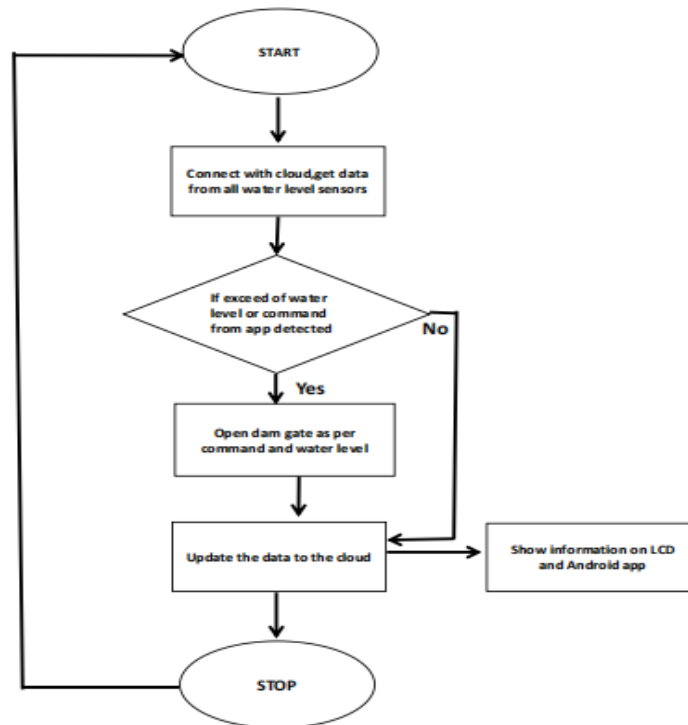
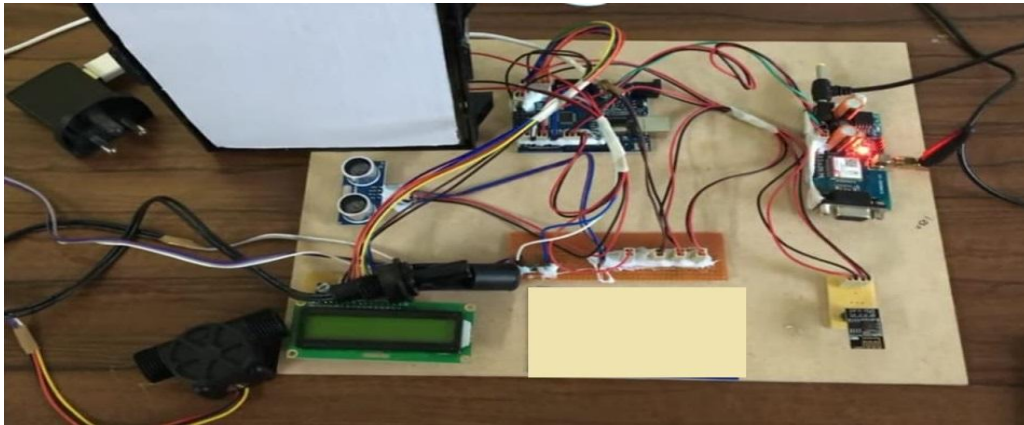


Figure 2: Flow Chart

At the beginning of the process, once we activate the circuit the ESP 8266 WIFI module will attempt to establish a wifi connection and once the connection is successful and therefore the circuit is connected to the web and cloud services the info from all the relevant sensors are going to be logged, This data will then be compared with the reference safe and important values saved on the cloud, if the values from the sensors are beyond the critical value then the info are going to be updated on the cloud, the user are going to be alerted on the android app via push notification and if required the Dam gates would be opened via the servo motor and therefore the water are going to be let loose to the extent that the dam is under the critical limit. Now, if the values are well under the security range then the info will only be updated on the cloud and therefore the information are going to be displayed on the LCD also because the graphical interface of the Android application on the user's smartphone.

#### IV. EXPERIMENT AND RESULT



**Figure 3:** Output Result

The existing problems faced by the authorities for disaster control associated with floods are often overcome by using the proposed model. The project is often successful in engaging the users and keep them informed with all the required information needed during a time of crisis. The water managing authorities, also because the users, are going to be ready to monitor the information in real-time. Arduino continuously monitors the data from sensors. If the sensor data crosses the threshold value the system sends the alert intimation to the respective person through Wi-Fi and sends the SMS through GSM and also opens the dam gates automatically. And as well as monitor the sensor data on the LCD display. This system can also predict the possibility of flooding before flooding takes place.

#### V. CONCLUSION AND FUTURESCOPE

A flood may be a natural disaster that can't be predicted easily, but we worked on this cause and developed a system that detects floods and provides early intimation to nearby people. tons of effort is required to be put into developing systems that help to attenuate the damage through early disaster predictions. The system provides a real-world application of the web of things and offers services like accurate level monitoring. Sensors are important elements within the flood detection system. Complete flood detection and avoidance system are proposed during this system. That, the notification sent are often read globally through IoT. An ultrasonic sensor is connected to the microcontroller that measures the worth of water within the dams or rivers and sends that information to the microcontroller. The GPRS sends that notification through the web on the webpage using the IoT network. within the future, we will integrate several sensors like pressure sensors and cameras into the system for accurate detection.



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