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# IOT Based Automatic Flood Detection and Monitoring System

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**ABSTRACT**: Nodes "IoT Early Flood Detection & Avoidance System" is an intelligent system which keeps close watch over various natural factors to predict a flood, so we can embrace ourselves for caution, to minimize the damage caused by the flood. Natural disasters sort of a flood is often 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 flood. The system has a Wi-Fi connectivity; thus, it's collected data can be accessed from anywhere quite easily using IoT. flooding is a potential hazard for every family. flooding thanks to natural disasters like hurricanes and earthquakes leads to massive loss of life and property. Warning communun ities of the incoming flood provides an efficient solution to the present by giving people sufficient time to evacuate and protect their property. However, the range of early warning system solutions introduces a haul of conflicting requirements including cost and reliability, and creates several interesting problems from factors as diverse as technological, social, and political. The complexity of these systems and need for autonomy within the context of a developing country while remaining maintainable and accessible by non-technical personnel provides a challenge rarely solved within developed countries, much less the developing. So, I decided to do this project as it is important to save lives of people and help them.

**KEYWORDS:** Flood Detection, radar system, Arduino, sensors, radar system

## I. INTRODUCTION

Flood is basically an overflow of a large amount of water beyond its normal limits, especially over what is normally dry land. Flood detection features a history in satellite remote sensing that dates back to the 1970s. Floods become a very serious problem for the people residing near the river and dam areas. There is always a threat to this people as they never know when and how there will be a flood. There are still many countries which don't have any financial backup and proper solutions to tackle such crucial situations. South Asian countries such as India and neighbouring countries are more prone to such situations sue to financial backlogs and other various reasons. India is the most flood-prone country in the world, according to a report by two researchers published on Water Resources Institute (WRI), a global research organization. India with 4.84 million exposed the flood, is followed by its south Asian neighbour, Bangladesh, at 3.48 million people [15]. In this paper the author proposes various methods which can help taking precaution in such situations.

## II. OBJECTIVE/METHODOLOGY

To detect a flood the system observes various natural factors, which includes humidity, temperature, water level and flow level. To collect data of mentioned natural factors the system consists of different sensors which collects data for individual parameters. For detecting changes in humidity and temperature the system has a DHT11 Digital Temperature Humidity Sensor. It is a advanced sensor module with consists of resistive humidity and temperature detection components. The water level is always under observation by a float sensor, which work by opening and closing circuits (dry contacts) as water levels rise and fall. It normally rests in the closed position, meaning the circuit is incomplete and no electricity is passing through the wires yet. Once the water level drops below a predetermined point, the circuit completes itself and sends electricity through the completed circuit to trigger an alarm. The flow sensor on the system keeps eye on the flow of water.

## III. PROPOSED ALGORITHM

We The proposed worked is basically a small algorithm or you can say it as it uses the following steps to work it accordingly following diagram explains the further steps:

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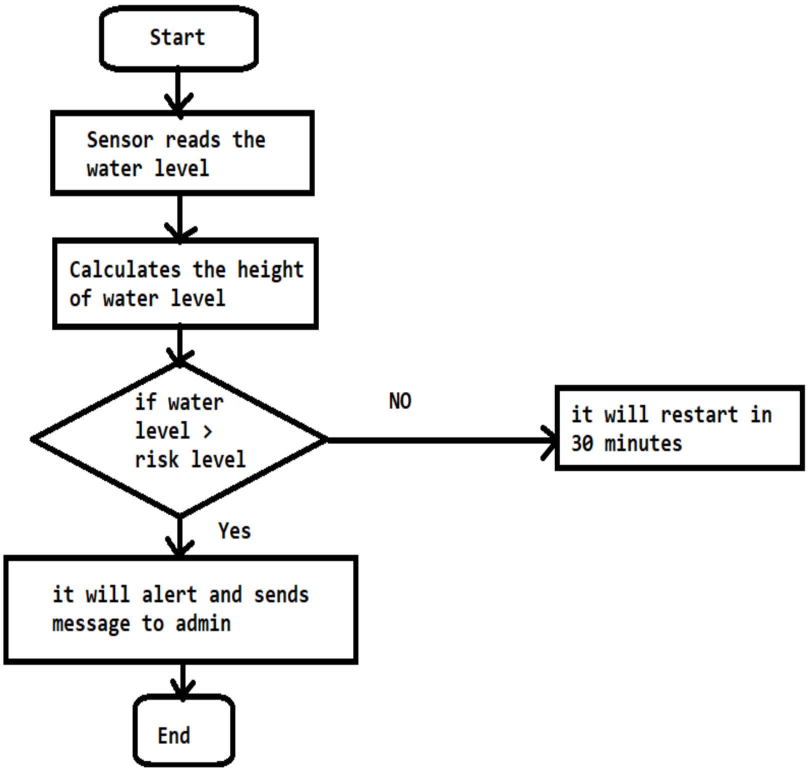


Fig 1: Flow chart of the proposed diagram

The water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The system also consists of a HC-SR04 Ultrasonic Range Finder Distance Sensor. The Ultrasonic sensor works on the principle of SONAR and is designed to measure the distance using ultrasonic wave to determine the distance of an object from the sensor. All the sensors are connected to Arduino UNO, which processes and saves data. The system has WIFI feature, which is useful to access the system and its data over IoT.

According to the above flow chart we propose first the water sensor will sense the level of water based on the sensors placed on various water levels like first will be 30meter next second will be on 60meter further 90meter and 120meter and the last 150meter height respectively (taking an average height of dam we propose this level of sensors this can be manipulated according to the dam heights). Further It will calculate the level of water if the level of water is greater than the fixed risk level then it will alert the people nearby residence and also will send message to the admin office about raised water level. Or else if the water level is normal then it will just go back to sleep and will restart again in 30 minutes.
For this work we use hardware specifications like

1. Arduino UNO
2. WIFI module
3. Ultrasonic sensor
4. Water flow sensor
5. Water level sensor
6. LCD Display
7. Resistors
8. Capacitors
9. Transistors
10. Cables and connectors
11. Diodes
12. PCB and Breadboards
13. LED

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14. Transformer/Adapter
15. Push Buttons
16. Switch
17. IC/IC sockets

Software specifications used:

1. Arduino Compiler
2. MC Programming Language: C
3. IOT Gecko

Fig 2: LCD display

Fig 3: Ultrasonic Sensor

Fig 4: Water level Sensor

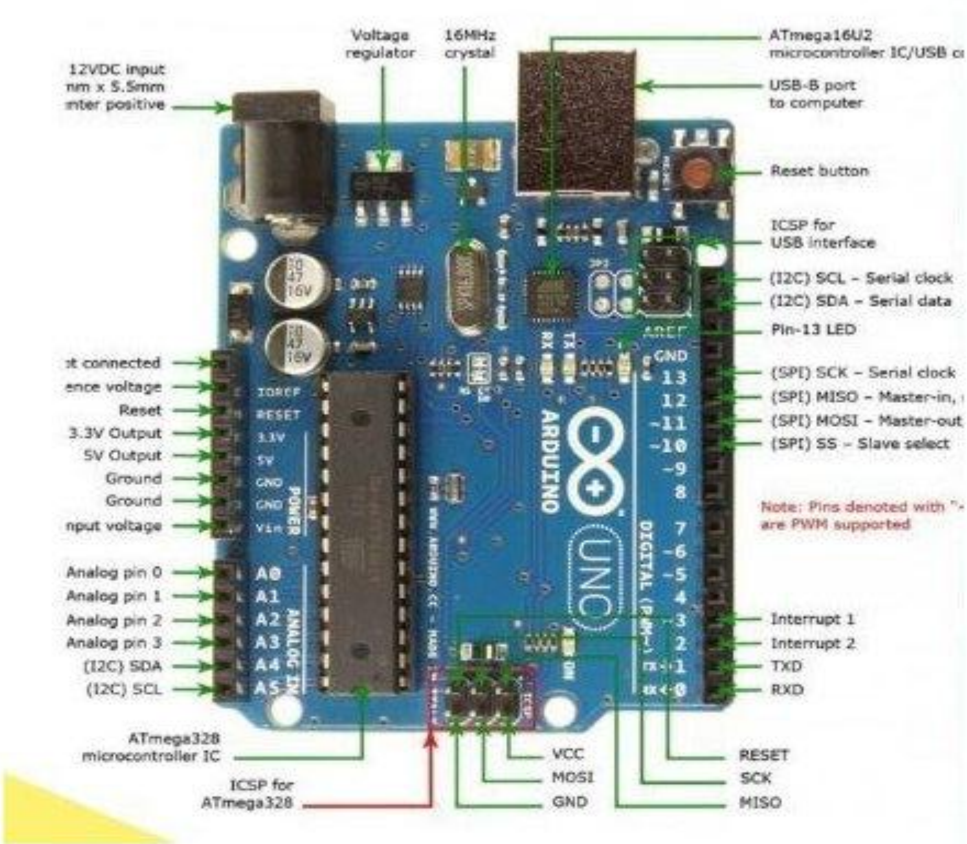


Fig 5: Arduino UNO board

## IV. BLOCK DIAGRAM

The proposed work represented using a block diagram as explained we are using Arduino UNO Board which is connected to WIFI module and all the sensors are connected to another end of the UNO board further the connections are diverted towards display which is used for displaying the level of water present and regulator that continuously regulates the water flow and tells about the water availability.

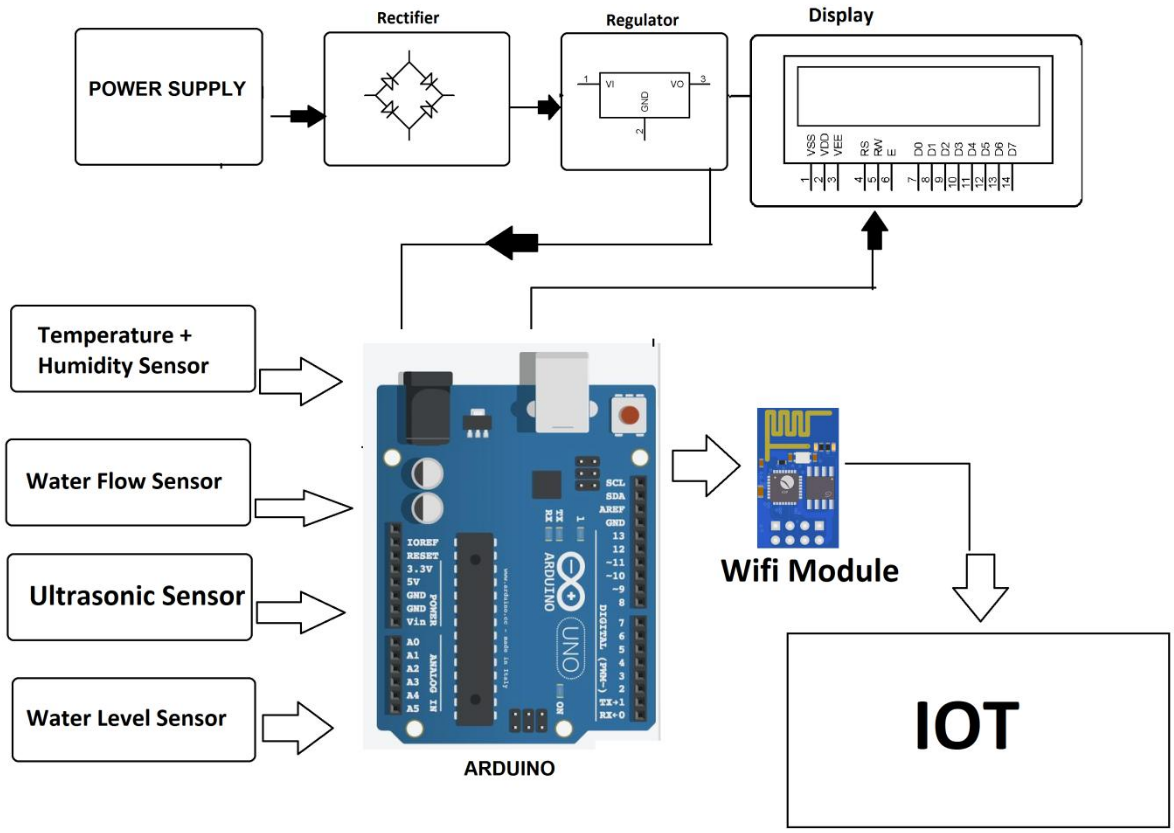


Fig 6: Block Diagram

## V. FUTURE WORK

In future we propose some advanced models that will contain various sensors strip about 150 meters of height. It will detect flood as well as how much water is increasing means it will give such an idea that when the dam overflows. We also propose inventing some kinds of mobile apps through which we can detect the flow of water anytime anywhere and also that app will notify the increase in water level due to rains as well as speed of water in the dam. This can prevent human loss

## VI. CONCLUSION

The best way to mitigate and control floods is to identify all factors that have a relationship to flooding; in this study, we refer to these as conditioning factors.The algorithm as proposed in the paper can run in real time on low-power microcontroller platforms, greatly reducing power usage and bandwidth requirements in a wireless sensor network context as demonstrated in this work. Future work will be focused on the detection of rain using the reflections of the secondary lobes of the ultrasonic rangefinder. We will also investigate the detection of water presence (not depth) on the ground using air and ground temperature measurements. This water presence information can be used for fault detection purposes, to make sure that the change in ground distance is actually caused by water.Our proposed flood model is effective, simple and intuitive. It reduces the variance and the noise of the training dataset, resulting in enhanced prediction accuracy.

## VII. ACKNOWLEDGEMENT

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