

ABSTRACT :

“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 like a flood can be devastating leading to property damage and loss of lives. To detect a flood the system observes various natural factors, which includes humidity, temperature, water level and flow level. To eliminate or lessen the impacts of the flood, the system uses various natural factors to detect flood. The system has a wifi connectivity, thus it's collected data can be accessed from anywhere quite easily using IoT.

TABLE OF CONTENT :

S.N	Topics	Page No.
1	Introduction	1
2	Literature Review	2
3	Methodology	3
4	Time Evaluation	4
5	Cost Estimation	4
6	Risk Analysis	5
7	Expected Output	6

INTRODUCTION :

In most of the parts of our country, many people become the victim of the natural disaster like a flood every year. Though the occurrence of the natural disasters is inevitable, the main reason for the maximum loss of lives and property is that people don't get enough time to avoid the consequences of the flood and that's because it happens at an unexpected time. So in our project **“IoT Early Flood Detection & Avoidance System”**, we have introduced the design that detects the occurrence of the flood due to various factors and helps people avoid it by providing them enough time to move themselves to the safer place. In the project, the various factors causing flood are studied and prediction of the flood

is made accordingly, thus, we embrace ourselves for caution and can minimize the property damage and loss of lives.

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 consist 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 an advanced sensor module which consists of resistive humidity and temperature detection components. The water level is always under observation by a float sensor, which works by opening and closing circuits (dry contacts) as water levels rise and fall. It normally rest 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. 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 rates of flow.

The system also consists of a HC-SR04 Ultrasonic Range Finder Distance Sensor and is used 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.

Literature review:

IoT Early Flood Detection & Avoidance System is a smart solution that will alert people before the occurrence of flood and provide them enough time to shift themselves and their property to the safe place. This design uses Arduino Uno, Wifi Module, Temperature Humidity Sensor, Ultrasonic Sensor, Water Flow Sensor, Water Level Sensor, LCD Display, Resistors, Capacitors, Transistors, Cables and Connectors, Diodes, PCB and Breadboards, LED, Transformer/Adapter, Push Buttons Switch IC, IC Sockets and Software Specifications Arduino Compiler. The system will give an alert whenever there occurs rise in the water level in sea, speed of the the water in river or when there is possibility of the heavy rain.

Cost Estimation:

Components	Estimated Cost (Rs)
Arduino Uno	1000
Wi-Fi Module	550
Ultrasonic Sensor	350
Water Level Sensor	600
Temperature Humidity Sensor	400
Water Flow Sensor	800
LCD Display (16x2)	250
PCB and Breadboards	500
Miscellaneous	1000
Total	5450

Time evaluation:

The design will be completed within a month and half.

Methodology :

- **Arduino Uno:** Arduino Uno is a microcontroller board based on 8-bit ATmega328P microcontroller. It also consists of other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (6 can be used as PWM), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header, and a reset button.

- **Wifi Module:** The ESP8266 Wifi Module is a self-contained SOC with integrated TCP/IP protocol stack which gives any microcontroller access to your wifi network. It is capable of either hosting in an application or offloading all wifi networking functions from another application processor.

- **water level sensor:** The level sensors are used to detect the level of substances that can flow. Such substances include liquids, slurries, granular material, and powder. such measurement can be used to determine the number of materials within a closed container or the flow of water in open channels.

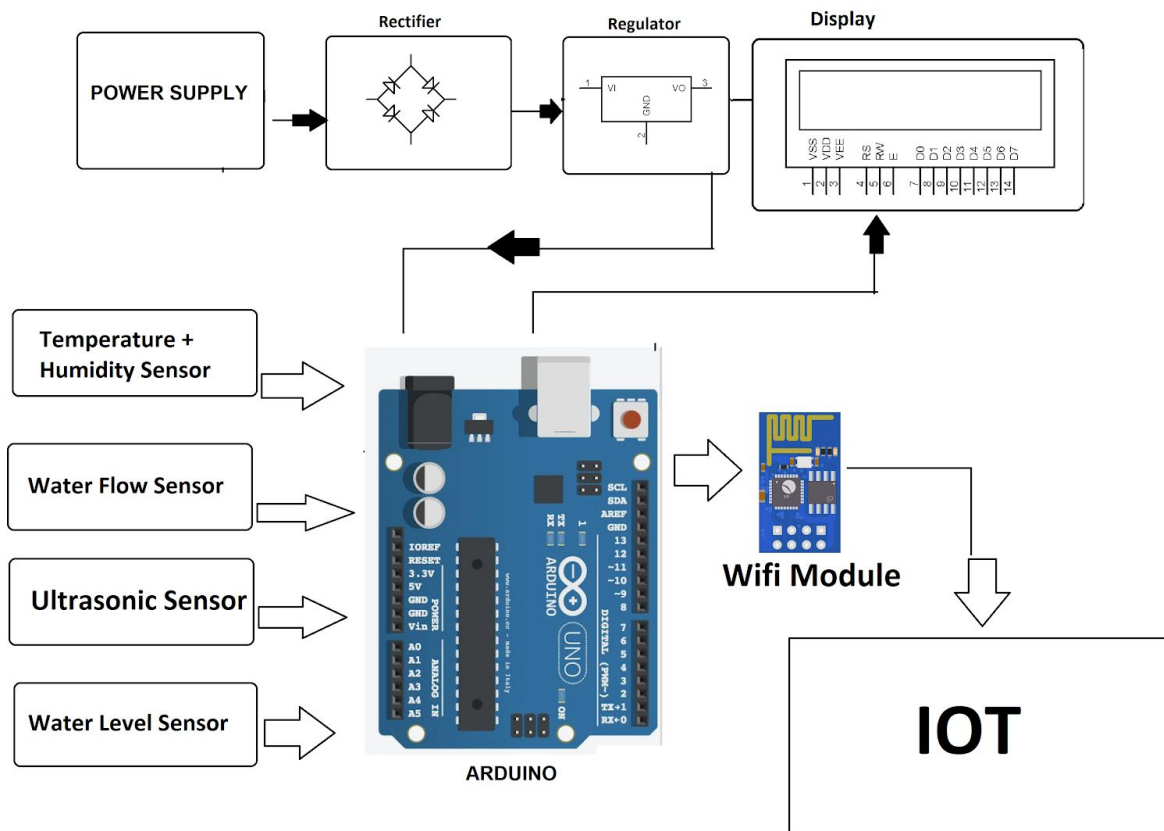
water flow sensor: The water flow sensor is a device that measures the speed of the water flow. It consists of a plastic valve body, a water rotor, and a hall-effect sensor. When the water flows through the rotor, rotor rolls and the speed of it changes with a different rate of flow. The hall-effect sensor outputs the corresponding pulse signal.

Ultrasonic sensor: As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves.

The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.

Temperature and humidity sensor: This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with

the temperature and humidity sensor capability. It is integrated with a high-performance 8-bit microcontroller. Its technology ensures high reliability and excellent long-term stability.



Risk analysis:

In our design, multiple electronic elements such as sensors and IC circuits will be used which are very sensitive and may produce the undesired output or in some cases not work at all if the required criteria are not full filled. Considering this, the probability of the design to fail i.e not produce the output that we have expected is possible. As there remains the possibility of the failure or certain error in the design which of course common in all kinda projects. Anyway, with the use of proper components, circuit connections and software requirements we hope our

design to meet our expectation. Thus, the probability of our design to work is much higher than the failure which we consider to be very little.

Expected output:

The design is expected to produce an alert message wherever there occurs any of the following.

- 1.The rise in the sea level beyond a certain limit.
- 2.Increase in the speed of water flow in rivers.
- 3.Change in weather in a way that gives warning of heavy rain.