

# IoT based flood prediction system

## Problem statement

The efficient drainage management and proper techniques can reduce the risk of floods. The development process has led many modernized areas. The lowland area has been redeemed by taking the land from the hills. There are also tributaries buried for the site. Such activities are the factors that cause floods.

If streams and valleys are used as streams, this area is covered with soil. When it rains, water flows from the hill to the lower area and then stagnates and floods will occur. Those affected by the floods do not blame the authorities in the event of a flood, residents can accept the fact that floods will occur especially during the monsoon season. But what is upset is that information and initial warning is not available. Early warning and information can reduce the implications of destruction, especially property or equipment, especially electrical equipment at a minimum. This destruction will increase if floods occur at night.

There are a number of challenges that are specific to the implementation of IoT flood early warning systems. Timeliness is one of the major parameters that contribute to the effectiveness of early warning systems. Information about the occurrence of a flood disaster needs to be presented to the affected areas as early as possible for both short term and long term flood predictions. Collecting data to a central processing platform may take a considerable amount of time especially for real time flood prediction systems. Flood early warning systems that run predictions on real time sensor data on the cloud require very good Internet connection at all times so that the quality of the forecasts is not compromised. Most of the deployments of IoT sensors that collect information that is used for prediction of flood events are located close to water bodies that may be far from the cities and maintaining a good Internet communication at all times may lead to costly deployments.

The reliability of the early warning systems is also another issue to consider. Most flooding events occur in unpleasant weather conditions such as heavy

rainfall or storms which can disrupt the Internet connectivity speeds. We need a mechanism that can allow us to process the sensor data within the proximity of where it is collected, both logically and physically.

## Software And Hardware Requirement

Arduino UNO

Water level sensor

Water flow sensor

Wifi module ESP8266

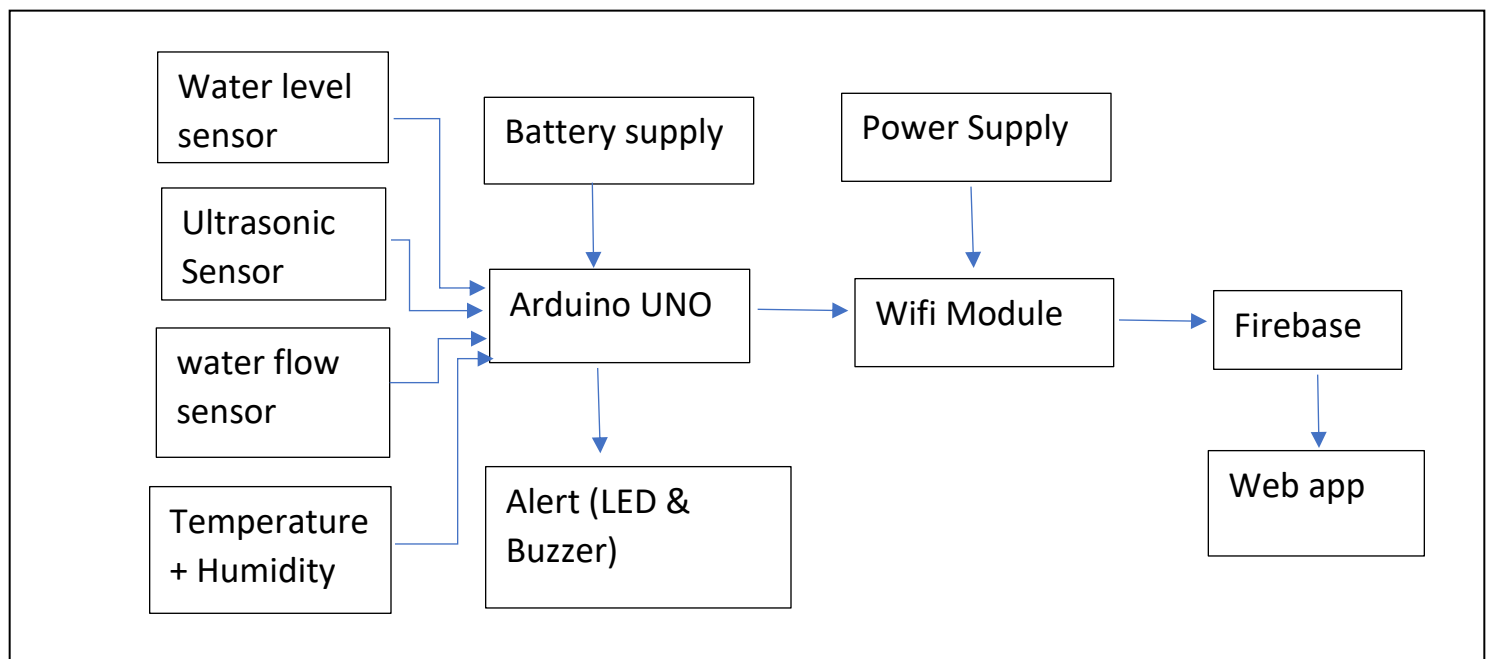
Ultrasonic sensor

Temperature and Humidity Sensor

Alarm

Light Emitting Diode

## Block Diagram



## Applications

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. 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.

## Advantages

This system gives a warning to the user in real time regarding the flood disaster and also gives other information. When there is danger, it gives notification to the user with an alarm on the mobile phone. It provides location to the user.

## Challenges

Successful implementation of the Internet of Thing (IoT) is precursory to a thriving smart city. However, the technical, physical, and environmental conditions can often pose challenges in their successful deployments. The deployment is further complicated if the time and location of implementation are amidst a natural disaster. In this work, we use flash flood detection as a natural hazard testbed and describe various IoT deployment, our progression, and first-hand experience from those implementations.

## Conclusion

Nowadays the Internet Of things (IoT) is broadly used in worldwide, this system will display the data of the water level measured on web server. If there is continuous heavy rain, user can simply monitor the water level through laptop or mobile phone wherever they are as long there is an internet connection. At the same time, this smart system can also control the alert signal and the gate to let the excessive water flows wirelessly.

## Reference

1. Ms. Arohi D. Sonawane, Ms. Pooja P. Vichare, Mr. Shubham, Argade, Sanika Chiplunkar, Rohini Kumbhar, Swati A. Khodke Bridge Monitoring and Alert Generation System Using IOT International Journal.
2. P. Bubeck, WJ Botzen and JC Aerts, "A review of risk perceptions and other factors that influence flood mitigation behavior ... MA Desima, P. Ramli, DF Ramdani and S. Rahman, "Alarm system to detect the location of IOT-based public vehicle accidents,"
3. M. Mathematic and R. Grace, "Flood alert management system using Iota and microcontroller," International journal of innovative research in computer and communication engineering, vol. 5, no. 4, April 2017.
4. H. Hamidon, "Flood level indicator and risk warning system for remote location monitoring flood observatory system", WSEAS Trans. Syst. Control, vol. 5, no. 3, pp. 153-163, 2010