

# Real Time Early Flood detection using IoT and Alert System with Android Application.

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**Abstract:** This Flooding is one of the major disasters occurring in various parts of the world. The system for real-time monitoring of water conditions i.e. water level, is developed to monitor flood .The objectives of the developed system is to serve as information channel of flooding to the normal users as a android based information source for the public

**Index Terms – SST Microcontroller, Android application.**

## I. INTRODUCTION

A flood is an occurrence where water submerges land that is normally dry. Floods are a natural process that can be due to a number of factors and is affected by human activities. Floods happen at irregular intervals and no two floods are the same. Sudden, heavy and intense precipitation can cause floods to quickly rise in minutes or hours followed by flashfloods, and are typically associated with small catchment areas. In large catchment areas, rainfall can build up over hours, days or weeks. Many factors contribute to floods however the main cause of floods is rainfall. When rain pours over a catchment, some rainfall are „ captured“ by soil, vegetation and water storages such as farms and dams. The rest flows downhill into waterways. The amount and time the rainwater reach the waterways are dependent on the characteristics of the catchment, particularly its vegetation, shape, size, the way the land is utilized and the preceding weather conditions. Early flood warning systems according to Grust (2008) are essential for the protection of the population against flood hazards as it allows people to get prepared. However, early flood warning systems will not prevent flooding. According to Perez et.al (2007), it is a community based flood warning system that can be used for disaster mitigation and disaster preparedness of the community because it provides an early flood monitoring and warning services. Based on studies conducted, flood warnings should be accurate, informative, timely, targeted to appropriate audiences, trustworthy and reliable to enhance flood forecasting and warnings.

Climate change has been a serious problem which attracts the interest of many countries in the recent years. One of the clear effect of climate change is flood which has happened more frequently in many regions and caused the devastating impacts on human lives and livelihoods. Many flood warning stations have been developed and installed in prosperous countries but the manufacturing cost is usually too high to be practical in developing countries. Therefore, building an efficient flood warning system while maintaining reasonable production cost has been a meaningful mission for many researchers and manufactures. Various flood detection methods have been introduced in the past decades. The authors in [1]–[3] analyzed the images captured by satellite in different ways to detect the areas where flood occurred. These techniques are only useful in flood localization but they can not predict whether flood occurs or not in the next hours. M. Oprea proposed a prototype intelligent system for flood warning and alert in real time [4].The purpose of the project is to develop a real-time flood monitoring and early warning system .This system provides better coordination of monitoring, communication and transmission technologies which are adaptable to background condition. This system informs the people about the upcoming flood through notification and alert messages and also it gives information about all safe places near the user location where user can migrate with the help of map. This system would be beneficial to the community for decision making and evacuation planning. Therefore ,this system can be reached to every common peoples hand so that it can be used efficiently to detect the flood earlier and take precautions beforehand.

## II. PRESENT SYSTEM

Available systems are able to detect rise in water level and communicate it to the monitoring station or to responsible authorities.

But there are some inherent problems with the system:

**1.Time:**Duration taken from the first detection of water rise till the information is communicated to the responsible authorities is very important and should be done in the shortest time possible. Most of the system available today are communicating the monitoring center only.

**2.Respond to alert:** The rescue teams will be informed by the authorities once the alert is received by them. In most cases it is impossible or time consuming to reach all the rescue teams at same instant.

**3.Cost:** Maintenance costs are high in long run.

**4. Plan:** The information on the flooded location are informed during critical level and makes the authorities to struggle in planning and executing the rescue activities.

### III. PROPOSED SYSTEM WITH OBJECTIVES

Flood can occur in different ways, as initial step the system will be implemented for floods occurring through dam overflow. It can be enhanced to detect flooding by different means. This System which will be capable of sending real time water level information from a remote dam location to the monitoring station. Apart from alerting the monitoring station the system can also be used to trigger flood warning to the concerned authorities, or even the general public.

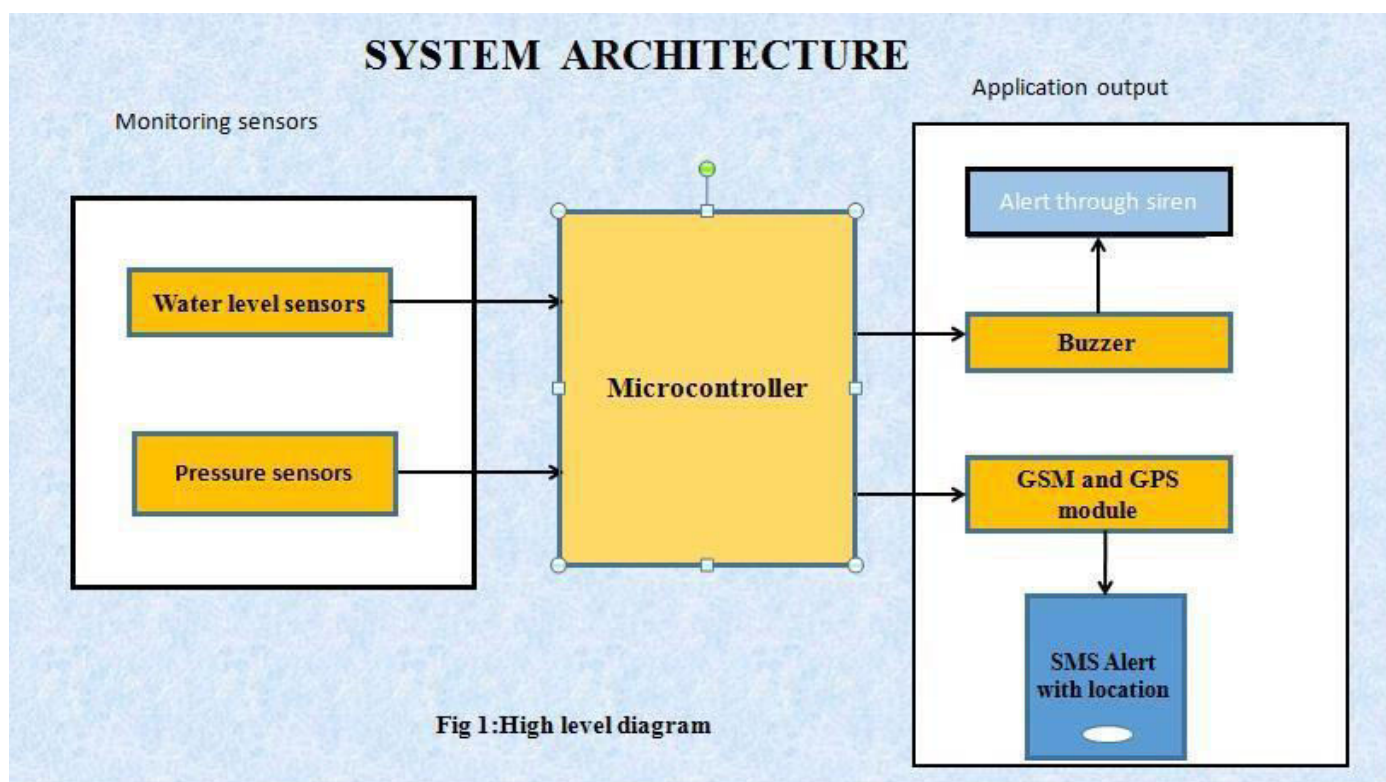
The main objective of the proposed systems is :-To provide real-time crucial flood related information and broadcasting functionalities to authorities, as well as local communities

### IV. IMPLEMENTATION

**1. Monitoring sensors:** In this module we use ,water level sensors , to monitor water level. pressure sensor, to measure the pressure the water flow and velocity.. SIM808 GSM/GPRS/GPS development board along with SST microcontroller that enables transmission of sensor data for real time visualization and storing data in database. When the water information is acquired through the sensors, it will be transmitted to GDU (gprs data unit) for data processing and data transmission via the mobile GPRS communication.

**2. Data transmission and processing:** The goal of flood monitoring system is to provide reliable network management to allow smooth transmission of water related data the system has mechanism that allow remote nodes to connect to the control center and has procedures for managing the entire wireless sensors network. The two main functionalities in this module is to first set the TCP/IP port for the server and manage concurrent TCP/IP connections between GDU's and server and retrieve all the data obtained from GDU's and put into the system database.

**3. Database and application server:** The implementation and functionalities of database and application server is to alert its user's. This implementation is done using embedded C It is implemented by dividing into two modules: Real time data reporting from sensors, forecasting, statistical and historical information module, and warning module.



It describes the flow of the system. monitoring sensors sends data. Then the data will pass through the monitoring sensor sand server and reaches the receiver end. After reaching victim's mobile as notification, the message will give the user the idea that flood may occur through a customized sensors data help of Internet of Things.

## DATA FLOW DIAGRAM

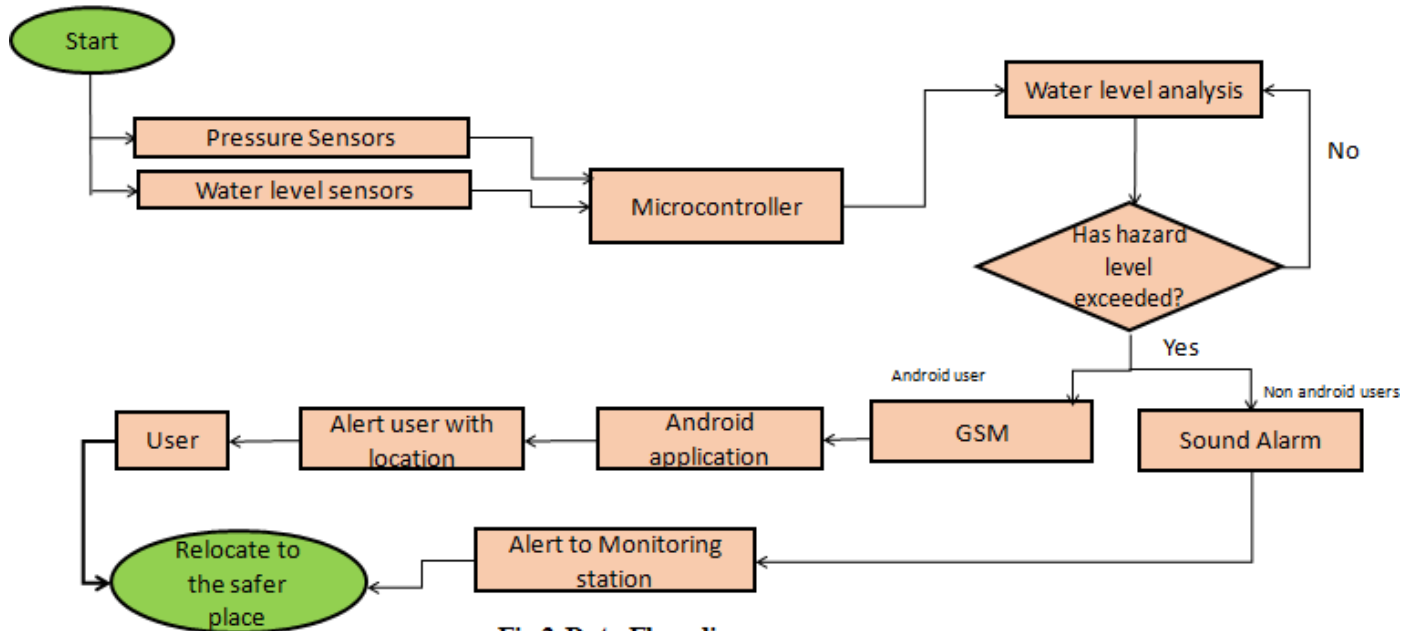
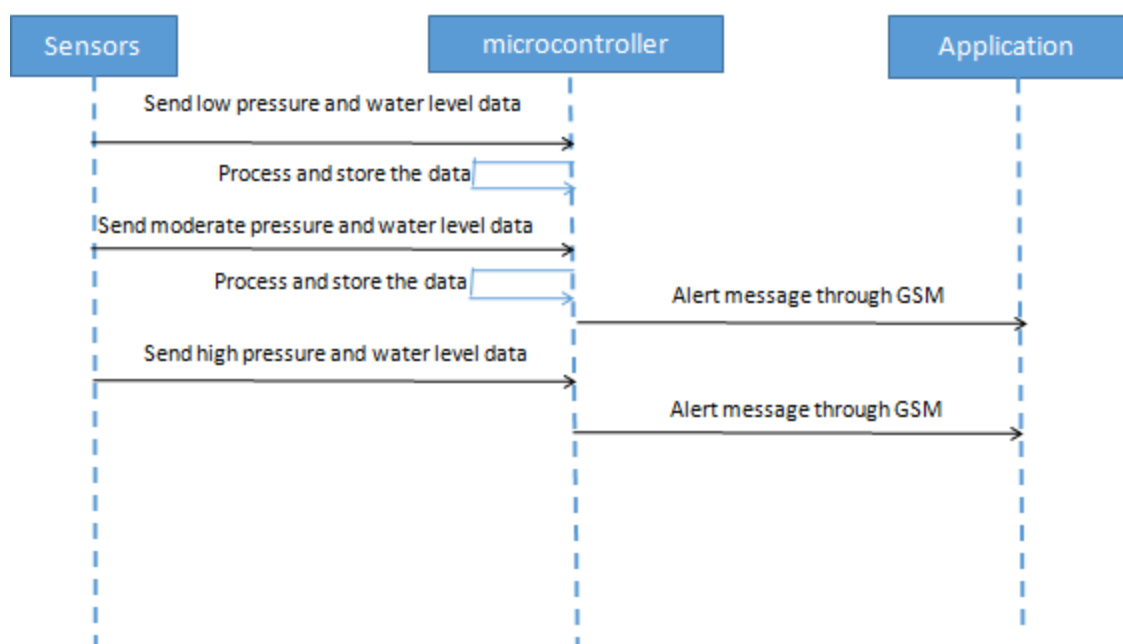


Fig 2:Data Flow diagram

The flowchart for After reaching victim's mobile as notification, the message will give the user the idea that flood may occur through a customized sensors data help of Internet of Things. It describes the flow of the system. monitoring sensors sends data.

## SEQUENCE DIAGRAM



This shows the functionalities and how the modules within the system interacts. The sensors here is 1<sup>st</sup> module. The sensors sends the data to the monitoring microcontroller .Then microcontroller send the data to the application .Application in turn sends message to the users

## V. RESULTS AND DISCUSSION

The main outcome of the project is to develop a real-time flood monitoring and warning system for a selected flood prone area .The system employs the use of advance sensing technology in performing real-time monitoring of water information .For realizing sustainable social development, the forecasting and early warning systems will continue to play a vital role in providing accurate and reliable warning information to enable them to better prepared for unnecessary damages and losses.

The project contributes towards economy and the citizens. The project serves as an efficient flood response operation system during floods to manage all the activities .It is beneficial to the community for decision making and evacuation planning

## VI. ACKNOWLEDGMENT

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