FLOOD MONITORING AND EARLY WARNING

Submitted by

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phase- 4 project submission

I. INTRODUCTION

In recent times, the flood has becom e one of India's major natural disasters (1). It is foun d that India is one of the top ten food-threatening countries in the world. Flood, a natural phenomenon that generally r esults from heavy rains caused by monsoon, hurricanes, clo ud bursting, melting of glaciers, which exceeds the capabili ties of water bodies.

But, one of the main aspects of the sources of flashy floods is heavy rain

(2). These factors increase the risk of floods
whose management and prevention are essential for the
protection of natural environment, li fe, and possessions.
Many important steps need to be ta ken in order to mitigate
economic and human losses. Amon gst the most critical and
early steps is to alert people to the c atastrophe before it
happens. There are still some areas with early flood warning
systems, but most of them are not a s effective as they can
typically only submit the data to som e organizations with
small distances

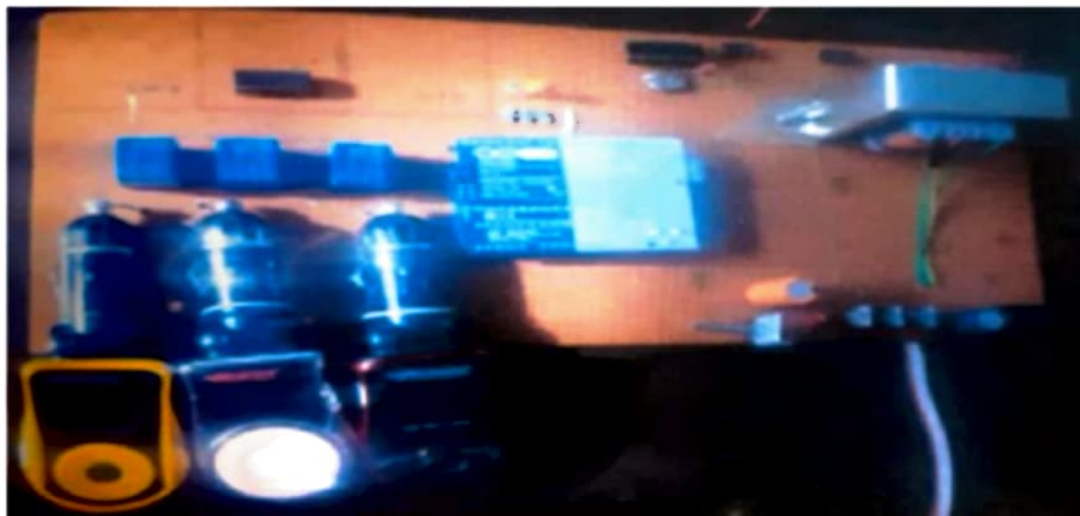
SUMMARY OF FLOOD AFFECTED AREAS IN INDIA AND THE NUMBER OF PEOPLE KILLED

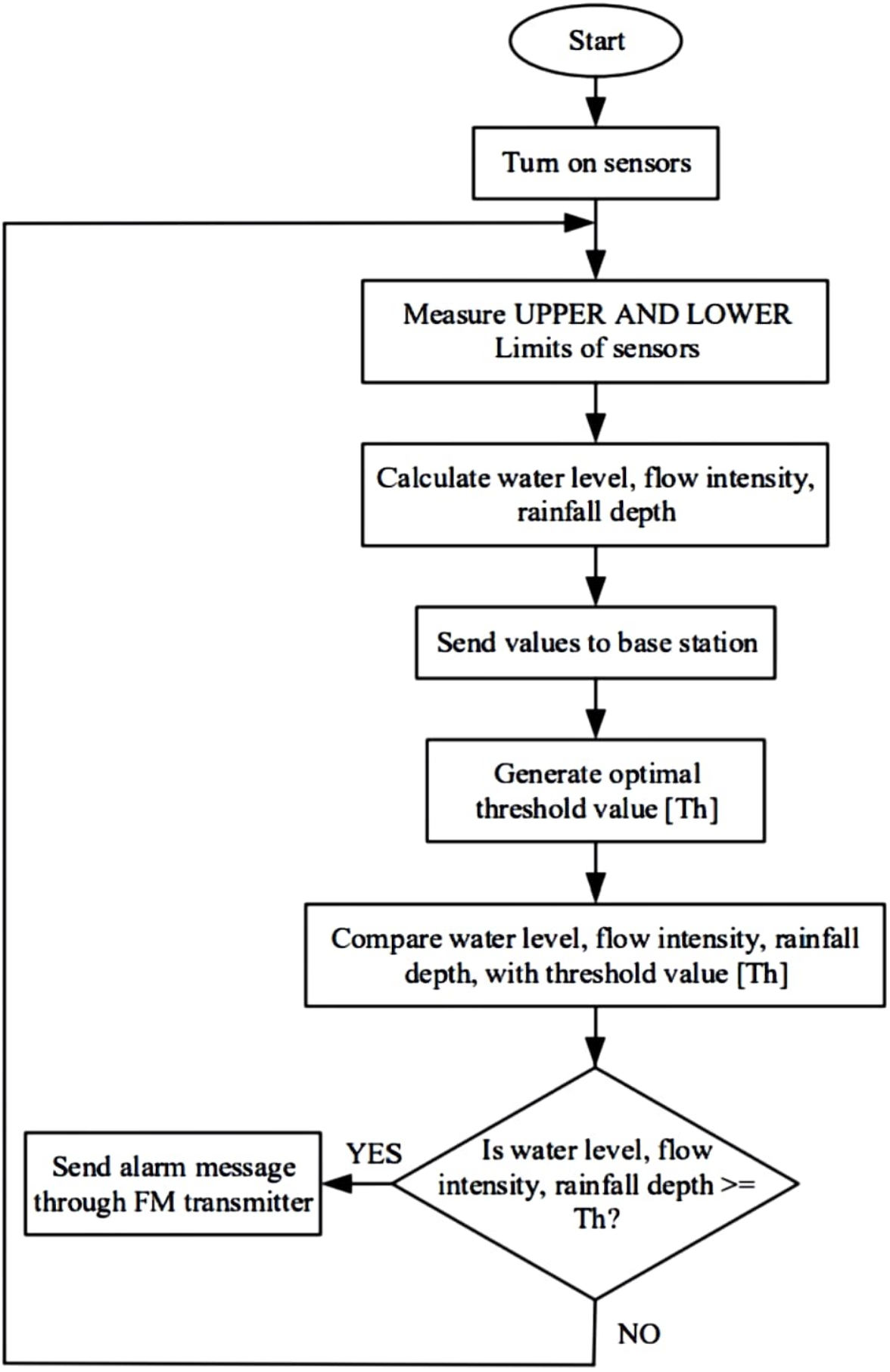
Year	Floods in different parts of India	No. of people killed
2004	Bihar	885
2013	Uttrakhand in upper Ganga Valley	1000
2014	Jammu and Kashmir in Jhelum river	227
2018	Kerala	445
2019	Kerala	101

A microcontroller can receive data from the power supplies and water level sensors. The data will be processed by the microcontroller to calculate the flow, current water level, and other power levels. A centralized storage system is used where the acquired data is stored so that the data can easily be extracted as per design search criteria is present.

A. Hardware Design

The design of the proposed model has two parts: the sensor module and the base station module. The hardware part of the proposed model consists of a sensor module deployed at the monitoring site. Such a sensor module can be easily used at multiple sites without any added cost except the cost of the sensor modules themselves. This model monitors the water level using a level sensor; a vane-meter is used for measuring water flow and udometer to capture and measure the rainfall depth. The data collected will be transmitted using a Radio Frequency (RF) transmitter at 435 MHz. These sensors will interact with the base station via an RF link, at base station processing is done. If the data from the sensor crosses the reference level, the relay system present at the base station switches on the FM transmitters, and an alarming signal will override the frequency of all the available radio stations. To drive these modules, it requires a power supply and a processing system (Microcontroller-Arduino). The power supply used for this design includes: transformer 12-0-12, battery, diode, 10k resistor, LED, 1000μF electrolytic capacitor, three 0.4 μF capacitors, regulators (7812, 7809, and 7805), heat sink. Fig. 2 gives an overview of the base station module and Fig. 3 gives an overview of the sensor module.




Start
Turn on sensors
Measure UPPER AND LOWER Limits of sensors
Calculate water level, flow intensity, rainfall depth
Send values to base station
Generate optimal threshold value [Th]
Compare water level, flow intensity, rainfall depth, with threshold value [Th]
Is water level, flow intensity, rainfall depth >= Th?
YES
Send alarm message through FM transmitter
NO

IV. Future Scope

In this article, an infrastructure project such as the proposed model always has a lot of opportunities for future research. If a sensor module could be price-effective, a significant number of sensor modules could be installed for the same expenditure, and a larger number of surveillance systems would usually mean better perception. Furthermore, affordable sensor modules make them less vulnerable to stealing and easily replaced if impaired. Future work implies improving the existing optimization of the sensors for using their battery life more efficiently. The solar power can also be considered as a source of power supply for sensors. Using different functions to approximate the trend of increasing water level, velocity, and rainfall measurement for better approximations. There is a scope to develop a robust fit procedure sufficient to provide practically accurate results even if data may be entered wrong due to data loss in the instantaneous transmission or sensor malfunction.

V. Conclusion

A flood-proof sensor-based system capable of over-riding the frequency of all available radio stations was proposed. The whole system is capable of measuring the information on the water level, velocity, and depth of rainfall at multiple locations. The data is appropriately encoded and transmitted through an RF link. The data will be received and decoded at the base station and send through FM transmitters to the general public for awareness.

THANK YOU