

Smart Flood Monitoring and Alert System using IoT

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Abstract— The primary goal of this venture is to lay out a flood detection and avoidance device to be able to stumble on and ship the records about the flood routinely to the close-by Government Unit and to defend the harm as a result of the flood and to citizens with the use of an Arduino. While the method removes the effects of flood, the device makes use of numerous elements to stumble on the flood. We place a sensor to degree a water stage in rivers, lakes, and streams primarily based totally on IoT. The motive of flood warning is to stumble on and forecast threatening flood activities 5so that the public may be alerted in advance. Flood warnings are relatively adaptive in which safety thru huge scale, difficult defenses, isn't desirable. Sensors, GSM, and wireless modules are used to provide records about the flood. In this proposed layout, the alerting device will screen close to with the aid of using dams concerning the reputation of the floods with sensors and the records may be dispatched the use of GSM module.

I. INTRODUCTION

Flood is one of the natural disasters that cannot be avoided. It happens too fast and affects so many lives and properties. Before this, most of the existing systems developed only focused on certain areas. Consequently, majority of the public cannot monitor and have no idea about when the flood is going to happen since they do not have any information and data about the weather condition. Having Smart IoT Flood Monitoring System will solve all the drawbacks of the existing system. The proposed system is suitable for cities and village areas. Furthermore, the public nowadays has internet access so they can monitor what is happening and predict if there is any upcoming flood at the web server. The proposed system is low cost in design and easy to maintenance. This project will update the water level at the web server and the system will issue an alert signal to citizens for evacuation so that fast necessary actions can be taken.

In a peninsular country like India, with extreme weather and climatic conditions, the occurrence of heavy rainfall is normal. Many a time, arrival of very heavy rains results in heavy discharge of water or also due to the sudden melting of the glaciers due to global warming.

The left were evacuated by the state and central disaster relief authorities. The severe water logging brought daily work to halt. In order to save the lives of the people, their habitat and the economy, the major step is to monitor the data on real time basis and when the situation is reaching a certain threshold, then to provide an immediate alert to each individual living in the area which is currently at risk.

Even though it is difficult to avoid any occurring natural calamity, mandatory steps need to be taken by the government agencies to shift the population to a safer region and by this the losses will get reduced to less than 30%. In this modern era, there are multiple systems working towards calamity forecasting, mitigation and are deployed at different locations of all nations and alert notifications are passed to government agencies; however, all this ends up only in slowing down the process.

The reason behind this is that flood is very spontaneous disaster and government agencies have to follow multiple steps before reaching to a decision. In this case, awareness among the people is very necessary along with the government official so that a comprehensive and better result can be achieved. In our system, it is combined with calamity prediction through weather forecasting. The flow of water is sensed by water flow sensor which will ultimately help in evaluating the intensity of flood and water level by the help of ultrasonic sensor which will be done by propagating sound waves.

Flooding is a major turn-up of disasters that occur in different parts of the world. As these cause a huge amount of loss in the human environment, to deduce and make the system for detecting these pre-disaster conditions is very crucial for issuing timely alerts.

“SMART FLOOD MONITORING AND ALERT SYSTEM” is an intelligent system which keeps close watch over various natural factors to predict a flood, so that we can equip ourselves for caution, safe movements 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 eliminate or lessen the impacts of the flood, the system uses various natural factors to detect flood. The system has Wi-Fi connectivity, thus its collected data can be accessed from anywhere quite easily using IoT.

II. PROPOSED WORK

The aim of this project is to develop a certain system which is efficient enough to predict the weather conditions and level of the water in water reservoirs so that preventive measures can be put in place priorly. This project is based on

the open source electronic platform i.e. Arduino. The Arduino Uno R3 is to be set up multiple different devices such as water level sensor for the water level detection by capturing time between transmitting and receiving values, temperature and humidity sensor DHT11 for analyzing the moisture content.

Severe water logging brings daily work to a halt. In order to save the lives of the people, their habitat and the economy, major step is to monitor the data on real time basis and if situation is reaching a certain threshold, then alert to provide to each individual living in the area which is currently at risk. Even if difficult to avoid the natural calamity but mandatory steps are to be taken by the government agencies to shift population to a safe region and the losses will get reduced to less than 30%. The reason behind this is that flood is a very spontaneous disaster and government agencies have to follow multiple steps before reaching to decision. In this case, awareness among the people is very necessary along with the government officials so that a comprehensive and better result will be achieved.

III. SYSTEM DESIGN

A. Block Diagram

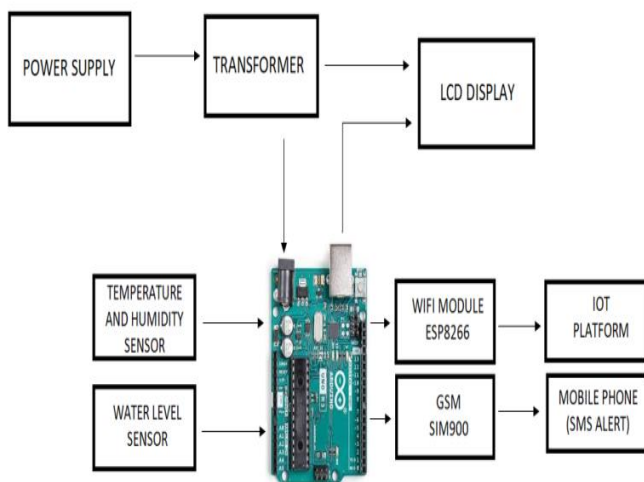


Fig. 3.1 Block Diagram

The block diagram is as shown in Fig. 3.1 which includes power supply, transformer, LCD display, Arduino UNO board, Wi-Fi module, GSM module, temperature & humidity sensor and water level sensor.

B. Applications

- The main objective of this project is to achieve a close watch over various natural factors causing the calamity of floods, and to minimize the damage caused by them.

C. Flowchart

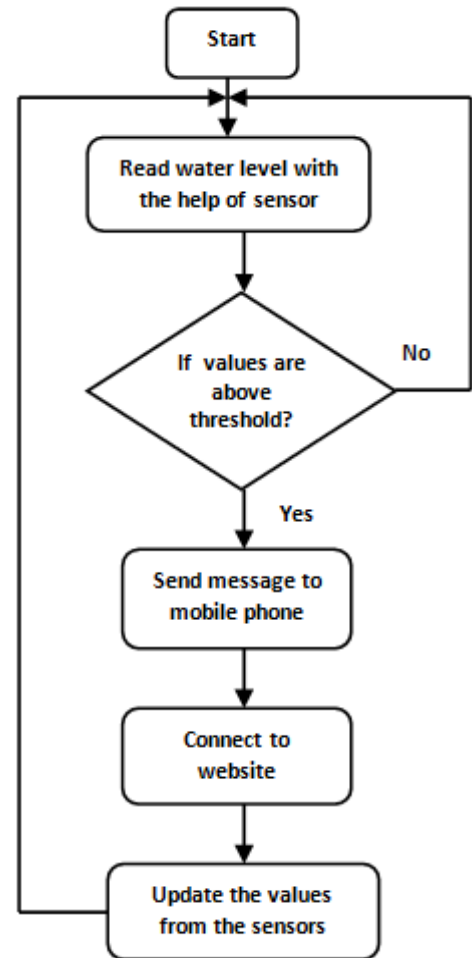


Fig. 3.2 Flowchart

The work flow of the entire process is shown in Fig. 3.2.

D. Advantages

- It is able to send an alert message to the user with the time of the water rise, also with the speed with which water rises, for prediction; thus to caution how quick the flood is approaching to happen.
- It also has been tested in a controlled environment to evaluate the performance.

IV. DEPLOYMENT

The implementation of the system which includes all wiring that is to be installed on the circuit extender along with Arduino and other sensors. The coding of the Arduino will be in Arduino language which comprises of C/C++

functions that are needed to be called in the code. The website is developed by using HTML, cross checking every one of the associations and then furnishes capacity to the Arduino. It will work in the manner as explained above and early warning will be sent to user.

V. EXPERIMENTAL EVALUATION

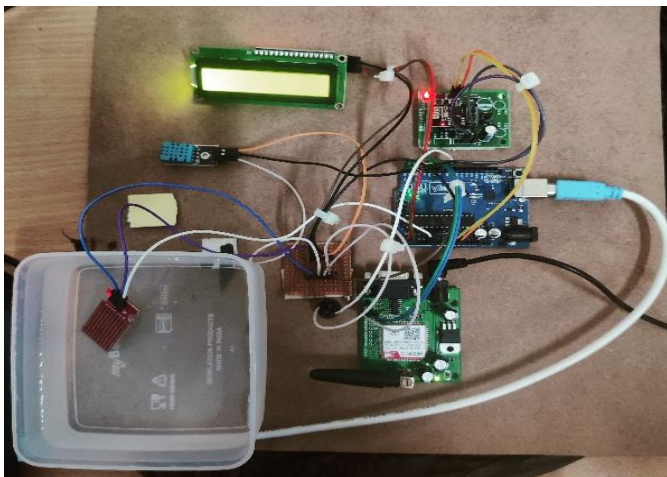


Fig. 5.1 System Module

The basic hardware components that are required are shown in Fig. 5.1. The terminal output obtained regarding the temperature and humidity is shown in Fig. 5.2.

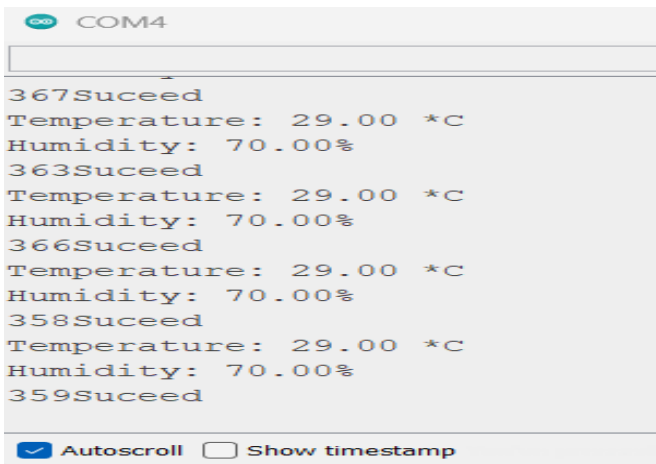


Fig. 5.2 Terminal output

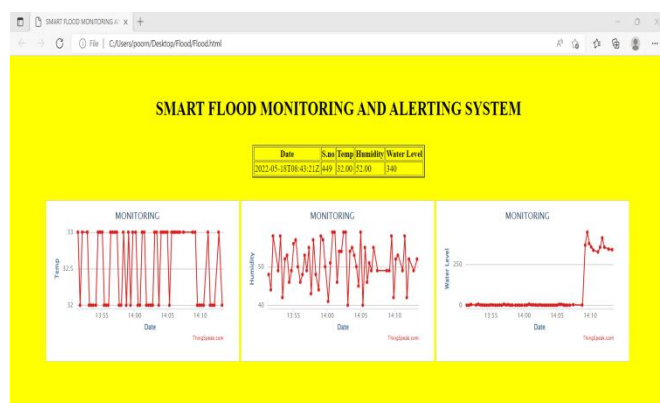


Fig. 5.3 Website interface

Fig. 5.3 shows the temperature, humidity and moisture variations that are recorded and the alert messages are sent to mobile phones as shown in Fig. 5.4.

Flood Alert Temperature: 33.00
 Humidity: 49.00
 Water Level: HIGH

Flood Alert Temperature: 33.00
 Humidity: 58.00
 Water Level: HIGH

Flood Alert Temperature: 32.00
 Humidity: 52.00
 Water Level: HIGH

Wed 2:13 pm

Fig. 5.4 Alert through messages

VI. CONCLUSION

The project contributes towards economy and citizens. It envisions safe, prepared and less casualty community before, during the project contributes towards safeguarding the citizens and his environment, and protecting the economy. It envisions a safe, prepared and less-casualty-prone community before, during and after calamities like cyclone/typhoon, floods and their ensuing devastation. The model promotes the use of real-time monitoring system through the developed web-based application and SMS notification system as a simpler and practical medium in disseminating calamity related information particularly in remote areas. By allowing the system in a two-way communication, it gives more flexibility in providing crucial, timely information to the community.

Finally, the developed “flood monitoring and early warning system” that aims to detect water level, functions perfectly according to the specification provided. It successfully passed several tests based on different parameters.

REFERENCES

- [1] Sebin Sabul and Nora Elizabeth, “Kerela Floods- A Model of Rescue and Rehabilitation using Information Technology and Social Media based Crowd Sourcing”, IEEE India Info. Vol. 13 No. 3 Jul-Sep 2018.
- [2] H.A. Rahman, “Global Climate Change and its effects on Natural Habitat and Environment in Malaysia,” Malaysian J. Environ. Manag., Vol. 10, No. 2, pp.17-32, 2009.
- [3] 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
- [4] Z.M.Taib, N.S.Jaharuddin and Z.D. Mansor, “A Review of Flood Disaster and Disaster in Malaysia” International Journal of Accounting and Business Management, Vol. 4, No.3,2016.
- [5] A.M. Leman, K.A. Rahman, M.N.M. Salleh, I.Baba, D.Feriyanto, L.S.C. Johnson, and S.N Hidayah M., “A Review of Flood Catastrophic Management in Malaysia, “ARPN Journal of Engineering and Applied Sciences, Vol.11, No. 14, Jul 2016.