

Iot Based Flood Detector and Early Precaution Method Instructor to Avoid Any Hazardous Event

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Abstract

Flood is one of the most dangerous natural disasters which cannot be ignored. It creates huge economic damage and also results in massive loss of life. Every year many people die due to lack of early warning. In this paper we represent a system which connects our arrangement with real time cloud which connects with our mobile phones to monitor water levels. Here, in this system we make prediction of flood on the basis of output of Arduino Uno and alert respective authorities about possible floods using IoT. The system also calculates the time it would take for flood to reach them and provides IVR, notifications to people so that they can be evacuate or manage time accordingly.

Keywords: Arduino Uno, Internet of Things, Android based application, Flood alert system.

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I. INTRODUCTION

Understanding the rate of flow of water, level of increase in water level, which is valuable information for predicting the flood. In this system we have used Arduino Uno with different sensors to predict the signal of flood and aware respective authorities along with nearby villages/areas to rapidly transmit information about possible floods using IoT. The water sensors are used to measure water level of three different locations. Also, three. Different rain sensors are used to measure rain level of those three areas. These sensors provide information over the IoT using Arduino Uno. On detection of information of flooding provided by system the system predicts that if there is any real case of flooding or not and if there is any case then our android application will send a notification to the users of that particular area and alerts the villages/areas that could be affected by it. The system also sends notification to people through our mobile application so that if they are in region which is at high risk then they can evacuate accordingly.

II. OBJECTIVE

- 1) To Monitor water level.
- 2) To reduce risk of flood in flood prone areas.
- 3) To avoid spreading false information.
- 4) To use mobile application as alerting system.

III. HARDWARE COMPONENTS

- i. Arduino Uno: Arduino Uno is an open-source microcontroller board. It consists 14 digital input and output pins and 6 analog inputs. It works on 16 MHz frequency.



Figure1: Arduino Uno

ii. Ultrasonic Sensor (HC-SR04): This is a electronic device which helps in measuring the distance from a target object by the ultrasonic waves which gets emitted from it and converts the reflected sound into an electrical signal.



Figure2: Ultrasonic Sensor

iii. Flow Rate Sensor: This sensor helps in measuring actual velocity of upcoming stream or flow of river. It helps also studying flow patterns of a stream or river.



Figure3: Flow Rate Sensor

iv. Temperature and Humidity Sensor (DHT-11): This is a sensor which measure the atmospheric air condition and measure the temperature and humidity of the atmosphere and provide the information regarding atmospheric situation.



Figure4: Temperature and Humidity Sensor

v. ESP8285 Wi-Fi Module: The **ESP8285** is a low-cost device which helps in connecting microcontroller with Wi-Fi network. It can be used to upload data receiving from system to online.

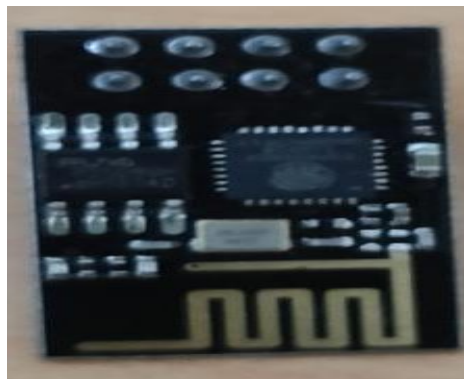


Figure5: ESP8285 Wi-Fi Module

- vi. LCD display
- vii. Power Source

IV. SOFTWARE COMPONENTS

- i. JAVA
- ii. Android Studio
- iii. AWS
- iv. IoT
- v. Cloud9
- vi. Arduino Development Studio

V. BLOCK DIAGRAM

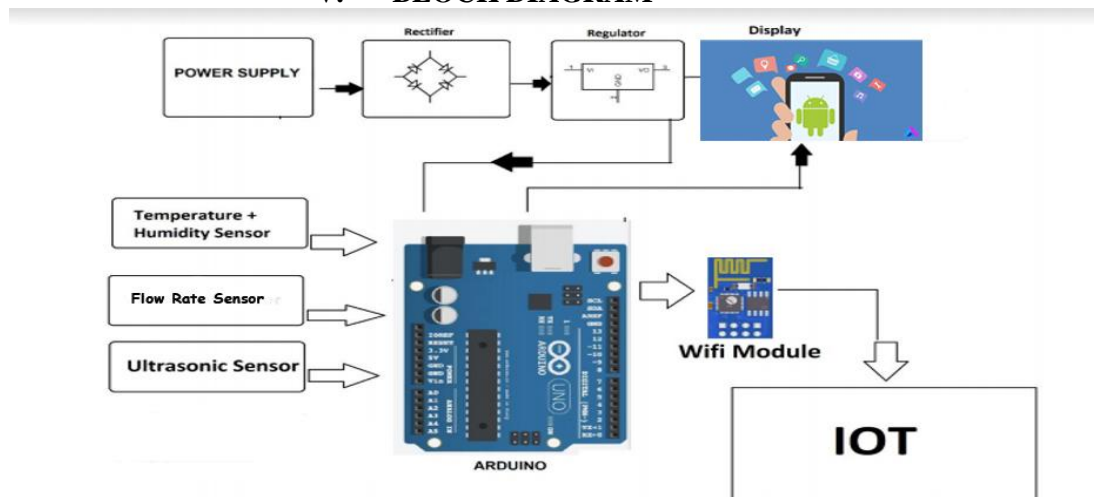


Figure6: Block diagram of working of flood monitoring system

VI. PROJECTION PLAN

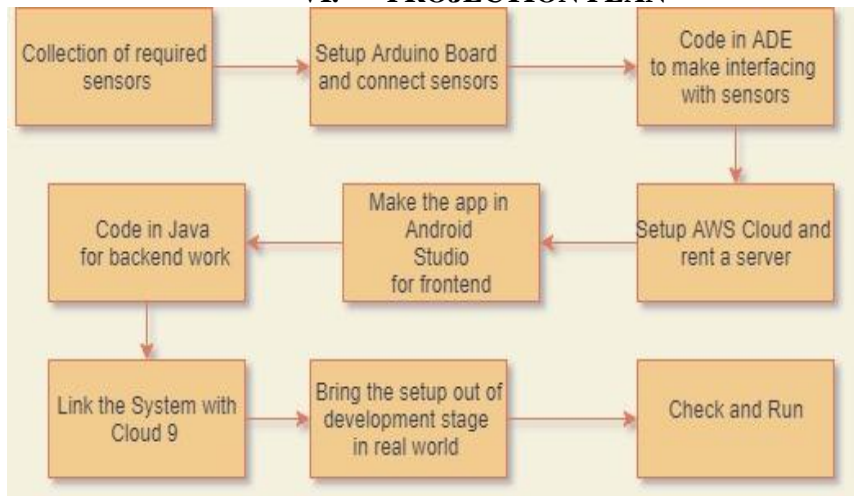


Figure7: Processing Steps

VII. METHODOLOGY

7.1 The Proposed Framework

Flood based monitoring system is already present in the real world by the researchers in the field of IoT but the problem with them is that either they are too expensive or they don't work with the enough precision as it was expected from them. Thus, they are not feasible to use. So, in this field we have decided to make a device which will read the possibility of upcoming flood by analyzing values from IoT and will upload the result on our android based developed application that can be accessed by common people so that they can be warned about the flood. The android application will also provide the notification based on risk factor, users that are near the region of high risk of flooding will receive the notification and the regions that are at low risk of flooding will not receive the notification but the users can access the information about other areas too for the sake of knowledge. Another reason for making the application more functional is because Dam gates are opened due to increasing water levels and for alerting the nearby areas by raising the alarm which can cost someone's life if gets avoided by mistake. So, in this case we will provide extra privilege to the government officials who are responsible for the opening of the gates of dam to update the information on application about the dam.

7.2 Implementation

- i. For software part we have integrated our system with cloud. We will make 3 levels for normal users and specify a color for danger levels.
- ii. This is done using the data sent by Wi-Fi module to cloud which then follows an algorithm pattern and prepares real time data.

- iii. Every detail related to the system can be viewed in this app. And, the app has classification for users. IVR and push notifications is also implemented.
- iv. The hardware part will contain ultrasonic, temperature and humidity sensors and other sensors all connected to Arduino.
- v. To enable to the system to connect and share the information through internet the hardware is connected to Wi-Fi module.

7.3 Working

To practical implement the system which will include the wiring that is to be installed on the breadboard along with Arduino and other sensors. The coding on Arduino language which comprises of C/C++ function that are called in the code. The android app will be developed with help of Android Studio for front-end and back-end will be coded in JAVA. In AWS Cloud9 IDE programming can be done in multiple languages which offers a good code-editing experience with support of runtime debuggers along with a built-in terminal.

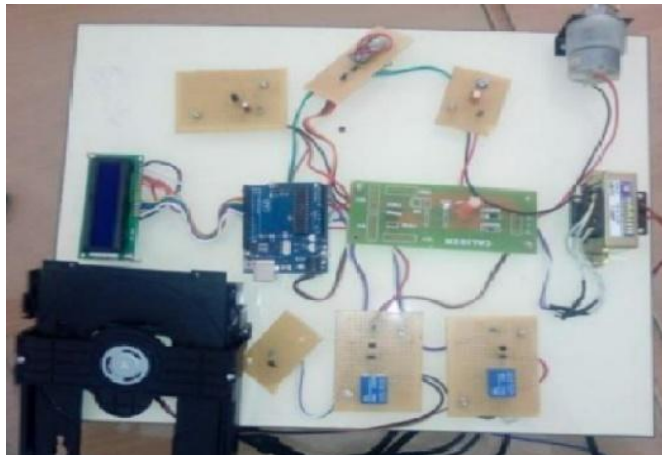


Figure8: Working model

It contains a collection of tools that you use to code, build, run, test, and debug software, and helps you release software to the cloud. The system will be ready to link with Cloud 9. At Last, the Arduino will be connected with the battery. It should work as we decided earlier and early warning will be sent to user.

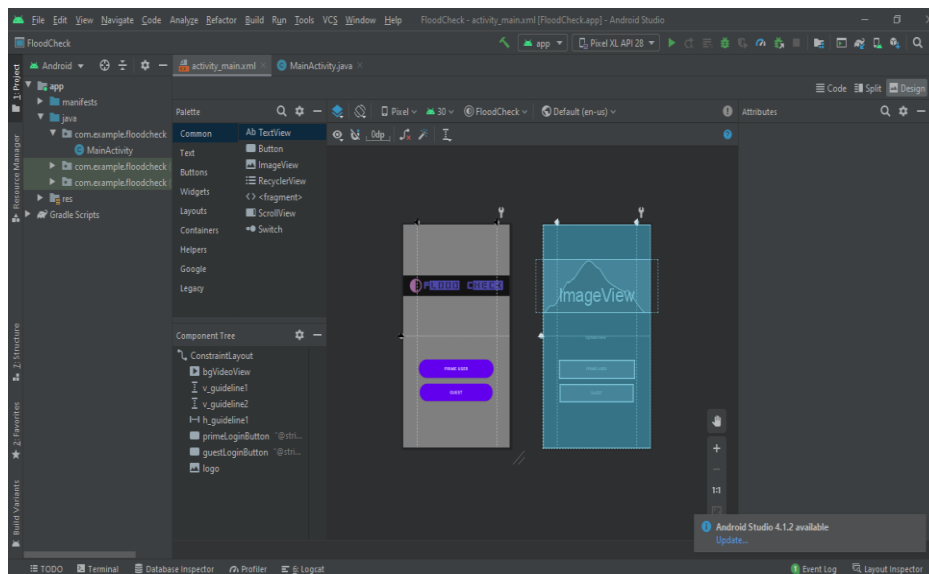


Figure9: Model of Android application

VIII. FLOW CHART

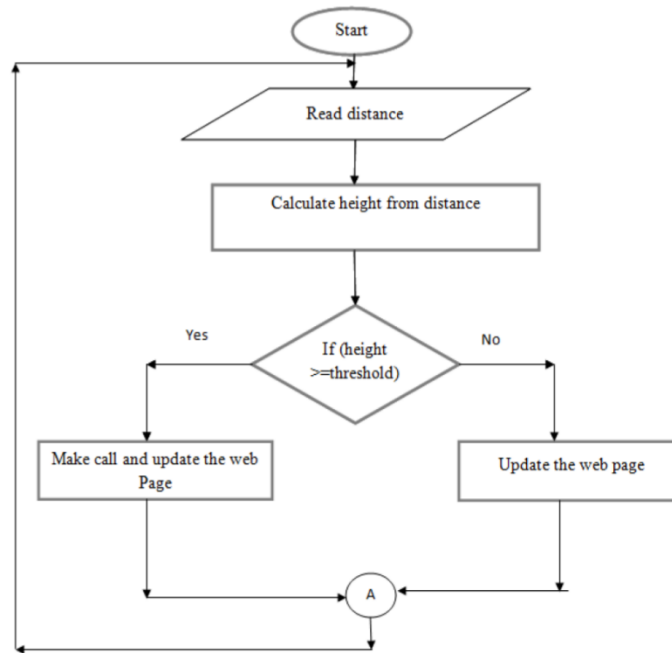


Figure10: Flow Chart

IX. APPLICATIONS

This application can also be used to monitor sensor data in real time that is it can provide.

- 1) Interrupts to mobile phones of users who are responsible for controlling flood gate in real time (24x7).
- 2) Users who are responsible for managing and planning evacuation techniques for citizens.
- 3) Normal users can have this app as a weather forecasting app which has an additional feature of keeping them updated about threat from flood.

X. CONCLUSION

Since, Flood disaster is a natural disaster which cannot be predicted. It can be monitored in real time. The main aim of this project is to save people's life by detection irregularities in water body levels with minimal cost. Our project will not be able to save a town from destruction but can help to minimize its impact by alerting the people in nearby areas. It can also contribute to government authorities that can help in saving lives from these kinds of hazardous events. In summary, our project can help people in planning and taking quick decisions against this disaster.

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