ARDUINO UNO BASED WATER QUALITY MONITORING AND FLOOD ALERTING SYSTEM USING IOT

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Abstract – There are a couple of spots that are more disposed to flooding than various spots; the execution of flood-prepared systems near any critical water an area or stream gives fundamental data that can ensure property and save lives. Clearly, the best flood alerted techniques are extreme and need high help, and require incredibly qualified delegates to work it. These days, there is no thought regarding when floods will happen, so there is a need to caution individuals who are close to the overwhelmed region. Hence, we are arranging this system to enlighten people about the approaching flood through notice and prepared messages.

Sending real time data to the users who have installed the app and also providing a direction details to the users within the app. For that reason, we will utilize a few sensors that will assist with giving data about the flood. This framework gives genuine execution to affiliations, associations, and people excited about creating and working flood seeing and cautioning structures.

This undertaking likewise incorporates a Sensor-Based Water Quality Monitoring System, which is used for assessing physical and substance boundaries of the water. The boundaries, for instance, Temperature, pH, flex sensor and water level, and nature of the water, can be assessed. This sensor data is essential for quality monitoring of the flood alerting system

Keywords: Water Quality Monitoring, Flood Alerting, Thingspeak, Android application, Arduino.

1. INTRODUCTION

Generally, floods happen in light of the hefty precipitation, from the melting of ice and snow on mountains, or from the mix of all of these when it outperforms water passing on the constraint of every one of these when it surpasses the water conveying limit of the dam into which it stores. One of the main issues is the Geographical territory that gets a flood going. Due to the Floods, valuable lives, including people and creatures, properties worth millions are found annihilated.

To build up A Solution to Flood Alerting System and Water quality monitoring system using IOT, we proposed a flood cautioning framework which expects thoughtfulness regarding three essential variables: Data assortment through gaging, information handling, and the equipment and programming required, spread of flood notice data.

While computerized flood cautioning frameworks are frequently shockingly reasonable to execute,.

The corrupting in water is broadening little by little, and different topic specialists and researchers are attempting to manage the issue by checking and staying aware of water. In this undertaking, we will test the water quality to guarantee its purpose be safety to shield human life from the dirtied water. Examining the status and evaluation of whether the water is useful for the enduring animals and plants is the essential objective.

2. PROBLEM OVERVIEW

The Flood Monitoring and Water Quality Monitoring System project is entirely based on the Arduino and gsm module, which will be interfaced with the Thingspeak server, here we will be using Thingspeak to store the sensor values, and also, we have linked the Thingspeak server with our mobile app so that user can log in with their credentials and check the respective sensor values which are present in the dam.

Here, we are using five different kinds of sensors for different operations; a water level sensor is used to keep track of the water level, a turbidity sensor is used to detect the solid particles present in the water, a temperature sensor is used for checking the Temperature of water, Ph sensor is used to check the quality and ensure that whether the water is suitable for daily use or not, flex sensor is used to determine the structural integrity of the dam.

In this project, we will connect the hardware parts with Arduino IDE using a USB cable; The Arduino will also be interfaced with the gsm module to send messages when the values of the sensor have reached the threshold limit. We are storing these values in the Thingspeak server.

We have also created a mobile application that is linked with the Thingspeak server, and also we have used various inbuilt tools like Firebase Authentication and Firebase Firestore for storing the user data and for Authenticating the user to grant access to the app. We are getting the data from Thingspeak, which is displayed in the form of a graph so the users can compare with previous values, and also by using a special function volley, we are able to decrypt JSON data to show the latest value to the user in the form of a number. As an extra feature, we have integrated our mobile app with Google maps SDK to check the location of the dam and get directions to the dam location from the user's current location.

2. LITERATURE REVIEW

The tainting in water is expanding bit by bit, and various trained professionals and specialist's endeavouring to deal with the issue by checking and keeping up the personality of water. This paper bases overwhelmingly on the quality checking of water. The paper intends to imagine the water quality with the objective that its aim is consistent to shield human life from the dirtied water. Work and evaluation of whether or not the water is useful for the living animals and plants could likewise be an essential objective.

This paper focuses on this need for the improvement of purifying of water. Their unit fluctuated in absolutely very surprising parts seen in water, yet these three factors like cation focus, ph., and Temperature unit polar came to call the quality. When all is said and done, this paper adds to choosing the personality of water in a really extremely accommodating and straightforward procedure for assessing the Turbidity, Ph, and Temperature. To do this assignment, we will recommend not many research papers and whatever we have zeroed in on in these papers is in a brief moment portrayed as follows:

This paper proposed an IoT-based water checking framework that actions water level progressively. The model depends on the possibility that the Degree of water can be a vital boundary regarding the flood events.

A cloud worker was designed as an information archive. The estimation of water level is shown in a dashboard. The proposed arrangement has an incorporated tangible framework that permits internal checking of water standards. Cautions and significant information are communicated to the cloud worker and The result of water estimation is shown in an electronic dashboard.

The sensor data is shipped off a conveyed caution focus by means of Arduino board and Transceiver. At the proper prepared center, handset and Arduino board are used to deliver flood alerts subject to sensor data values and to recognize flood data, and this data is taken care of in a data set. This is anything but a savvy framework. Furthermore, execution is likewise powerless when contrasted with our framework.

3.HARDWARE AND SOFTWARES USED:

This project is completely based on the Arduino Uno, and also for the Development of Mobile application; we have used Android studio, so we need a laptop or pc.

Hardware:

- we have used various sensors and microcontrollers for the development of this project which is mentioned below:

  1. Arduino Uno

  2. P.H sensor

  3. Temperature sensor

  4. Water level sensor

  5. Turbidity sensor

  6. Flex sensor

  7. Gsm

 8. Esp8266 WIFI module

  9. Power supply

Software:

- We have used two different software's for the development of this project

- It is required to have a laptop in order to develop this project

- We have used third-party tools like Thingspeak and Google firebase.

- One has to know how to work with Arduino ide software

- One should have knowledge of the understanding of android studio and how to write and build XML and Java codes. Basic knowledge of U.I. designing.

4. PROPOSED SYSTEM

- We will be using an Arduino, as the Microcontroller.

- Center point is where all the sensors are connected to the microcontroller

- It has three significant stages: Sensors, Controller, and Wi-Fi interface to transfer data to the server. data from different sensors are gathered by the Microcontroller, figured, and transferred on the worker.

- The information transferred on the worker is Stored in the Thingspeak server.

- The set aside data is again directed to the front- end mobile application.

System Architecture
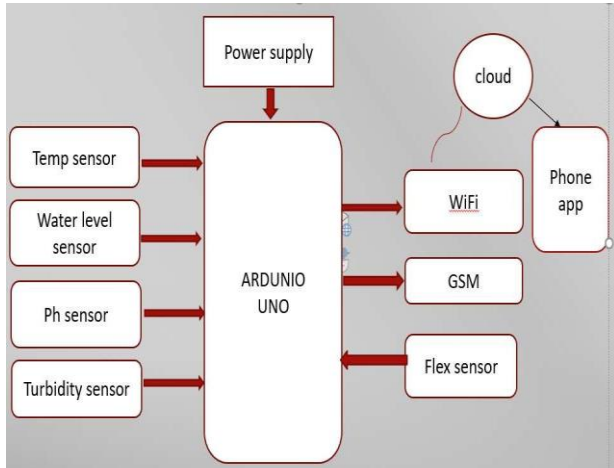
The System consists of three important modules: 1] Hardware controllers

2] Cloud server

3] Front end application (mobile app)

The System consists of 5 sensors which are for various application like to detect integrity in the dam, Ph level of the dam, detect the level of sand in the dam, to detect water level and also temperature of the dam, There are connected to a microcontroller which is used to send data to the thingspeak server and data is forwarded to front end mobile application which uses Google Firebase and it is used for the authentication purpose so users can analyze the data.
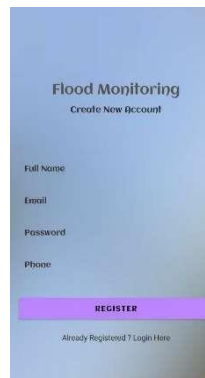
5.IMPLEMENTATION
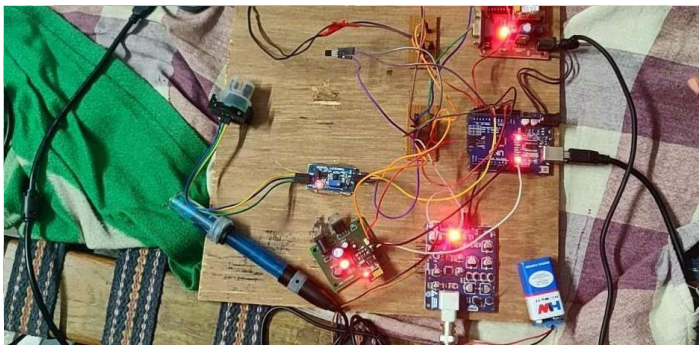
Fig: Hardware Implementation
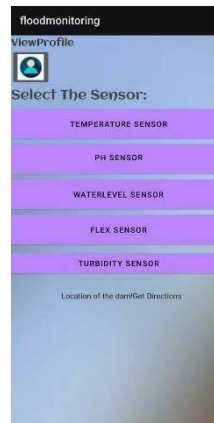
Snapshots of Mobile Application:

Login Page

This page allows users to login to the existing account or create a new account. we have used google firebase For authentication.


Registering Page

This page is used to create new accounts by using email address users can create a new account and the same credentials can be used for the login into the App.


Main Page

In this page we are providing various options where users can check the profile page and also various sensors it allows users to check data with individual sensors and analyze them also we have added google apps sdk.

Profile Page
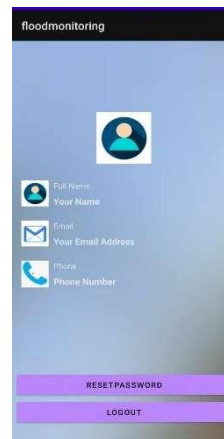
In this page users can get their details and also they can reset their Password which we will sent a reset password link to the users email.
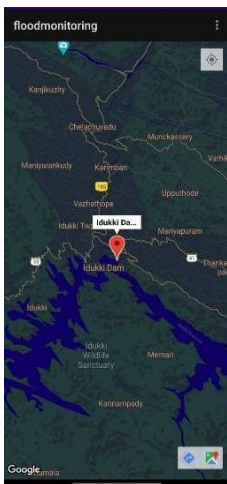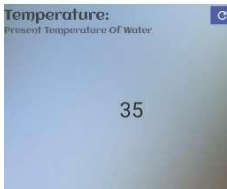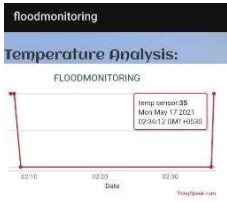
Sensor data values

Here users can check the sensor value user are able to check the previous data and campare them so they can know whether dam is in good condition or is it better to visit the dam today. So, we are displaying data in the format of graph so it will easily readable to the user and for better understanding. In the bottom we are displaying the latest value.

Google maps sdk

This page is used to display the maps and exact dam location. Here we are also providing various options like hybrid view, terrain and also satellite view. We have added an option so user can get directions from the user current location.

6.CONCLUSIONS

As India confronted the most recent disastrous flood in Uttarakhand, here it stands up the need for proficient flood tracking systems. Flood expecting and the giving of flood cautions are astonishing approaches as far as possible damage. The proposed framework can be effective as it has better coordination of following, correspondence, and transmission technology suitable for the conditions. The System stores and sends sensor data into the server which in turn can be viewed and analysed through the app. The proposed framework moreover ensures expanded openness for surveying crises and performance in reacting to disastrous incidents.

Checking of murkiness, pH and Temperature of Water utilizes a water identification finder with a novel benefit and a current GSM organization. The framework will screen water quality precisely, and it's low in regard and needn't bother with people working. The water quality testing is most likely going to be affordable, advantageous, and quick. The framework has reasonable adaptability.

This technique is familiar with checking elective water quality boundaries by supplanting the related sensors and the significant programming framework programs.

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