FLOOD MONITORING AND EARLY WARNING

ABSTRACT :-

The human are still not able to battle the natural calamities besides huge development in technologies. The fact is that the natural calamities can neither be abolished nor be prevented. But the technology has been developed gigantically in order to prevent loss of life. This project is totally based on informing the civilians about the upcoming flood so that they can evacuate the danger area before the flood hits. For detecting the rise in water level Ultrasonic Sensor and Water Level Sensor is used. For detecting the change in humidity and temperature Humidity and Temperature Sensor is used. The data from the DTH11 and HC-SR04 is read by the microcomputer and analyze the data in order to detect the level of water. If the level of water is less than the defined threshold value then the microcomputer turns the LED and buzzer on. Furthermore, the data obtained from the microcomputer is uploaded to the database. The values of the sensors updating in real time can be monitored in database table. The content of the database table is now linked with the web API (Application Programming Interface) and trigger is set. And now when the level of water crosses the threshold value the trigger is triggered and the web API sends the SMS to the phone number registered to it.

INTRODUCTION :-

An overflow of a large amount of water beyond its normal limits, especially over what is normally dry land. A flood is an overflow of water that submerges land .In the sense of “flowing water”, the word may also be applied to the inflow of the tide. Floods are an area of study of the discipline hydrology and are of significant concern in agriculture, civil engineering and public health. Flooding may occur as an overflow of water from water bodies, such as a river, lake, or ocean, in which the water overtops or breaks levees, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an area flood. While the size of a lake or other body of water will vary with seasonal changes in precipitation and snow melt, these changes in size are unlikely to be considered significant unless they flood property or drown domestic animals. Some floods develop slowly, while others such as flash flood scan develop in just a few minutes and without visible signs of rain.

Flooding is not new to the Terai districts of Nepal. Every year, the monsoon floods have caused significant damage and loss to human lives and livelihoods within these southern flood plains. Yet each time the rescue and relief operations seem slow and insufficient and the government comes under fire for not responding quickly enough. A critical review – that is, reflecting and building on lessons from past flood events along with institutional memory – is seriously lacking, particularly across the government entities. Identifying lessons and learnings from past events is critical in order to recognize the simple lapses that can be avoided and solutions that can immediately be put into effect. This Post-Event Review Capability (PERC) report discusses the overall disaster management landscape, i.e. disaster risk reduction, preparedness, response, and recovery during the 2017 floods in Nepal. Focusing on the four river basins -Karnali, Babai, West Rapti, and Kankai – an effort is made to critically examine the flood event and impacts together with response and recovery measures undertaken by government and various other agencies in flood-affected

Areas of these rivers. Comparing the 2017 flood effects and impacts with previous flood response in the region, this review tries to identify the most useful lessons to take forward, and what could now be done differently to lessen the risks of future floods.

Objectives

* The main objectives of the project are:
* To read the temperature and humidity of the environment continuously
* To warn the people through SMS system using web API
* To detect the level of water in real time

CODING IN C PROGRAMMING

#include "ThingSpeak.h"

#include <ESP8266WiFi.h>

const int trigPin1 = D1;

const int echoPin1 = D2;

#define redled D3

#define grnled D4

unsigned long ch\_no = 1026389;//Replace with Thingspeak Channel number

const char \* write\_api = "XK88XXXXXXX";//Replace with Thingspeak write API

char auth[] = "fu0o5JaLXXXXXXXXXXXXXXXX";

char ssid[] = "admin";

char pass[] = "";

unsigned long startMillis;

unsigned long currentMillis;

const unsigned long period = 10000;

WiFiClient client;

long duration1;

int distance1;

void setup()

{

pinMode(trigPin1, OUTPUT);

pinMode(echoPin1, INPUT);

pinMode(redled, OUTPUT);

pinMode(grnled, OUTPUT);

digitalWrite(redled, LOW);

digitalWrite(grnled, LOW);

Serial.begin(9600);

WiFi.begin(ssid, pass);

while (WiFi.status() != WL\_CONNECTED)

{

delay(500);

Serial.print(".");

}

Serial.println("WiFi connected");

Serial.println(WiFi.localIP());

ThingSpeak.begin(client);

startMillis = millis(); //initial start time

}

void loop()

{

digitalWrite(trigPin1, LOW);

delayMicroseconds(2);

digitalWrite(trigPin1, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin1, LOW);

duration1 = pulseIn(echoPin1, HIGH);

distance1 = duration1 \* 0.034 / 2;

Serial.println(distance1);

if (distance1 <= 4)

{

digitalWrite(D3, HIGH);

digitalWrite(D4, LOW);

}

else

{

digitalWrite(D4, HIGH);

digitalWrite(D3, LOW);

}

currentMillis = millis();

if (currentMillis - startMillis >= period)

{

ThingSpeak.setField(1, distance1);

ThingSpeak.writeFields(ch\_no, write\_api);

startMillis = currentMillis;

}

}

CODING IN HTML

<!DOCTYPE html>

<html>

<head>

<title>Flood Monitoring and Early Warning</title>

<style>

/\* Add your CSS styles here \*/

</style>

</head>

<body>

<header>

<h1>Flood Monitoring and Early Warning System</h1>

</header>

<div id="map">

<!-- You can embed a map or visualization of flood data here -->

</div>

<div id="warnings">

<h2>Current Warnings:</h2>

<ul>

<li>Area A - Flooding Warning</li>

<li>Area B - Evacuation Advisory</li>

</ul>

</div>

<div id="report">

<h2>Report a Flood</h2>

<form action="submit\_report.php" method="post">

<label for="location">Location:</label>

<input type="text" id="location" name="location" required>

<br>

<label for="description">Description:</label>

<textarea id="description" name="description" rows="4" required></textarea>

<br>

<input type="submit" value="Submit Report">

</form>

</div>

<footer>

<p>&copy; 2023 Flood Monitoring System</p>

</footer>

</body>

</html>

CODING IN JAVA

import java.util.Timer;

import java.util.TimerTask;

public class FloodMonitoringSystem {

public static void main(String[] args) {

// Simulate data collection and processing

Timer = new Timer();

timer.schedule(new DataCollectionTask(), 0, 10000); // Every 10 seconds

}

static class DataCollectionTask extends TimerTask {

@Override

public void run() {

// Simulate data collection

double rainfall = Math.random() \* 100; // Replace with actual data retrieval

// Check if rainfall exceeds a threshold

if (rainfall > 50) {

// Raise a flood warning

System.out.println("Flood warning issued: High rainfall detected.");

// Notify users and authorities

// Insert data into the database

// Update the user interface

}

}

}

}

CONCLUSION

Flood monitoring and early warning systems play a crucial role in mitigating the impact of floods. These systems help detect and predict floods, allowing authorities to issue timely warnings to residents in affected areas. To enhance the effectiveness of such systems, it is essential to invest in advanced technology, improve data collection and analysis, and ensure efficient communication of warnings to the public. By doing so, we can save lives, reduce property damage, and better prepare communities for the increasing challenges posed by flooding in a changing climate.