



IOT BASED FLOOD AND EARTHQUAKE MONITORING SYSTEM

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ABSTRACT:

Flood and earthquake are one of the most devastating natural disasters in the world. Such natural disasters deleteriously affect the environment, lives of human, etc. which indirectly affect the economy of the country. Due to such natural disasters, there is a decline in the death rate of the human and fauna. So we should have a monitoring and observatory flood and earthquake detection system. The proposed system based on IOT technology gives a realtime analysis of flood and earthquake and so that the authority can monitor flood and earthquake affected areas. This paper highlights the Flood and earthquake Observatory System as a warning and alert system to efficiently monitor the critical flood prone and earthquake areas in real time basis baring the cost and safety measures. The proposed system also alerts the authority regarding the presence of a human in the area. Design of the proposed system includes integrating sensors to the microcontroller, GSM modem, and IOT platform for examining and visualizing sensor values which have been uploaded.

INTRODUCTION:

In the recent days, Many countries are facing of several social issues in aged population, healthcare, disaster reduction/prevention, safety, security, etc. the natural disasters occur in many areas and many people loss their life progress of India towards smart cities and digitalization is noticeable. India's historic vulnerability

cannot be overstated. Around 57% land is vulnerable to earthquakes. Of these, 12% is vulnerable to severe earthquakes, 68% land is vulnerable to drought, 12% land is vulnerable to floods, 8% land is vulnerable to cyclones, and many cities in India are also vulnerable to chemical, industrial and man-made disasters. In the recent years, on 30 July 2014 many people lost their lives because of Malin landslides disaster due to the heavy rain in Malin village of pune district in Maharashtra, India. Malin village receiving the heavy rain on 29th July 2014 and the date of 30th July landslide will occurred due to heavy rainfall. This issue will observed because of deforestation and many other several reasons. There are many more disasters will occurred but the solution is to be implemented the internet of things techniques to reduce the losses and makes an early warning system. This system utilizes the Internet-of-Things (IoT) technologies to helps in social infrastructures to opens a new door for innovative solutions to prevent the losses from natural disasters like floods, forest fire, earthquake, spark etc. and the most important thing is to we save our life and also saves the animals life we firstly focuses on flood alert system .Internet based sensor networks have recently gaining the attention Sensors are connected to the Internet and the information from the sensors is gathered at a server. When Particular region is equipped with sensor devices, microcontroller, and various application become a self-protecting and self-monitoring that environment is the smart environment. Sensors sensor information transmission and monitor the data which will be collected from various sensors and give alert message to people using SMS and using Calls.

Earthquakes, both directly and indirectly, have caused much suffering to mankind. During the 20th century alone

about two million people were killed as a result of earthquakes. A list of deadly earthquakes (death tolls 25) of the world during the past five centuries was compiled by Utsu [115]. It shows that earthquakes of magnitude 6 (

150 per year worldwide) can be damaging and deadly if they occur in populated areas, and if their focal depths are shallow (< 50 km). Seismic risk can be illustrated by plotting the most deadly earthquakes of the past five centuries (1500–2000) over a map of current population density. This approach was used by Utsu [115], and his result is shown in Fig. 1. Most of these deadly earthquakes are concentrated (1) along the coasts of Central America, the Caribbean, western South America, and Indonesia, and (2) along a belt that extends from southern Europe, the Middle East, Iran, Pakistan and India, to China and Japan.

2. RELATED WORK

Albert Joshy Varghese, Abin Thomas Jolly, Astile Peter, Bhavana P Rajeev [1] developed IoT based Disaster Monitoring and Management System for Dams. . These are send to the cloud server via WiFi module ESP8266 for monitoring and control. The proposed system will be helpful to solve all the water related problems. Kalpesh R. Deshpute, Nilesh S. bawa, Vishal B. Gaikwad, Sagar S. Sawkar [2] designed a Flood detection system using IOT. They developed system , the flood occur, the ultrasonic sensor will sent signal to the microprocessor circuit and the sense water level will be display in the user interface and it will automatically send a Short Message Service (SMS) to those recognized residents. Syed attique shah, zafer sekedursun r, sufian hameed, dirk draheim, [3] The Rising Role of Big Data Analytics and IoT in Disaster Management: Recent Advances, axonomy and Prospects. In this paper The fusion of BDA and IoT promises a new and more effective approach for carrying out the core operations of disaster management processes With state-of-the-art big data analytical tools and well-managed IoT Mohamad Syafiq Mohd Sabre , Mohamad Syafiq Mohd Sabre, Shah Abdullah , Amrul Faruq [4] proposed a Flood warning and monitoring system utilizing internet of things technology. This study based on the development of a smart flood monitoring system using ultrasonic sensors with NodeMCU and Blynk application. The results offer flexibility, efficiency and low cost. Wireless sensor node based on Blynk platform is an ideal platform to monitor flash floods. Gowthamy J, Chinta Rohith Reddy, Pijush Meher, Saransh Shrivastava, Guddu Kumar [5] In this paper, a prototype water monitoring system using IoT is presented. .For this some sensors are used. The collected data from the all the sensors are used for analysis purpose for better solution of water problems. The data is sends to the cloud server via Wi-Fi module ESP8266. So this

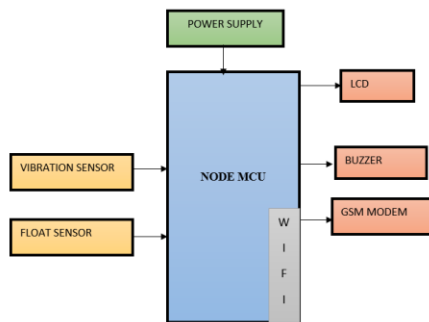
application will be the best challenger in real time monitoring & control system and use to solve all the water related problems.

EXISTING SYSTEM:

- The existing Indian flood alert system it's depend on Input data from satellites for flood forecasting, and it come after a long interval and some the information is quite insufficient.
- Manually monitor the river

PROPOSED SYSTEM:

The proposed system is a warning and alert system to monitor efficiently critical flood prone and earthquake areas in real time basis. The system includes a water level sensor (float sensor) which detects water level intensity and gives alert to house member through alarm dangerous siren is alerted and alert the authorities by providing messages through GSM, and even nearby house member will also be alerted. The system even detects an earthquake by using a vibration sensor (accelerometer/ gyroscope) and provide alert to authorities through GSM. The gateway here is ESP Wi-Fi module. The gateway then transmits the sensor data packets to the cloud server over internet protocol and we can monitor the sensor values in webpage and also in internet enabled devices.

BLOCK DIAGRAM:**HARDWARE DESCRIPTION:****NODE MCU:**

NodeMCU is an open-source Lua-based firmware and development board designed specifically for IoT applications. It includes firmware based on Espressif Systems' ESP8266 Wi-Fi SoC and hardware based on the ESP-12 module. The NodeMCU Development Board can be easily programmed with Arduino IDE since it is easy to use. Programming NodeMCU with the Arduino IDE will hardly take 5-10 minutes. All you need is the Arduino IDE, a USB cable and the NodeMCU board itself.

NodeMCU ESP8266 Specifications & Features

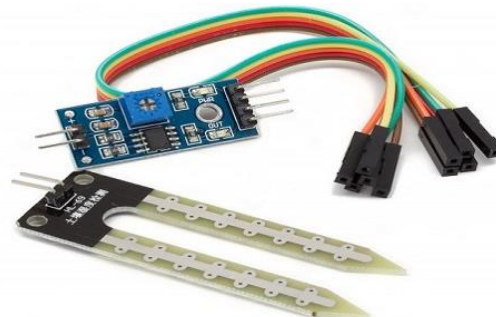
- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB

**TILT VIBRATION SENSOR:**

The Tilt Sensor Vibration Alarm Vibration Switch Module for Arduino come with the basic components for operation. Supplying power and it is good to be used. Attach it to object and it will detect whether the object is tilt. Simple usage as it is the digital output, so you will know the object is tilt or not by reading the output. It uses SW-460D or SW-520D tilt sensor. The Tilt Sensor is the ball rolling type, NOT Mercury type. Comes with an M3 mounting hole for ease of attaching it to an object. On board, it provides a tilt switch, high sensitivity and commonly being used for tilt detection. The module comes with power LED and status LED for the visual indicator. The module will output logic LOW when the module is not tilted until the threshold angle; it will output logic HIGH when it is tilted over the threshold angle. We have tested, the tilt angle is quite big, from 45 degrees to 130 degrees. However, it depends on the angular velocity too. It can be used as a vibration sensor too.

**Moisture sensor:**

The soil moisture sensor is one kind of sensor used to gauge the volumetric content of water within the soil. As the straight gravimetric dimension of soil moisture needs eliminating, drying, as well as sample weighting. These sensors measure the volumetric water content not directly with the help of some other rules of soil like dielectric constant, electrical resistance, otherwise interaction with neutrons, and replacement of the moisture content.



RESULTS:**CONCLUSIONS**

In this study, Real time prediction and alarm system to warn the people has been accomplished. The main key problem to warn the people in real time mode is tried to solve. Using the GSM system, an early warning message sent as the earthquake detector detects the earthquake sound wave and generate the pulse to auto turn off system that would turn off the gas or electricity connection and send the pulse to alarm system to warn the people using voice audible alarm.

An IOT based Flood disaster management system has been proposed to adopt new techniques, could reduce the chances of losses of human lives as well as damage to large-scale infrastructures due to both natural and humanmade disasters. According to this project we can implement inexpensive wireless sensor network components to detect floods, spark, forest fire, landslides and send alert to the people residing across the coastal line of a country. In summary, the aim of this study is to supply fundamentals about IoT-based disaster management systems that help us to know past research contributions and future research direction to solve different challenges disaster management systems.

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