



IoT-FLOOD DETECTION AND ALERTING SYSTEM

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ABSTRACT-

The main objective of this project is to design a flood detection and avoidance system that will detect and send the information about the flood automatically to the nearby Government Unit and to protect the damage caused by the flood and to residents using Arduino. The process eliminate the impacts offload ,The system uses various natural factors to detect the flood. Here present a sensor to measure a water level in rivers, lakes and streams based on IOT. The purpose of flood warning is to detect and forecast threatening flood events so that the public can be alerted in advance. Flood warnings are highly adaptive where protection through large scale, hard defenses, is not desirable. Sensors ,GSM and WIFI modules which will be helpful to give information about the flood. In this proposed design, the alerting system will monitor nearby dams regarding the status of the floods with sensors and the information can be sent using the GSM module. By Interfacing esp32 CAM to Arduino for live streaming the video can be viewed through web Page using local server IP address with faster transmission rate.

KEYWORDS:

flood detection,wireless networking,temperature monitoring,alerting system.

1. INTRODUCTION

Flood is one of the natural disasters that cannot be avoided. It happens too fast and affected so many lives and properties. Before this, most of the existing system that has been developed are only focus on certain areas. Other than that, majority of the public cannot monitor and have no idea when the flood going to be happened since they do not have any information and data about the weather condition. By having Smart IoT Flood Monitoring System, this will solve all the drawbacks of the existing system. The proposed system is suitable for cities and village areas. Furthermore, if the public has an internet access, they can monitor what is happening and predict if there is any upcoming flood at the web server. The proposed system is a low cost in design and easy for maintenance. This project will update the water level at the web server and the system will issue an alert signal to the 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. Multiple times, the arrival of very heavy rains results in the heavy discharge of water because of the sudden melting of the glaciers due to global warming. Especially, in the monsoon which normally begins in the mid of June and lasts till October, thousands of people lost their lives by drowning and their habitats were collapsed. The left were

. As these causes a huge amount of loss in the human environment. To reduce and make the system from alert, detecting these conditions is very crucial.

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 if the situation is reaching a certain threshold, then alert is to be provided to each individual living in the area which is currently at risk. Even if it is difficult to abandon the natural calamity but the mandatory steps are to be taken by the government agencies to shift the population to a safe region and the losses will get reduced to less than 30%.

In this modern era, there are multiple systems working and are deployed at different locations but the alert notification is passed to government agencies and this ends up 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 officials. So that a combined and better result will be achieved. In our system, it is combined with 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 the major turn-up disasters that occur in different parts of the world

“IoT Early Flood Detection & Alert System” is an intelligent system which keeps close watch over various natural factors to predict a flood, so we can embrace ourselves for caution, 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 WIFI connectivity, thus its collected data can be accessed from anywhere quite easily using IoT.

1.2 Internet of Things (IoT):

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that

goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to areas such as smart cities.

"Things," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest to look at "Things" as an "inextricable mixture of hardware, software, data and service". These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include home automation (also known as smart home devices) such as the control and automation of lighting, heating (like smart thermostat), ventilation, air conditioning (HVAC) systems, and appliances such as washer/dryers, robotic vacuums, air purifiers, ovens or refrigerators/freezers that use Wi-Fi for remote monitoring.

As well as the expansion of Internet-connected automation into a plethora of new application areas, IoT is also expected to generate large amounts of data from diverse locations, with the consequent necessity for quick aggregation of the data, and an increase in the need to index, store, and process such data more effectively. IoT is one of the platforms of today's Smart City, and Smart Energy Management Systems.

2.2. LITERATURE SURVEY

[1]

INTERNET OF THINGS BASED REAL TIME FLOOD MONITORING AND ALERT MANAGEMENT SYSTEM

The system is much advantaged for protecting the lives of people and animals. This system is very much utilized for monitoring of the water level, flow variations in rivers and the same can be used for measuring of the water level at Dam/Reservoirs. The measured values are regularly updated on the web server which is very much useful to send flood alerts to consistent authority and people for faster action. This constitute a wireless sensor nodes which called as a mote and the motes are placed along the river beds to monitor water condition. Each Node is connected with a GSM module. The system provides a real-world application of internet of things and offer services like accurate level monitoring directly are indirectly benefited by the system Sensors are important elements in the Flood Observatory System. Further studies on wireless sensor technology will be best to replace the current sensors. Precise and accurate detection of water level will improve the data collection system for the monitoring station. The flood alert information's can be displayed on LED display boards for road users and for safety reasons could be placed at strategilocations.

[2] DEVOLEPMENT OF A LOW COST COMMUNITY BASED REAL TIME FLOOD

MONITORING AND EARLY WARNING

SYSTEM - The proposed system employs the use of low cost Arduino Uno micro controllers and other low cost devices to detect potential flood and alert the community in real time. Results obtained from the system prototype/field test demonstrated its capability in mitigating the devastating impacts of floods especially for the poorest and most vulnerable communities in developing countries.

[3] SMS BASED FLOOD MONITORING AND EARLY WARNING

- This monitoring system is fast, cheaper and reliable hence it helps prevent the loss of lives damage to properties. One problem in the system may develop if the network provider makes changes to the network. The GSM module cannot upgrade itself. The system is further improved by make it independent by incorporating a solar battery charging system. This can be supported by the GSM module. GSM module has a feature that enables it to check the battery level at any time. Since the setup will be in a remote area, the solar charging system will allow for the battery to be constantly charged. The user can also check the battery status through the GSM module. The module should be able to feedback the battery level to the user via SMS. Further remote top-up, adding resident numbers are also incorporated to make the system fully efficient.

This paper demonstrates the design process, implementation and experimental verification of an SMS based Flood Monitoring and Early Warning system. With tools such as

credit top-up and storing contact numbers will be done via SMS. Updates on the height of the water level would be texted upon users' request. The system provides timely information and alerts at-risk or threatened populace and relevant authorities by means of SMS when the level of water surpasses the user defined threshold value. The Global System for Mobile Communications (GSM) module is used for sending the mobile text messages while the Arduino Uno microprocessor is used to read in the input from the pressure sensor and then calculate the height of water. This simple yet effective warning system is deemed to be one of the fastest and cost effective method of alerting the relevant authorities and the vulnerable residence.

[4]A Real Time Solution to Flood Monitoring System using IoT and Wireless Sensor Networks

– There are some places that are more prone to flooding than other places, the implementation of flood alert systems near any major water area or body of water provides critical information that can protect property and save lives. Of course, the most effective flood warning methods are very costly and requires high maintenance and also requires highly qualified employee to operate it. Nowadays, there is no idea about when flood will occur so there is need to prewar people who are near the flooded area. Hence we are design this system to inform the people about the upcoming flood through notification and alert messages. For that purpose we are going to use some sensors which will helpful to give information about the flood. As well as we are going to give all safe places near

the user location where user can migrate. Always we are using map for trace safe location. This system provides actual implementation to organizations, communities and individuals interested in establishing and operating flood monitoring and warning systems.

Existing system refers to the system is to develop a local real-time river flood monitoring and warning system for the selected communities near river. This study focuses only on the detection and early warning alert system (via website and/or cell phone text messages) that alerts local subscribers of potential flood events.

In this project, some hardware is used that are Microcontroller, sensors, components required for power supply. The Hardware collects the water level, Pressure of water, Rainfall measure to detect the levels of the flood. The hardware consists of Wi-Fi enabled controller which connects to the server and allows to share the data to through internet.

[5] Interfacing esp32 cam to Arduino for live streaming:-

Interfacing esp32 cam to Arduino for live streaming and the video can be viewed through web Page using local server IP address with faster transmission rate. This will allow them to predict the risk of flooding. And can save the people in that area. not only this with the help of this system can be rescued Those trapped in the flood.

3.Proposed System / Working:

In this proposed system, we have designed a earlier flood detection and alerts system using Arduino UNO, Multiple Sensor and Module as major key components. To detect a flood the system observes various natural factors, which includes humidity, temperature, and water level of Dam. To collect data of mentioned natural factors the system consist of different sensors which collects data for individual parameters. For detecting changes in humidity and temperature the system has a DHT11 Digital Temperature Humidity Sensor. It is an advanced sensor module with consists of resistive humidity and temperature detection components. The water level is always under observation by a Ultrasonic Sensor. The Ultrasonic sensor works on the principle of SONAR and is designed to measure the distance using ultrasonic wave to determine the distance of Water from the sensor. All the sensors are connected to Arduino UNO Microcontroller Board, which processes and saves data. The system has wifi feature, which is useful to access the system and its data over IoT. User is provided with a Android Application to Monitor the Flood Causing Parameters from anywhere in the World using Internet Connectivity.

This System is also equipped with a Wireless Alarm. If the Water Level of Dam crosses the danger level, than Microcontroller unit trigger this wireless Alarm. This Wireless Alarm is used to alert the Local People present near the Dam, so that they can take preventive measures and save their lives.

The power supply setup of the system contains a step-down transformer of 230/12V, used to step down the voltage to 12VAC. To convert it to DC, a bridge rectifier is used. Capacitive filter is used

which makes use of 7805 voltage regulator to regulate it to +5V that will be needed for microcontroller and other components operation, in order to remove ripple.

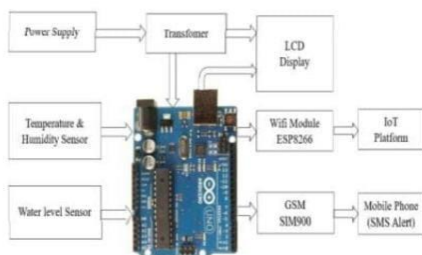
Internet of Things is interconnecting the devices such as sensors, actuators or embedded Items such as software/hardware. Here the network connectivity is necessary. According to the Gartner, 50 billion objects would be connected by the end of 2020. Internet of Things senses the readings from the sensor and control and monitors the data with the help of network. Floods are the natural disasters with creates the severe damage to the urban/rural sectors. In India, the agriculture sector has the highest impact due to the floods. Every year, 400 million hectares of Indian land is affected due to the floods. As majority of the people are in the cities, due to the floods they don't get the water information easily and quickly . These mostly cause the property loss, Citizen Work loss or human loss. In this proposed design, the alerting the system by monitoring near the dams regarding the status of the floods with sensors in the main objective.

Natural calamities happens everywhere in the world, and which affects the human life and economy of the country. Economy and growth of any country depends upon the agriculture, hence the proper alert makes the farmers vigilant to protect the crop from flooding. In order to detect and avoid flood like disastrous calamities in a timely manner, current world technology plays a vital role. We can prevent natural disaster caused by flood, with the aid of an IOT based early flood related parameter monitoring and detection system and its avoidance using the Arduino project, is proposed as a solution to the mentioned problem. The proposed model is very much

utilized for monitoring of the water level, flow variations, humidity and temperature variation in the river and the same can be used at dam or reservoirs. The measured values are regularly updated on the web server which is very much useful to send flood alerts to authority and people for faster action.

3.2 METHODOLOGY

1. To style a circuit and make a programming code using the microcontroller.
2. To detect the present level of the flood where the system contains temperature and humidity, water level sensor.
3. To watch the present level of the flood the collected data's are updated within the website.
4. To warn the residents when it reaches the predetermined level of water, it'll send the SMS alert through GSM. The main problem related to the natural disaster was property damage and loss of lives



3. CONCLUSION:

Thus our proposed system can detect Climatic changes dynamically that have an adverse effect on certain factors of nature like temperature, humidity, rainfall etc. Also, because of convective activity, there is more rainfall in certain areas during monsoon seasons which might flood the areas near rivers or dam. Another reason for flood is cyclone.

While cyclones appear to be natural calamities, they are in essence required by nature to maintain the balance of temperature.

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