IoT Based Integrated Flood and Reservoir Alerting System

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Abstract— In the recent times there is a huge environmental changes leading to global warming which intern leads to the raise in the water level around the globe causing huge rainfall, flood. In the recent event happened in the states of Karnataka, Maharashtra caused a huge loss of lives due to heavy rainfall and flood. In order to avoid these situation implementing the proposed paper to save the people from danger caused due to flood which causes the huge destruction of the property every year. In the proposed paper it has been designed as early flood warning system, which consists of field unit which is placed along the river banks and to the dam. The above field unit consists of various sensors which continuously keep monitoring the data, the above data is compared with reference data stored in the database and based on the above instance, data decision will be taken and the respected alert will be given to the people.

Keywords: Arduino, Think speak, GSM module, Wifi module

I. INTRODUCTION

"Iot based Integrated Flood and Reservoir Alerting System" is an realistic device which keeps near watch over numerous natural elements to are awaiting a flood, so it may embraced ourselves for warning, to restrict the damage because of the flood. Natural screw ups like a flood can be devastating fundamental to belongings damage and loss of lives. To eliminate or reduce the influences of the flood, the tool makes use of several natural elements to discover flood. The device has wifi connectivity, for that reason its accrued facts may be accessed from everywhere pretty without trouble the usage of iot. To hit upon a flood the device observes numerous herbal elements, which includes rainfall, water degree and float level. To accumulate statistics of stated herbal elements the machine encompass various sensors which collects facts for individual parameters. For detecting the quantity of rainfall in an area the device has rain sensor which suits as a switch and measures the depth of the rainfall. The water glide sensor includes a plastic valve frame, a water rotor, and a hall-impact sensor. Even as water flows through the rotor, rotor rolls. Its velocity changes with splendid fee of glide. Gadget furthermore consists of water level sensor basically an optocoupler positioned at wonderful degree of dam, which continuously senses the water degree inside the dam. When the water reaches the desired diploma it makes a closed circuit making present day to go together with the glide. All the sensors are connected to controller, which methods and saves statistics. The device has wifi characteristic that is beneficial to get entry to the machine and its facts over iot, and an alerting system.

II. EXISTING SYSTEM

In superpower country like USA, Russia etc. the flooding towards downside is decreased considerably and do not have an effect on a lot of because of accessibility of emergency system. However the developing countries like Asian nation, Brazil etc.is suffering tons throughout flood. Every decade variety of lifes are lost because of increase in number of floods in many a part of our country. 2 years ago the flood occurred in city, the capital of Madras resulted in significant loss of life and property. Whenever, flood occurs in residence place close to the river bank and backwater area are affected highly than other areas. They have to be alerted earlier so that they will have extra time to evacuate now. Throughout city arrive 2015, pretend news were unfold as Associate in Nursing example , A false message that aforementioned 2 lakes had broken and city had been stop from remainder of the districts ,spread panic among commuters, particularly people that were stranded for hours along on the arterial Mount Road on weekday night.

Fig. 1: Existing system

To avoid the above instance licensed warning system can be used as shown in fig.1. The proposed system provides such info so as that folks will avoid false news. And the system makes use of voice call as it's helpful for those that do not skills to browse the text message.

III. METHODOLOGY

As shown in fig.2, working of proposed model is briefly explained. First the user can store the mobile number to which the system will send SMS to inform about the water level in the dam and alert about the flood. The 10 digit phone number will be stored in the EEPROM. The alert message is pre-loaded in the EEPROM.

The controller will continuously monitor the water level in the dam through water level sensor, amount of rainfall in a specified area through rainfall sensor, rate of flow of water to dam via water flow sensor.

The above monitored data is sent to IoT module with the help of wifi connectivity and stored in the cloud, where it can be sent to further dam stations and also used to analyze the condition of dam for the occurrence of flood.

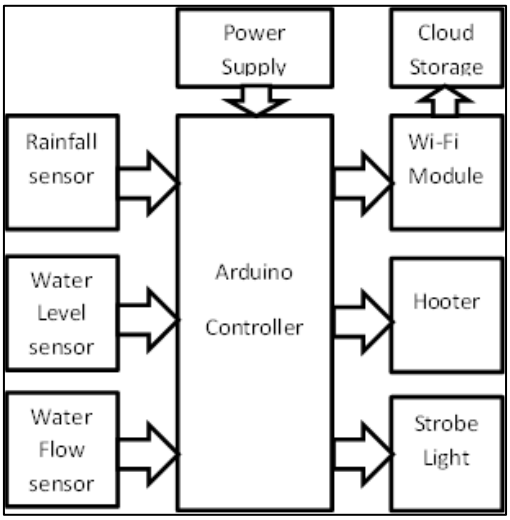

Fig. 2: Block diagram of Iot based Integrated Flood and Reservoir Alerting System

When the analyzed data reaches the threshold value, alerting is made. First, visual alert is made with the help of strobe light. Second, audio alert is made via hooter. The alert message is sent to the registered phone number with GSM module.

The flow chart in fig.3 briefly explains the working of Iot Based IFRAS, where initially setting up of controller is made by registering the mobile number of concerned officers and localities. All the parameters such as water level in dam, rate of flow of water towards dam and amount of rainfall around the dam surrounding are continuously monitored and stored in cloud. The above data is then compared with predefined threshold value. When the value exceeds the limit, further measures are taken and alerting is made.

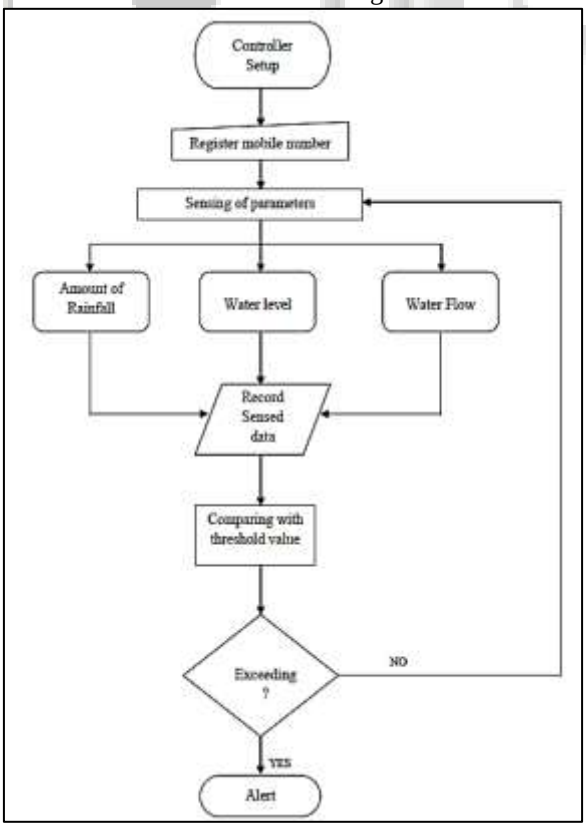

Fig. 3: Flow chart of proposed system.

IV. RESULT

The proposed System predicts flood considering three parameters (amount of rainfall, rate of water flow, water level in reservoir) which increases the efficiency in prediction of flood as compared to present alerting system. In proposed system alerts are made in various methods such as sound, visual for nearby residential people. Alerting is also made remotely via internet on social media (such as Facebook, twitter etc.) platform. SMS alerting is also provide only to the registered mobile numbers with the information containing place of flood occurance, present water level in reservoir .The system makes use of arduino which processes data at a speed of 16Mhz enough to compute and evaluate the parameters in predicting the flood in real time.

Table 1 compares the features between present system and IFRAS system.

	Comparison aspect	Existing system	IFRAS sensor Network	Remarks
1	Bitrate between Sensors	None	50 Mbps	NodeMCU speed
2	Bitrate between Sensor and Main Station	40 Kbps	40 Kbps	
3	Data generated in each Parameters	10 bits/reading	10bits/reading	Using 10 bit resolution ADC
4	Data generated in each sensor reading	20 bits	10 bits	Due to pre-processing procedure
5	Frequency of data sending between Sensors	Not Available	Every 1 second	
6	Frequency of data sending between sensors and base Station	Every 5 seconds f = 1/5 = 0.2Hz	Every 60 seconds f = 1/60 = 0.016Hz Or Every 5 seconds in case of emergency f = 1/5 = 0.2Hz	Smart sensors sends data every 5 seconds in case of Flood Alarm but in normal cases, it sends every 1 minutes for the purpose

				of general monitoring
7	Data Transfer with Main Station per hour	14.4 (Kbit/Hour)	0.48 (Kbit/Hou) Or 5.7 (Kbit/Hou)	

Table 1: Features of present system and IFRAS system.

V. FUTURE SCOPE

In future IFRAS can be powered with independent power source with the help of solar panels, windmill, since IFRAS can be situated near sea shore even tidal energy can be used to provide power. Further a camera can be integrated with the system and can be deployed around the river area. With the help of camera and image processing, surveillance can be made and monitored to check if any people are stuck in the flood and particular measures can be taken in saving their lives. As water pollution is also a major concern, pollution sensors can also be implemented with proposed system and can be placed near water bodies to monitor the level of water pollution. Since tides generated in the ocean generates power, this can be harnessed by implementing generators with the system and can be placed near sea shores.

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