FLOOD MONITORING AND EARLY WARNING SYSTEM USING RASPBERRY PI

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ABSTRACT- The humans 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.

KeyWords:-Raspberry Pi,Temperature and HumiditySensor(DHT11),Buzzer,Rain Sensor, Ultrasonic Sensor,Frame Work.

1. INTRODUCTION

To build up A Real Time Solution to Flood Monitoring Using IoTwe proposed a flood cautioning framework which expects regard for three essential variables: Data assortment by means of gaging, information preparing, and the equipment and programming required, and the dispersal of flood notice data. While robotized flood cautioning frameworks are frequently shockingly cheap to carry out, the essential factor deciding because of strange high downpour during rainstorm season. It was the most noticeably terrible flooding in Kerala in almost a century. In which more than 373 individuals passed on inside fortnight. 35 out of 42 dams inside the state open without precedent for history. Kerala got hefty rainstorm precipitation on the midevening of August and bringing about dams completely filling in the initial 24 hours of precipitation the state got 310 mm of rain.Flood is an unavoidable cataclysmic event in everywhere on the world, causing weighty progression of water and further more serious harm to properties and lives.

Catastrophic events have become a significant worry all through the world, particularly in the agricultural nations, for example:-Bangladesh, Malaysia and so on Flood is likewise one of the regular disasters. To forestall the overwhelming impacts of floods before such occasions happen, early admonition for individuals to clear in the close by zones can be successful in saving lives and to forestall debacles. Generally, flooding cannot be stopped and unavoidable, but early detection or warning system can be used to reduce losses faced by the citizen and government. For this reason, we need to create flood sensing devices which will detect the water and rain. This system is integrated to the microcontroller board which will help to send the data each time the water reaches the threshold value.
The Raspberry Pi module will help to connect the Wi-Fi device for internet and keep track of data on

a daily basis. The data through the esp32 module will be stored in a cloud. If water reaches threshold value, register mobile will get alert messages on their phone through Blynk application. This system can also predict the possibility of flooding before flooding takes place.

2. BACKGROUND
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 anarea 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. Somefloods develop slowly, while otherssuch as flash flood scan develop in just a few minutes and without visible signs of rain.

3. PROPOSED SYSTEM
In this proposed system, the raspberry pi-4model is used. It gets the values from Ultrasonic sensors and compute the values. The data will be sent to Wi-Fi device. Further the WIFI device sends all the sensed information to the client people through wireless communication. The water level readings will be stored in the cloud. For Prediction purposes we need the data in csv format. From the cloud we can convert the data in csv format because we need historical data for prediction purposes. Processed data will be sent to thecloud using Raspberry pi 4. Cloud will store the data and can be further used to predict the chances of floodpriorly.

4. METHODOLOGY
In this Block Diagram we will discuss about the connections of all other circuits with raspberry pi 4.And Raspberry pi 4 is the brain of the above circuit. In this methodology the Raspberry pi is connectedwith the buzzer,ultrasonic,temperatureand humidity sensor,dam gate control. To produce outputs at the respective blocks.
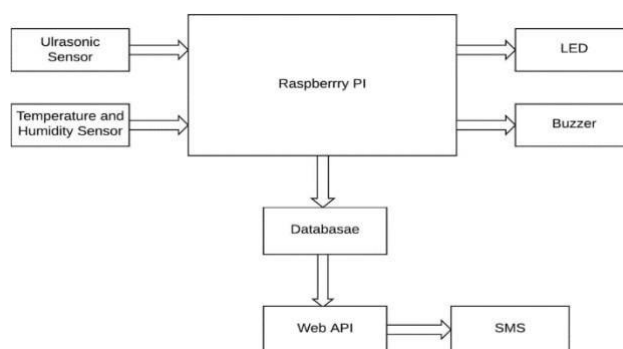

FIGURE 1:-BLOCK DIAGRAM5.RASPBERRY PI

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'dexpect a desktop computer to do, from browsing the internet and playing high definition video, to making spreadsheets, word- processing, and playing games.

6. TEMPERATURE AND HUMIDITYSENSORS(DHT11)
Temperature sensors measure air temperature, while humidity sensors measure air humidity.

The calculation of the air humidity does not directly influence a wind site assessment, but knowing this parameter helps assessing the potential danger ofice build-up at the measuring location. Temperature sensors should always be mounted at a height of at least 10m to ensure sufficient distance from heat radiating from the earth. This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor capability. It is integrated with a high- performance 8-bit microcontroller.
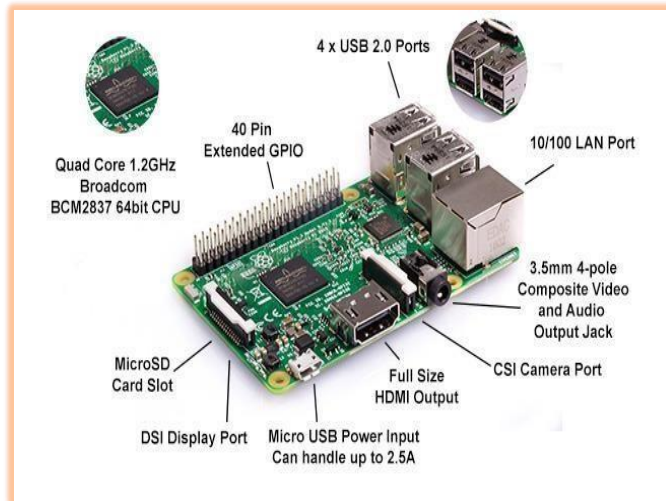

FIGURE 2:-RASPBERRY PI

7. SOFTWARE DESCRIPTION

Python was created by Guido van Rossum, a former resident of the Netherlands, whose favorite Circus. The source code is freely available and open for modification and reuse. Python has a significant number of users. Python is an interpreted, object-oriented programming language similar to PERL, that has gained popularity because of its clear syntax and readability.

8. BLYNK APPLICATION

Blynk platform powers low-batch manufacturers of smart home products, complex HVAC systems, agricultural equipment, and everyone in between. These companies build branded apps with no code and get the full back-end IoT infrastructure through one subscription.
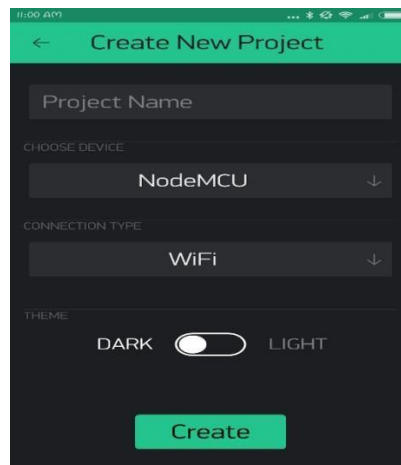
FIGURE 3:-BLYNK APPLICATION

9. APPLICATIONS

➢ The early flood detection and avoidance systemhas following applications.
➢ Early information about flood.
➢ Gives the real time temperature and humidity dataalong with level of water.

10.CONCLUSION

Finally, it is concluded that, the system can detect and hypothesize the flood earlier. The project is based on embedded system and close loop control system. System consists of hardware and software applicationsto detect water level of rivers, dams etc. System automatically detects the change in level of water and alerts the system when it crosses the threshold value(less than 15cm). The system include ultrasonic sensor to detect the rise in water level and alert if distance between water and sensor is less than 15 cm.DHT11 sense the temperature and humidity which helpto analysis the environmental factor for flooding.
If the water level crosses the threshold value than Raspberry pi turns the buzzer and led turn on which symbolizes the warning for early flood.

11.RESULT

After all the complete connections of the system weremade successfully along with the required software, the system was ready for testing. Individual models were tested at the beginning of the project. The systemwas tested for analyzing the various parameters such as temperature, humidity and level of water.
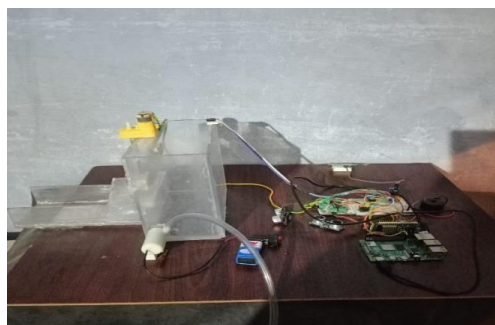
FIGURE 4:- EXPERIMENTAL SET UP
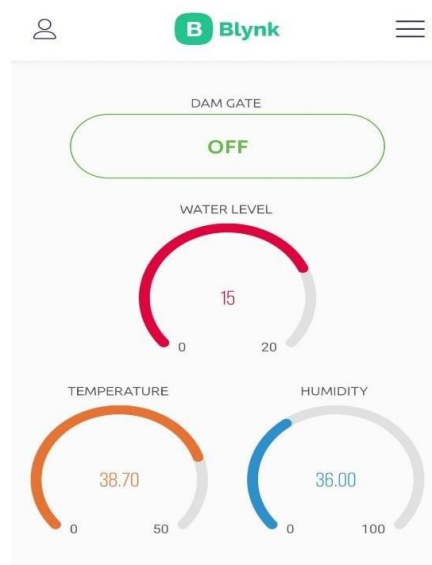
FIGURE 5:-OUTPUT RESULTS

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