

FLOOD FORECASTING AND EARLY WARNING SYSTEM BASED ON INTERNET OF THINGS

Mrs J.Aparna Priya 1, k.Navya 2

1) J.AparnaPriya, Assistant professor, Anurag Group of Institutions, Hyderabad, Telangana, India

2) K.Navya, Anurag Group of Institutions, Hyderabad, Telangana, India

ABSTRACT

The proposed project provides a flood forecasting and early warning system which would be helpful to flood prone areas. Measuring water level in Dams, rain falling and flow rate through distribution networks. The data from sensors is continuously uploaded to the cloud hosted for flood management system. This system also enables message alert to the mobile users and the buzzer will be ON. That not only gives us a warning but also it tell us approximate time that there is possibility of flood so the people will be alert in advance the accurate calculation of flood and early warning without human intervention.

Early warnings with respect to natural disasters especially flood predictions play a vital role in saving precious lives and assets. specially the flood have become most disastrous happenings in the last few decades the main reason that leads to unique geo-climate surroundings in that the cause of heavy rainfall.

Keywords: Raspberrypi3, ultrasonic sensor, waterflow sensor, rain fall sensor

I.INTRODUCTION

Early warnings with respect to natural disasters, specially floods and drought predictions play a vital role in saving precious lives and assets. Globally, there has been an increase in the concern regarding natural disaster potential

hazards and environmental risks as recently the number of occurrences of these have escalated.

Especially, the floods have become the most disastrous happenings in last few decades. Most of its population gets affected by floods. The main reason that leads to this is the unique geo-climate surroundings and the geography and environmental states that cause heavy rain fall especially in the northern part of Pakistan ultimately causing flooding and affecting major areas of the country every year. People have to sacrifice their wealth, lives, property etc...

All over the country due to floods. The conventional remote sensing and manual monitoring of water-level cannot generate Effective flood/drought warnings that result in immense amount of damage.

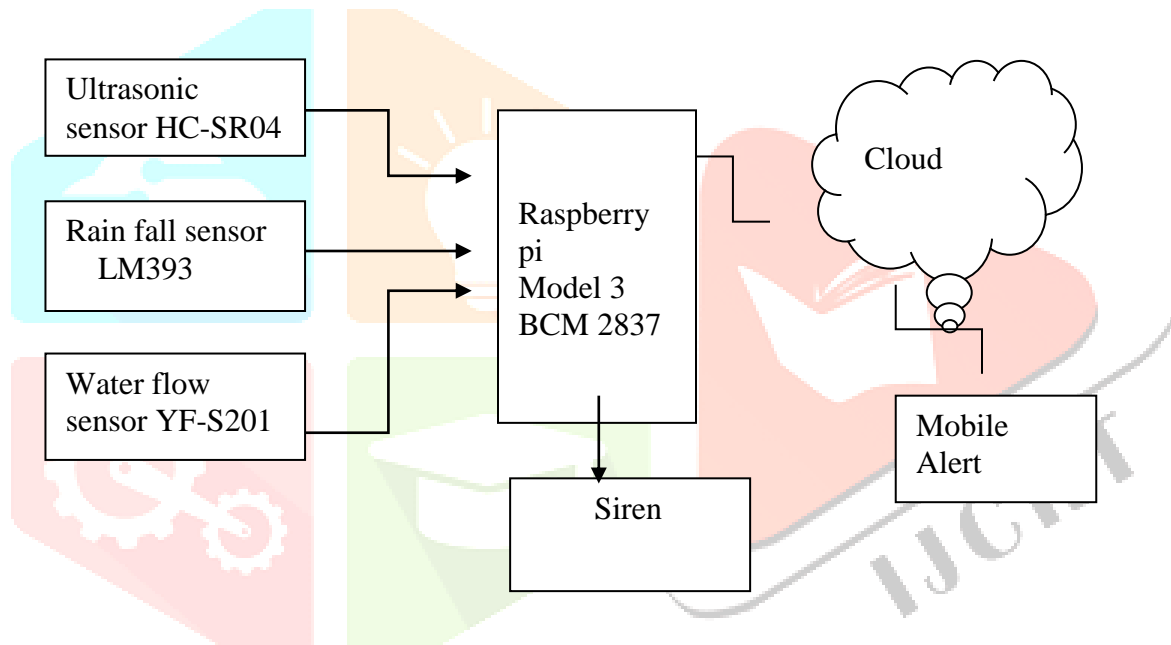
II.LITERATURE SURVEY

This Paper consists of design and development of a flood forecasting and early warning system in real time has been reported in this paper. The system principally such as water level monitoring and water flow and rain fall measurement has been developed The system can monitor the status of flood forecasting send an sms via FCM(fire based cloud message).automatically.

The providing flood forecasting is a part of flood management planning and development strategies. These strategies address occupied flood prone areas where non-structural measures can be effective, for example temporary defenses such as flood gates or movable barriers, or domestic protection such as sandbagging, as well as local evacuation to flood shelters. Flood management requires engaging water management agencies and local or municipal authorities, along with transport and

communications operations and emergency services. Flood forecasting has to provide information to these users so they can prepare and respond. In extreme cases flood forecasting is part of a wider disaster management capacity devolving from the highest level of government. The precise role of flood forecasting will vary according to the circumstances dictated by both the hydro-meteorological environment and the built-up environment.

BLOCK DIAGRAM:



**III.HARDWARE IMPLEMENTATION
MODULES DESCRIPTION**

1.RASPBERRY PI 3 MODEL B

Fig: Printed Circuit Board Of Raspberrypi 3 Model B

Raspberry Pi as sever was chosen because it draws extremely low power, small form factor, no noise, solid state storage. Raspberry Pi model B developed by raspberry pi based on ARM1176JZFS, 700 MHz processor, is present as a local web server. For Raspberry Pi hardware debian optimized operating system raspbian is used. For long and effective wireless transmission

Zigbee series 2 module was interfaced with it. It provides extensive hardware support for packet handling, data buffering, burst transmission, clear channel assessment, link quality and indication

BCM2837 features:

- AT Raspberry Pi board contains BCM2837 controller which supports ARMv7 Quad core processor processing unit which supports following features.
- BCM2837 contains the following peripherals which may safely be accessed by the ARM:
 - supports 1GHz processing unit frequency
 - Timers
 - Interrupt controller
 - GPIO
 - USB
 - PCM / I2S
 - DMA controller
 - I2C master
 - I2C / SPI slave
 - SPI0, SPI1, SPI2
 - PWM
 - UART0, UART1

Ultrasonic transmitter emitted an ultrasonic wave in one direction, and started timing when it launched. Ultrasonic spread in the air, and would return immediately when it encountered obstacles on the way. At last, the ultrasonic receiver would stop timing when it received the reflected wave.

Ultrasonic Application Technology is the thing which developed in recent decades. With the ultrasonic advance, and the electronic technology development, especially as high-power semiconductor device technology matures, the application of ultrasonic has become increasingly widespread:

3. RAIN FALL SENSOR

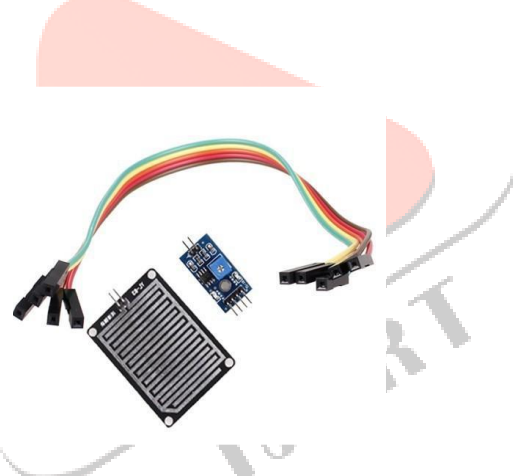


Fig: Rain Fall Sensor

Description:

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity through a potentiometer.

2. ULTRASONIC SENSOR

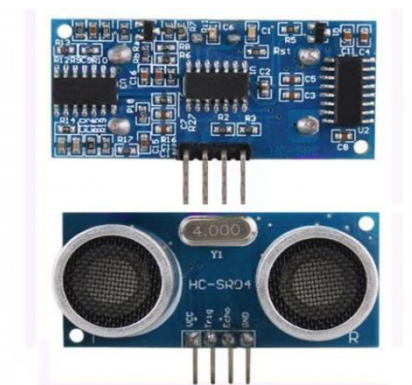


Fig: Ultrasonic Sensor

The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level.

4. WATER FLOW METER / SENSOR

This sensor sits in line with your water line and contains a pinwheel sensor to measure how much liquid has moved through it. There's an integrated magnetic hall effect sensor that outputs an electrical pulse with every revolution. The hall effect sensor is sealed from the water pipe and allows the sensor to stay safe and dry.



Fig:Water Flow Sensor

IV RESULT

TEST PLAN

- First raspberry pi is powered and ethernet cable is connected to raspberry pi ethernet shield
- Water Level from Ultra Sonic Sensor is read and uploaded to webpage.

- Flow Sensors data is read and uploaded to webpage.
- When the dam level3 is full message alert is given to the people using FCM (firebase cloud message) and the siren will be ON the people will be alert .



Figure: complete project kit

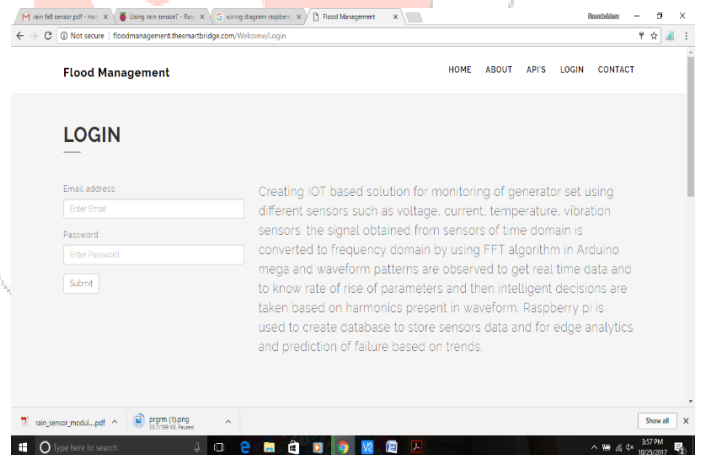


Fig: login page of web page

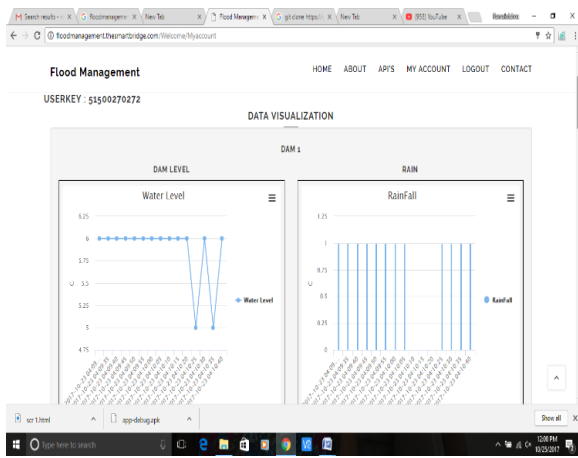


Fig:Data visualization of damlevel1 and rain fall

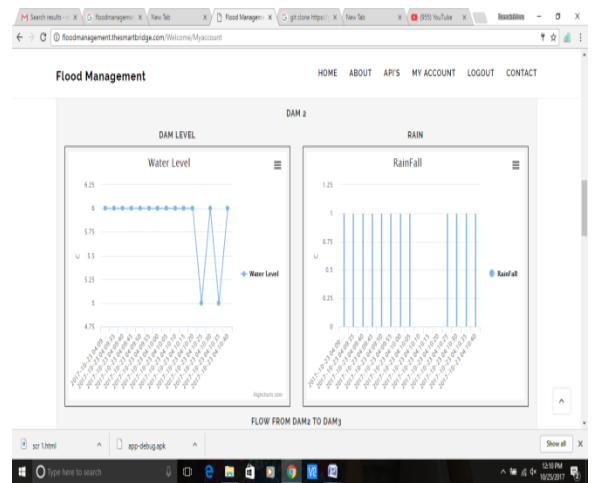


Fig:Data visualization of damlevel2 and rain fall

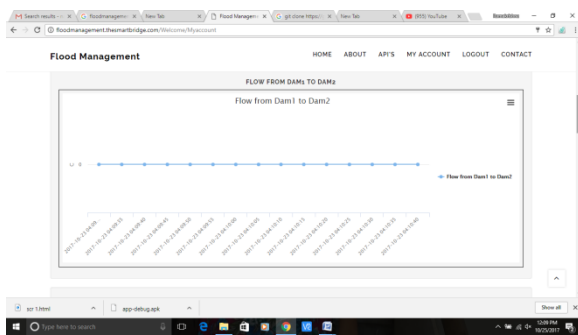


Fig: water flow of flood management

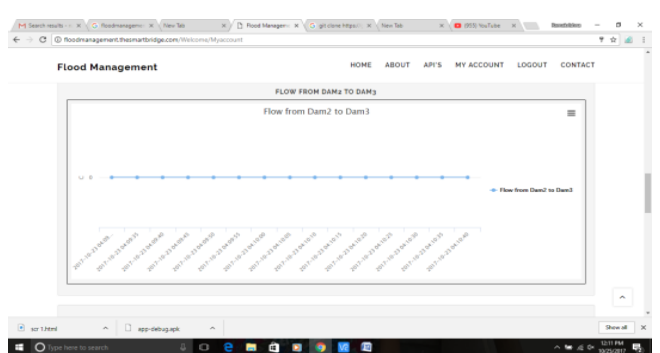


Fig:Data visualization of water out flow

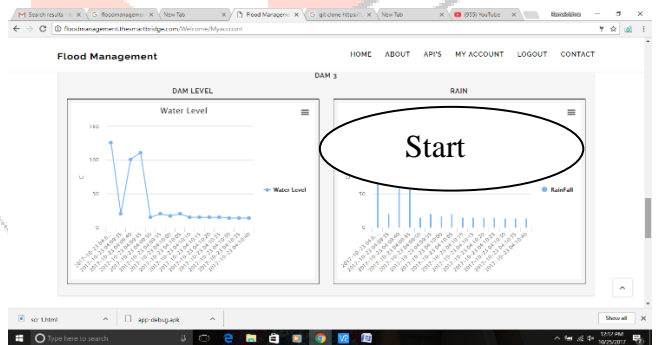
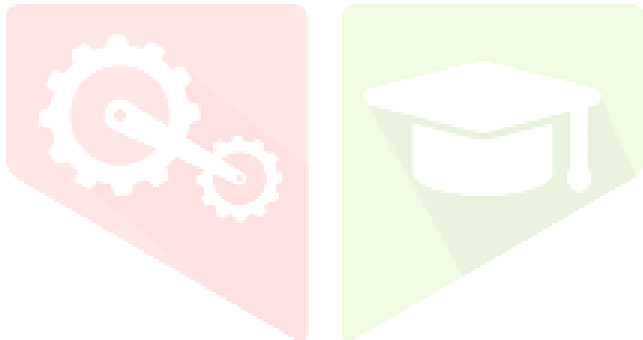
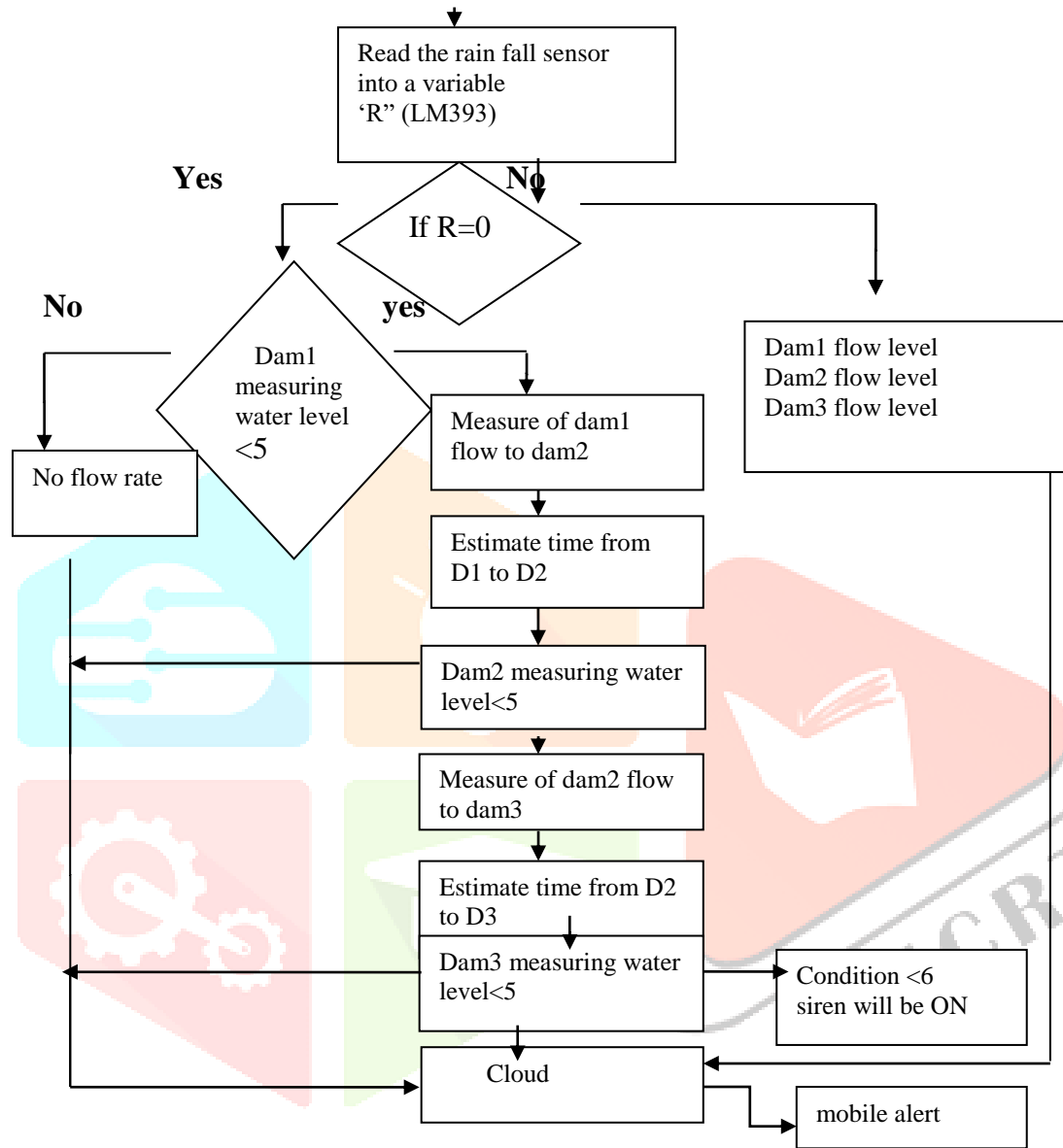


Fig:Data visualization of damlevel 3 and rain fall



FLOW CHART:



V SOFTWARE REQUIREMENTS

- Operating System - Linux
- Server design - PHP
- Database Design - MySQL
- Web page Design -Bootstrap
- Language - Python

VI CONCLUSION AND FUTURE SCOPE

The system is to warn people in the upstream and the downstream about upcoming flash floods and monitoring rainfall.

We can detect the rainfall by using rainguage in centimeters we can collect previous data from the weather forecasting station and we can alert the people before heavy rainfall we will know where there is the possibility of rainfall so that we

can intimate people where the flood will be arriving. so the people move to the safe places or at least they prepare before some damage happens.

REFERENCES

- [1] A.A.PsndUdayBhave, "Flood detection system using wireless sensor network," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 5, no. 2, pp. 386–389, Feb 2015.
- [2] F. F. Commission, "Flood risk management," <http://www.ffc.gov.pk/downloads.aspx>, 2015 (accessed July 30 2015).
- [3] M. Abdullah, "Simulation of wireless sensor network for flood monitoring System," Lecture Notes in Computer Science, Springer, vol. 8519, pp. 255–264, 2014.
- [4] M. Islam, T. Islam, M. Syrus, and N. Ahmed, "Implementation off lash flood monitoring system based on wireless sensor network in Bangladesh," in Informatics, Electronics Vision (ICIEV), 2014 International Conference on, May 2014, pp. 1–6.
- [5] NDMA, "Flood-watch," <http://disasterinfo.gov.pk/floodwatch/>, 2015 accessed August 2 2015).
- [6] S. S. Mane and M. K. Mokashi, "Survey on real-time flash-flood monitoring, alerting and forecasting system using data mining and wireless sensor network," International Journal of Advance Research in Computer Science and Management Studies, vol. 2, no. 12, pp. 297–302, December 2014.

