

IOT BASED EARLY FLOOD DETECTION AND AVOIDANCE

U.Venkatesh kumar¹ Arjun.T.K² Hari Prasad.S³ Clinton.P.S⁴
¹Assistant Professor,²34UG scholar, ECE Department
Sri Krishna Collage Of Technology,
Coimbatore,
India

Abstract: Floods are a constant threat throughout the years to the united states and its territories like Puerto ricoa; through there are various methods of alerts available such as the emergency broadcast system or sirens, none of these can alert a user remotely in an efficient and timely manner. The design goal of this project is to provide a real time system able to monitor sudden floods."IoT early flood detection and avoidance 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 the 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 a Wi-Fi connectivity, thus its collected data can be accessed from anywhere quite easily using IOT.

Index term:

I. INTRODUCTION

Flood occurs when water overflows from the river, lake or from heavy rainfall and it can happen a any time of the year. Flooding can be very dangerous, when floods happen in an area that people live ,the water carries along objects like houses, cars ,furniture's and even peoples.it can wipe away property, tree and many more heavy items. For years,. Through the local government unit flood control has been extending their efforts to inform the commuters regarding the situation in flooded areas during rainy season, still the dissemination of information to the local are not enough. For this reason the "arduino flood detection system" is been developed. Which gives an alert to locals rural area situated near by the flood effected area by an alarming siren .the flood is detected by the ultrasonic sensor which show the distance of the average level to the flow of water and the rise of water during heavy rainy season and the level reaches the level of caution and the flow of water is found by the float sensor and the siren is rang when the water reaches the caution level which is detected by a water level sensor. The data are collected and the system has Wi-Fi features which are useful to access the system and its data over IoT.

II. EXISTING SYSTEM

In existing system there no flood alerts able systems. Disaster flood alert system using GSM and ultrasonic frequency sensors is one of the important technology which is useful to make the people alert from disaster flood, in this paper ultrasonic transducers are used to find out the water level of the flood, and then information given to the controller and GSM ,this system continuously send the messages towards control room about the level of the flood when water level will change. There are several disadvantages in the existing system .there is no wireless system for data transfer. The existing system cannot be able to operate without caregivers. This made this system to have high cost and more time consumption. The existing system has no privacy security system which was a great drawback of the system.

III. PROPOSED SYSTEM

In this proposed system the flood is detected using various natural factors like humidity, pressure, temperature, water level and flow level. The data are collected using various sensors. Here we use temperature and humidity measure using DHT11 digital temperature humidity sensor water level is measured using float sensor which work by opening and closing circuits as water level falls and rises. The proposed system provides various advantages like their data can be stored and the data can be measured to measure with the previous floods occurred to find out the damage this can cause or the data can be used for future use. The data are stored in an web application using IoT systems. The web application can be used by several users at any time to check the status of whether a flood occurs or not anywhere at any time .

IV. IMPLEMENTATION

To detect a flood the system observes various natural factors, which include humidity, temperature; water level and flow level.to collect the data of mentioned natural factors. the system consist of different sensors which collects data for individual parameters.

For detecting changes in temperature sensor.it is an advanced sensor module which consists of resistive humidity and Temperature detection components. The water level is always under observation by a float sensor, which work by opening and closing circuits (dry contacts) as water levels rise and fall.it normally rest in the closed position, meaning the circuits is incomplete and no electricity is passing through the completed circuit to trigger an alarm. The flow sensor on the system keeps eye on the flow of water. The water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The system also consists of a HC-SR04 ultrasonic range finder distance 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 an object from the sensor. All the sensors are connected to arduino UNO, which processes and saves data. The system has Wi-Fi feature, which is useful to access the system and its data over IoT. Using IoT the flood can be detected at any time at anywhere just by using the web application created for storing the data and to access the data stored in IoT.Flood detecting notification by using wireless sensor network is to detect the flood in advance way. Using the Wi-Fi module the data are stored in the IoT.The data's are updated and stored in the web application in every 15 seconds.in our system we can monitor the data collected from sensors from a web application by logging into it.every user who needs to log in into the web application will be given with a username and password and they can log in with the give username password. The web application is created in a website called thingspeak.com.After logging in the web page take to the next tab consisting of the collected data of the collected data from the various sensors. In this system two significant things include hardware design and software development. The hardware part is very important for the system that can be able to control the whole system and the transmitter and receive the signal. Refer fig-5.1 for the block diagram.

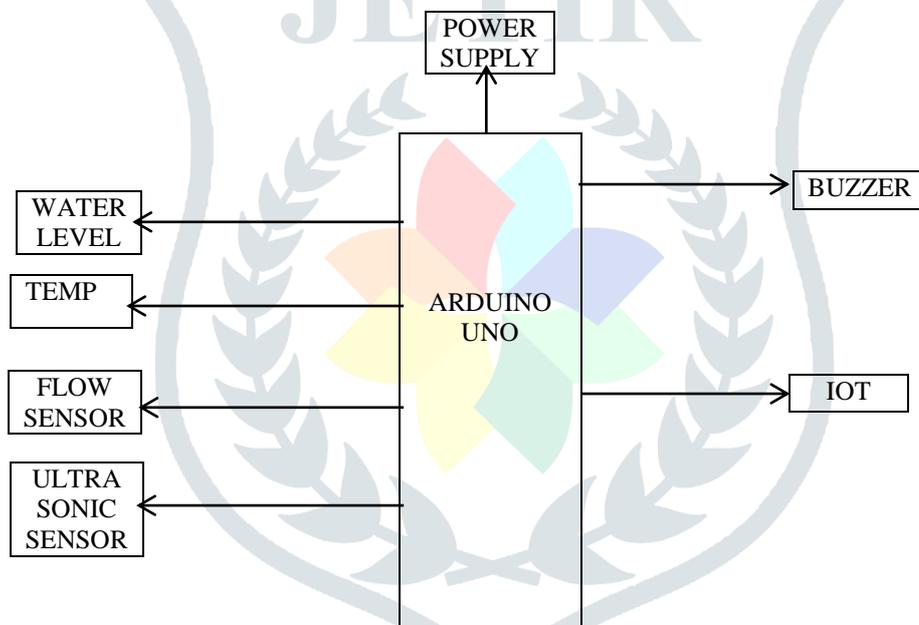


Fig-5.1 The Block

The picture of the sheet showing ultrasonic distance refer fig-5.2

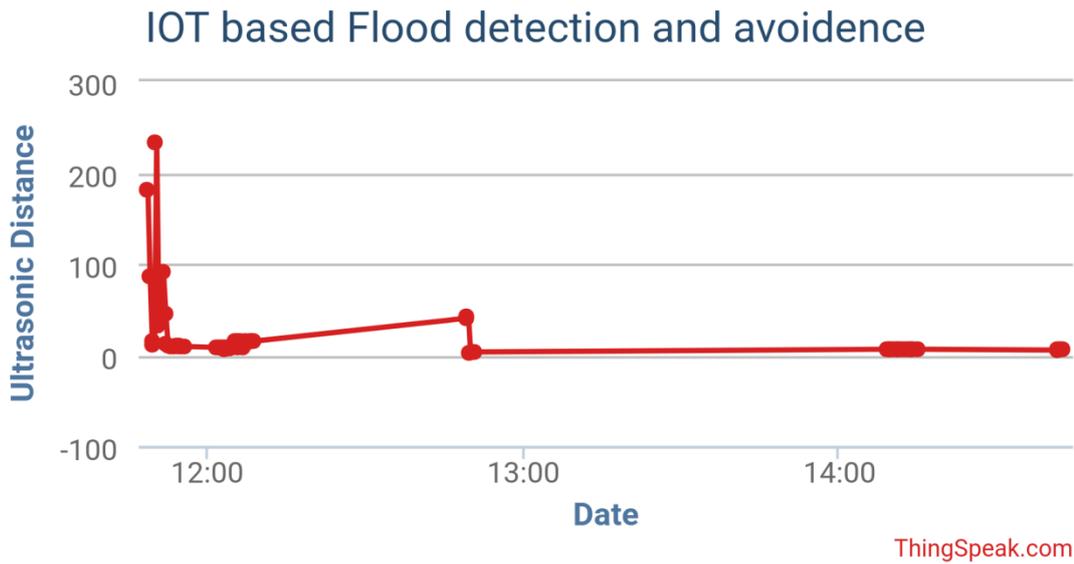


Fig-5.2 Ultrasonic distance Graph

The picture of the sheet showing water level refer fig-5.3

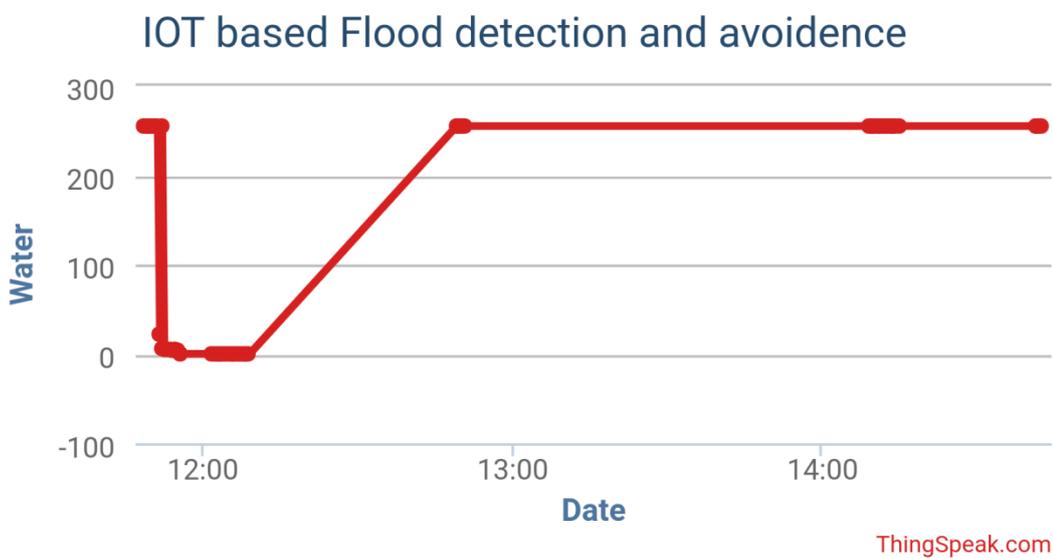


Fig-5.3 Water level Graph

The picture of the sheet showing temperature refer fig-5.4

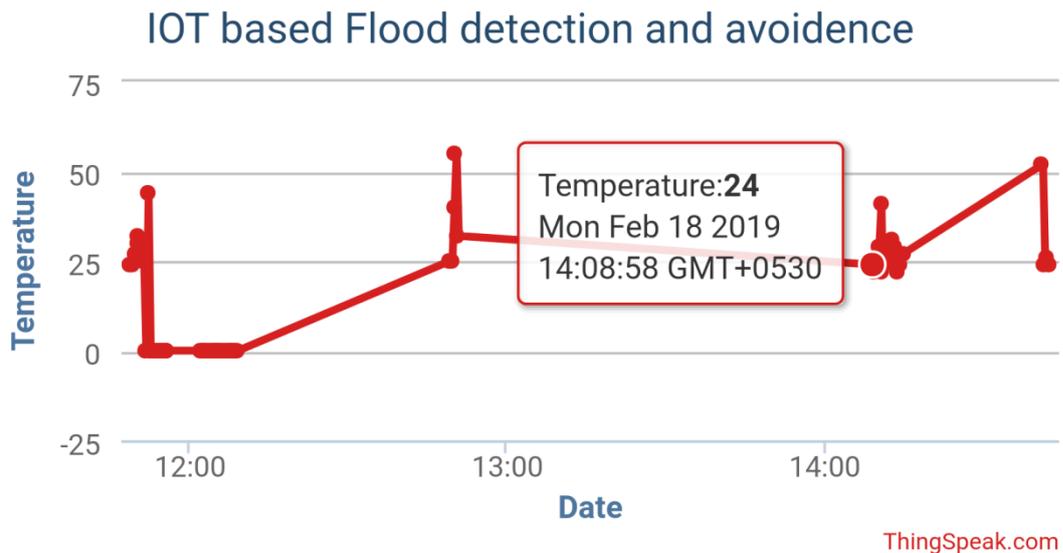


Fig-5.4 Temperature Graph

The picture of the sheet showing water flow refer fig-5.5

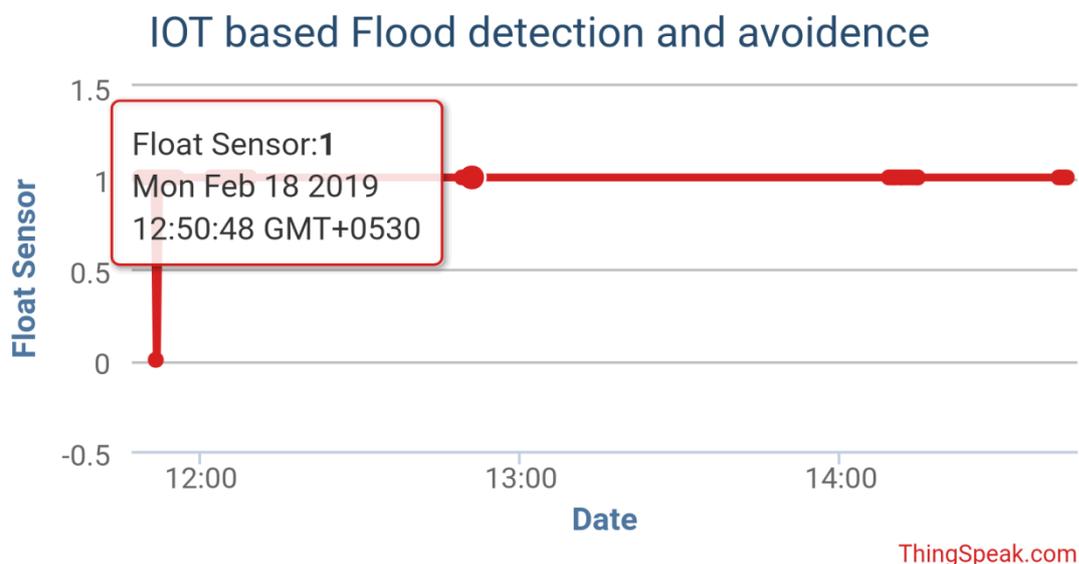


Fig-5.5 Water Flow Graph

V.HARDWARE:

5.1 Arduino UNO

The arduino Uno is a microcontroller board based on the ATmega328 (datasheet).it has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, a power barrel jack, an ICSP header and a reset button contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB –to–serial driver chip. Instead it features the Atmega16U2 programmed as a USB-to-serial converter.arduino Uno operates at 5V and 3.3V.the second one is not connected pin. Uno has a frequency (clock speed) of 16MHZ .Its EEPROM is 1KB and the SRAM is

2KB.arduino can be used to communicate with a computer another arduino board or other microcontroller. The ATmega328P microcontroller provides UART TTL (5V) serial communication which can be done using digital channel this serial communication over USB and appears as a virtual com port to software on the computer. There are two RX and TX LEDs on the arduino board which will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer. A software serial library allows for serial communication on any of the Uno digital pins communication. The arduino software includes a wire library to simplify use of the I2C bus.



Fig-5.2 Arduino Uno

5.2 Power supply

Power supply that supplies power to computer. Most personal computers can be plugged into standard electrical outlets. The power supply then pulls the required amount of electricity and converts the AC current to DC current. A power supply unit converts main AC to low-voltage regulated DC power for the internal components of a computer. While an ATX power supply is converted to a main supply it always provides a 5Volts standby (5VSB) voltages so that the standby functions on the computer and certain peripherals are powered.



Fig-5.3 Stepdown Transformer

A transformer that increases voltage from primary to secondary (more secondary winding turns than primary winding turns) is called a step-up transformer. Conversely a transformer designed to do just the opposite is called a step-down transformer is actually quite simple. The transfer has more turns of wire on the primary coil as compared to the turns on the secondary coil. This reduces the induced voltage running through the secondary coil, which ultimately reduces the output voltage

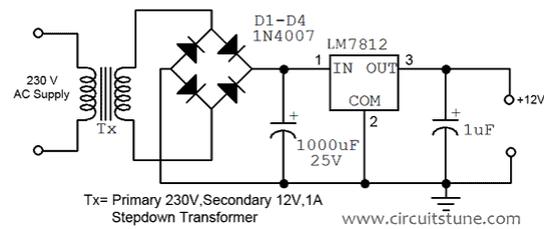


Fig-5.4 Power Supply Diagram

5.3 Water level sensor

This is simple and small portable water level/water droplet identification detection sensor water that has high cost performance. Complete water yield and analog conversion, the output value apply to your custom function. It is low power consumption and high sensitivity. It can make better performance with Arduino 328 controller and sensor relay shield. Water level sensor is an easy-to-use, cost-effective high level drop recognition sensor, which is obtained by having a series of parallel wires exposed traces measured droplets/water volume in order to determine the water level. Easy to complete water to analog signal conversion and output analog values can be directly read Arduino development board to achieve the level alarm effect.



Fig-5.5 Water level sensor

5.4 Temperature Sensor

The temperature sensor LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of room temperature and over a temperature of -55°C to 155°C temperature range.



Fig-5.6 Temperature sensor

5.5 Ultrasonic sensor

Ultrasonic ranging module HC-SR04 provides 2cm-400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The module includes ultrasonic transmitter, receiver and control circuit. The basic principle of work, using IO trigger for at least 10µs high signal. The module automatically sends eight 40kHz and detect whether there is a pulse signal back, if the signal back through high level, time of high output IO durations is the time from sending ultrasonic to returning. It needs a supply of 10µs pulse to the trigger input to start the ranging and then the module will send out an 8 cycle burst of ultrasound at 40 kHz and raise its echo. The echo is a distance object that is pulse width and range in proportion



Fig-5.7 Ultrasonic sensor

VI.

VII. Conclusion

The application of urban flood control management system which is used on internet of things technology provides comprehensive monitoring and pays more attention to the management of urban drainage and flooding prevention. It also provides operational services, conducts the monitoring and realizes the comprehensive supervision management early warning management and investigations management which has not yet only improved the flood control decision making and drainages, but also the city flood control capacity has been significantly improved. It leads to continuous contribution to the second society and harmonious development and construction.

VIII. References

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