SIDDANANGA INSTITUTE OF TECHNOLOGY TUMAKURU

MINI PROJECT PRESENTATION ON

EARLY FLOOD DETECTION AND AVOIDANCE USING IOT

DEPARTMENT OF ELECTRICAL AND ELECTRONICS

Under the guidance of

K.C.RUPESH

Assistant Professor

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SUBMITTED BY

CHANDRASHEKAR V S -1SI20EE010

HARINI J M -1SI20EE013

YOGESH KRISHNA H M -1SI20EE042

G R SANTHOSHAREDDY -1SI21EE401

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INTRODUCTION

- “IoT Early Flood Detection & 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 minimise 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 a wifi connectivity, thus it’s collected data can be accessed from anywhere quite easily using IoT.
- To detect a flood the system observes various natural factors, which includes humidity, temperature, water level and flow level.
- To collect data of mentioned natural factors the system consist of different sensors which collects data for individual parameters.

PROBLEM STATEMENT

The Main problems in INDIA with respect to floods are inundation, drainage congestion due to urbanization and bank erosion. The problems depend on the river system, topography of the place and flow phenomenon. The catchments of these rivers receive large amount of rainfall .

Floods lead to a vast loss of life and property in many countries. But in developing countries the lack of proper technology leads to more loss of life and property due to flood. This is due to lack of flood detection systems. Our project solves problem by implementing an early flood detection mechanism

MOTIVATION

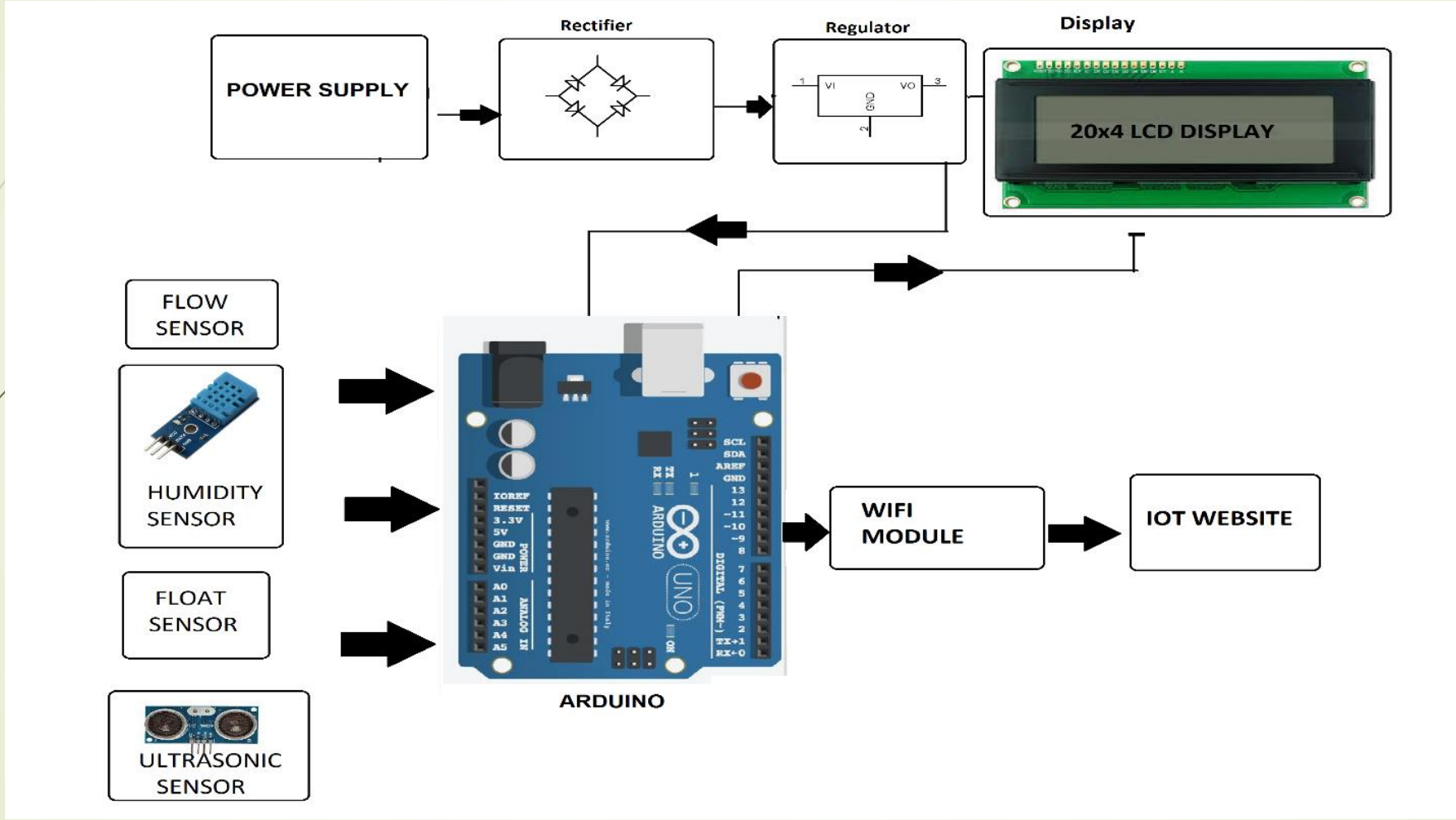
> To detect the raise in water level and flood
>Safety of residents
>To alert the sailors,cargo and authorities

LITERATURE SURVEY

Title	Year	Author	Technique	
Automatic water level controlling system	2013	Asaad Ahmed Mohammedah	Using arduino we are measuring the level of the water in the tank and well.	It serves us to control and monitor the fluid level under the major problem of water scarcity. The one of the most frequent problems and issues , that we are facing in today's world is demand in water, to overcome that we are**Literature survey** introducing Automatic fluid level control system
Water level monitoring using zigbee based wireless sensor n/w	2009	Zulha Nirasin	Wireless sensor network like wifi using	The Water monitoring system using zig-bee based wireless sensor network. Using the wireless sensor network the water level can be determined and controlled using sensor nodes. The actions involved in this module to monitor and control the water.
environmental parameters monitoring& controlling system	2017	Dr. Virendra V	model using environmental parameters	Model using environmental parameters such as humidity, temperature, pressure and rainfall were used by an array of sensors and then the data created is compared using ANN techniques

Automatic controller of water plc controller of HMI	**2013**	**Rishab Das**	**float sensors. Float sensors are used to devices to check.**	**The model along with the HMI was created to describe the establishment of automation of liquid level controller. Changes may be done with the help of float sensors which will surely ensures the appropriate level of water with the high level of cost and the razor in sensors while checking the level of liquid will leads to damages in outputs.**
Automatic conteroller by short message service(sms)	2014	Sanam Pudasai	Relay circuit connected with the sensors	This paper decides to increase in upgrading the water level monitoring system additionally with the GSM module to notify the the person who is the security for those issues through the Short messaging system (SMS) service.The sms is passed to the person who's is incharge when the liquid level crosses the border through the notification sent to the mobile

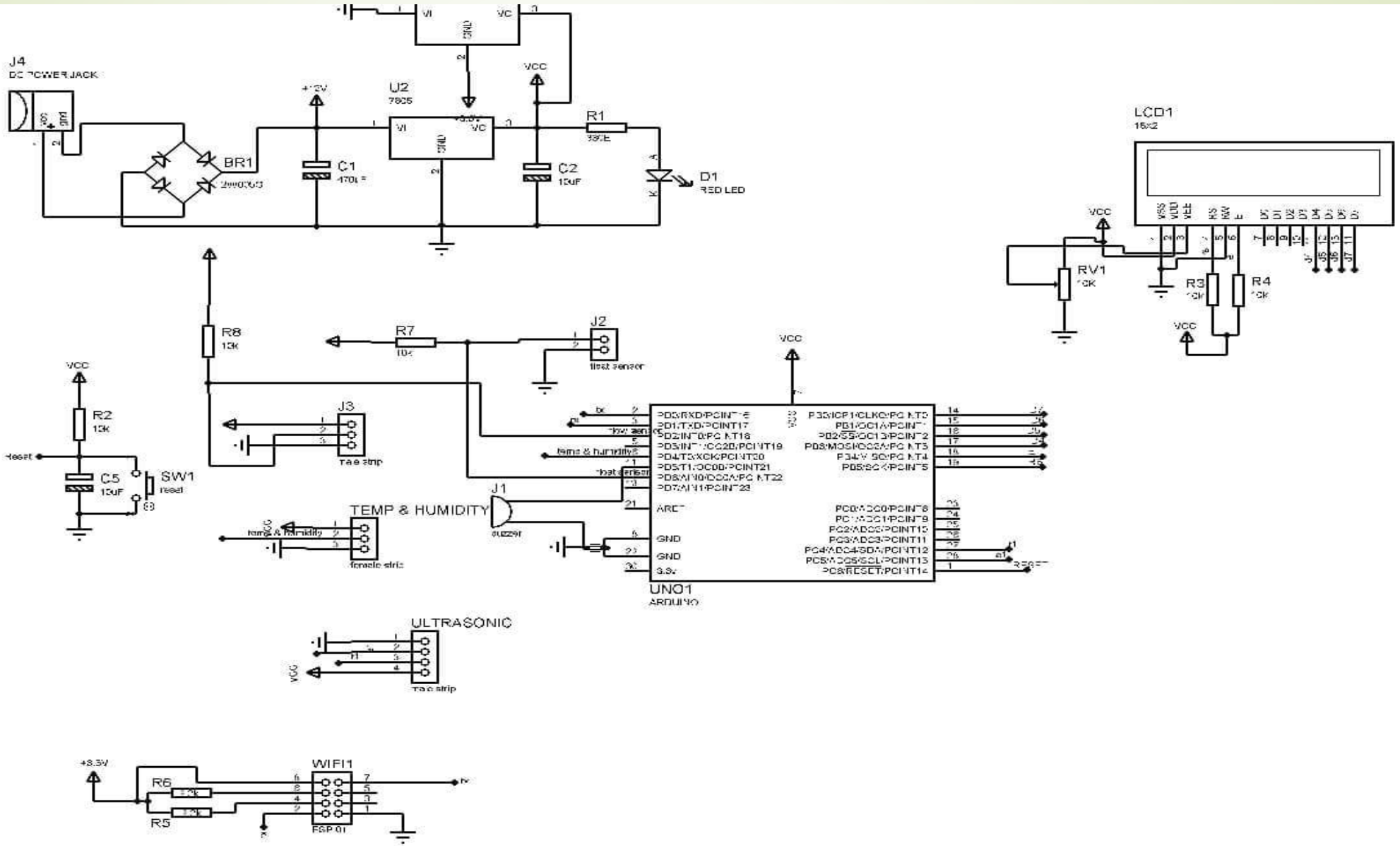
BLOCK DIAGRAM



WORKING

- To detect a flood the system observes various natural factors, which includes humidity, temperature, water level and flow level.
- 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 a advanced sensor module with 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 circuit is incomplete and no electricity is passing through the wires yet. Once the water level drops below a predetermined point, the circuit completes itself and sends electricity 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 consist 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 wifi feature, which is useful to access the system and its data over IoT.

Circuit diagram



HARDWARE AND SOFTWARE COMPONENTS

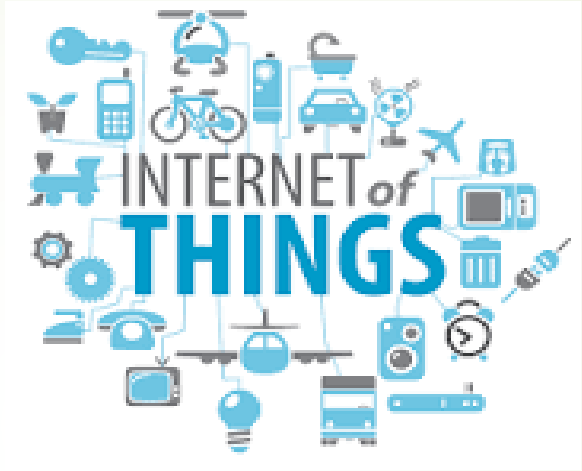
Hardware Components

- Arduino Uno
- Wifi Module
- Temperature Humidity Sensor
- Ultrasonic Sensor
- Water Flow Sensor
- Water Level Sensor
- LCD Display
- Resistors
- Capacitors
- Transistors
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Transformer/Adapter
- Push Buttons
- Switch
- IC
- IC Sockets

Software Specifications

- Arduino Compiler
- MC Programming Language: C
- IOT Gecko

IOT



The Internet of Things (IOT), is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

AURDINO UNO

>The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller .
>The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.
>The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.
> It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts

HC-SR04 Ultrasonic Module

≥An HC-SR04 ultrasonic distance sensor actually consists of two ultrasonic transducers.
>One acts as a transmitter that converts the electrical signal into 40 KHz ultrasonic sound pulses. The other acts as a receiver and listens for the transmitted pulses.When the receiver receives these pulses, it produces an output pulse whose width is proportional to the distance of the object in front.

Water Flow Sensor

≥Water flow sensor is made up of plastic valve system, a water rotor, plus a hall-effect detector.
>Its rate varies with another speed of flow. The hall-effect sensor outputs the corresponding heartbeat

DHT11 Digital Temperature Humidity Sensor

>The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor.

>It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed).

FLOAT SENSOR

>A device used to detect the level of liquid within a tank.

>The float sensor consists of an electromagnetic switch. It operates just like any other switch.

LCD Display

>The term LCD stands for liquid crystal display which displays the output

ESP8266 Wifi Module

>ESP8266 WiFi Module is an integrated TCP/IP protocol stack with an independent SOC with that can give any microcontroller access to your WiFi network.

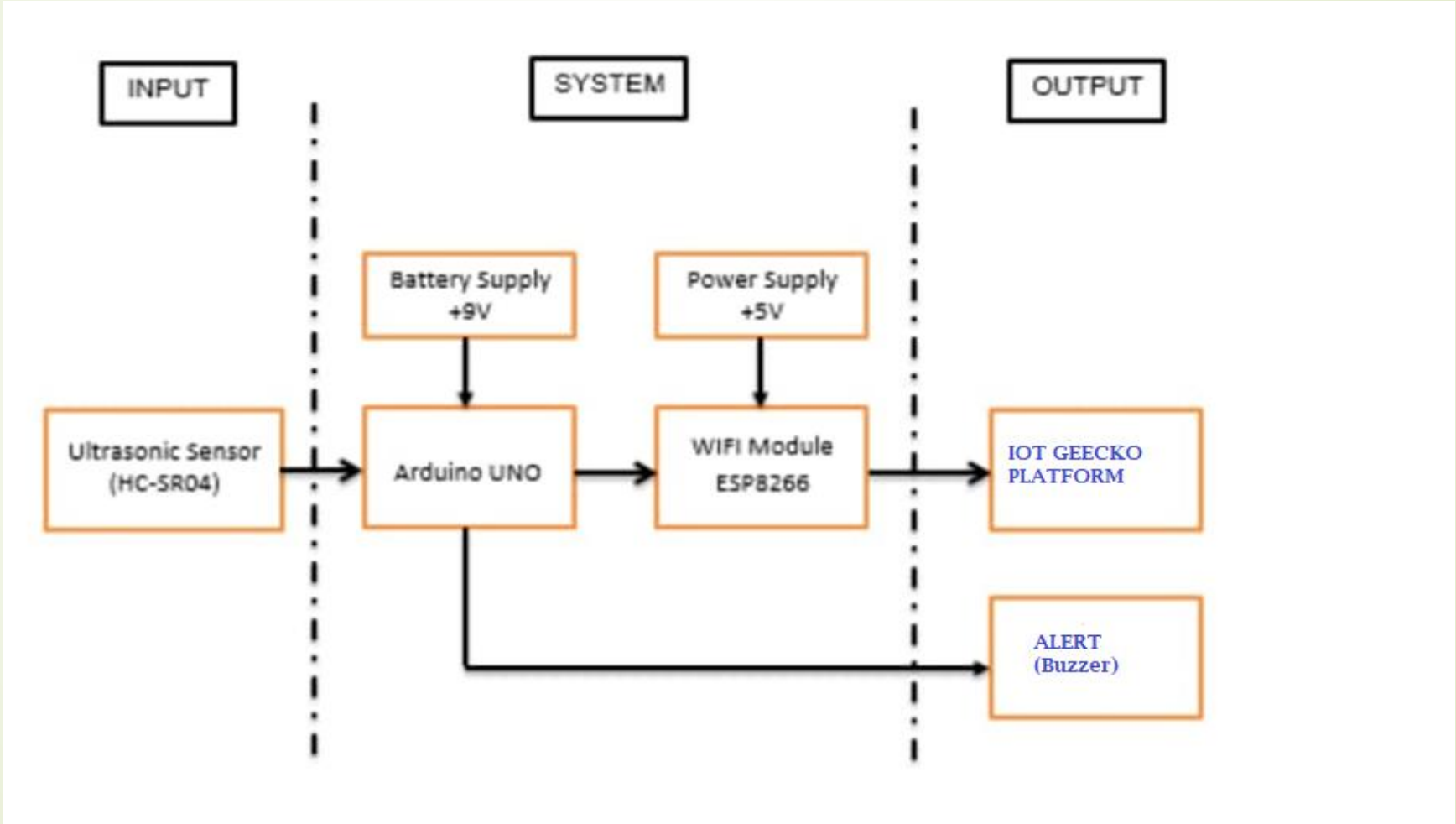
PCB – Printed Circuit Board

>it is a non-conductive material with conductive lines printed or etched

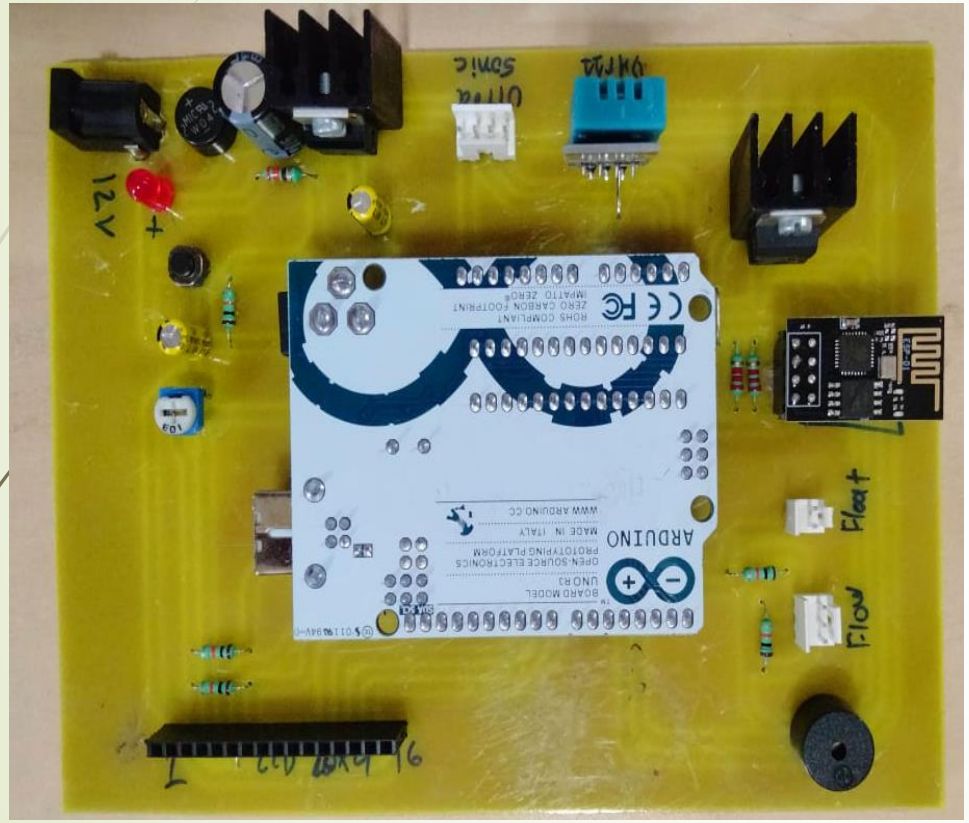
>A printed circuit board (PCB) mechanically supports and electrically connects electronic components or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate.

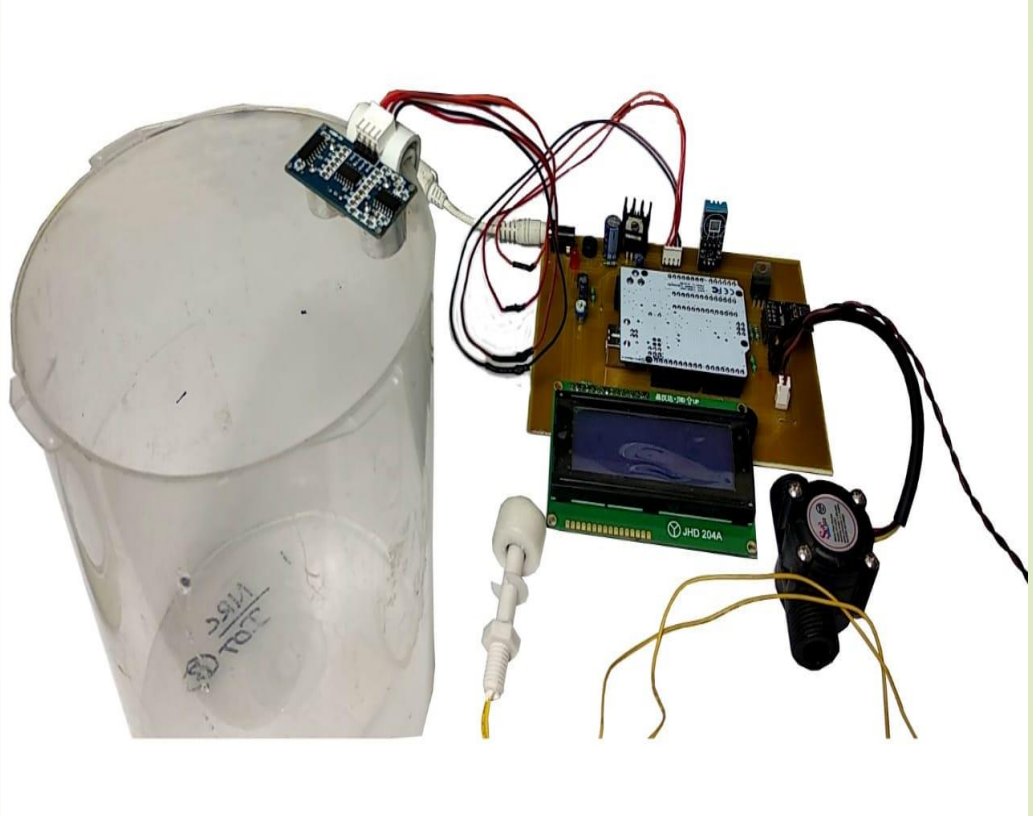
>Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it

FLOW DIAGRAM



Work done till date





FUTURE WORK:

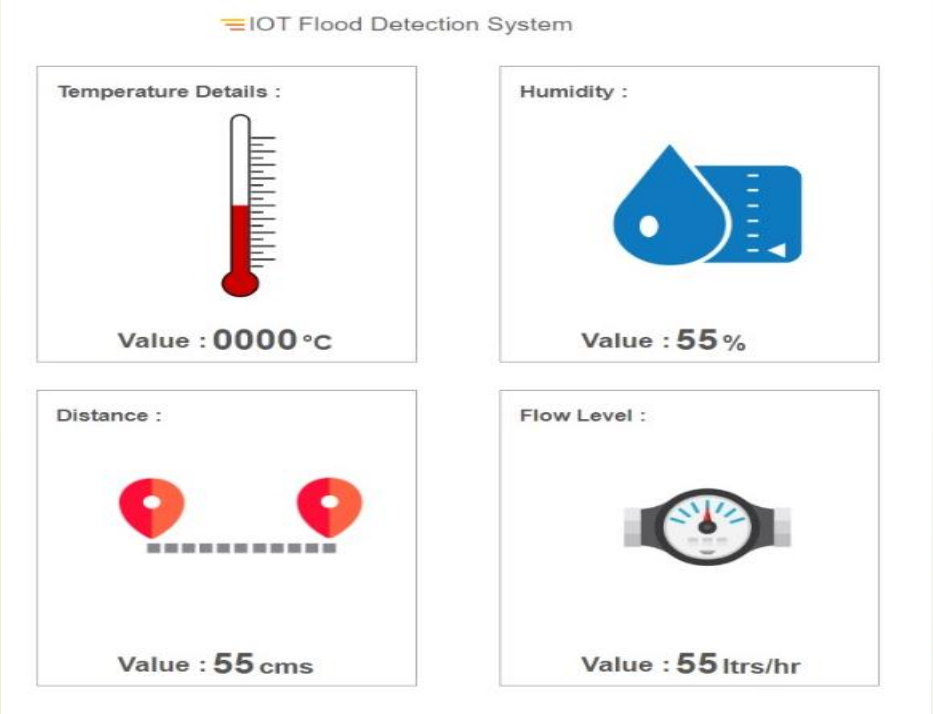
>Code correction

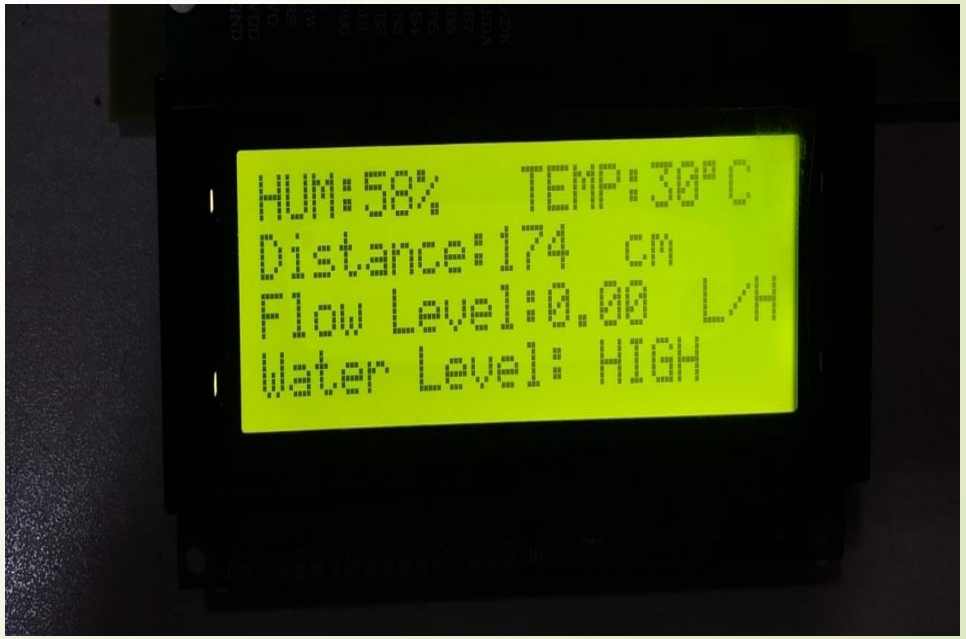
> Testing

>Result analysis

EXPECTED OUTCOME

The expected outcome of this project is to create the Flood Monitoring and Alerting System using Arduino UNO, ESP 8266 Wi-Fi module, DHT11 (Temperature and Humidity Sensor), HC-SR04 (Ultrasonic Sensor), Flow Sensor, LCD display.
And also to implement Alerts and Real-time readings on the LCD and IOT GEECKO which allows us for flood Monitoring of the system.





CONCLUSION AND FUTURE SCOPE

This project highlights the possibility to provide an alert system that will overcome the risk of flood. As the project is enabled with IOT technology and hence the sensor data can be monitored from anywhere in the world.

More sensors can be integrated into the system in order to create more accurate and efficient flood detection system.

It can also contribute to multiple government agencies or authority that ultimately help the society and mankind about the flood like hazardous natural disaster.

It will monitor each and every aspect that can lead to flood. If the water level rises along with the speed, it will send an alert immediately.

It also ensures increased accessibility in The Future scope of the project is , flood can also be related to the intensity of rainfall, which is the height of the water layer covering the ground in a period of time. Hence the development of a rainfall forecasting sensor
eventually turn up to the early flood monitoring and detection, Scholarly studies are ongoing and can be implemented to our existing system in future.

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