

A Project Report
on
“EARLY FLOOD DETECTION AND AVOIDANCE USING IOT”
Submitted in partial fulfilment of the requirements for the award of

BACHELOR OF ENGINEERING
in
ELECTRICAL AND ELECTRONICS ENGINEERING
of
Visvesvaraya Technological University, Belagavi
Submitted by

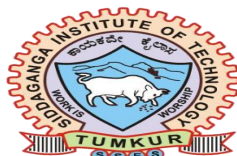
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SIDDAGANGA INSTITUTE OF TECHNOLOGY
(An Autonomous Institute Affiliated to Visvesvaraya Technological University, Belagavi,
Recognized by AICTE and Accredited by NBA, New Delhi)
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SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU-572103*(An Autonomous Institute Affiliated to Visvesvaraya Technological University, Belagavi,**Recognized by AICTE and Accredited by NBA, New Delhi)***DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING****CERTIFICATE**

Certified that the project work entitled **“EARLY FLOOD DETECTION AND AVOIDANCE USING IOT”** is a bonafide work carried out by **CHANDRASHEKAR V S - 1SI20EE010, HARINI JM - 1SI20EE013, YOGESHKRISHNA HM - 1SI20EE042, G.R SANTHOSHREDDY - 1SI21EE401** in partial fulfilment of the requirement for the award of the degree of **Bachelor of Engineering in Electrical and Electronics Engineering** of **Siddaganga Institute of Technology, Tumakuru**, an autonomous institute under Visvesvaraya Technological University, Belagavi during the academic year **2022-2023**. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

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ABSTRACT

Flooding is typically brought on by an increased quantity of water during a water system, sort of a lake, river overflowing. On occasion a dam fractures, abruptly releasing a huge quantity of water. The outcome is that a number of the water travels into soil, and 'flooding' the region. Rivers are involving river banks, in a station. Aside from lack of products and house and office property, streets infrastructure flood water consists of bacteria and sewage flow of waste sites and chemical spillage which results in a variety of diseases afterwards. Flood predictions need information like: The speed of change in river stage on a realtime basis, which can help indicate the seriousness and immediacy of this threat. Understanding the form of storm generating the moisture, such as length, intensity and a real extent, which is valuable for discovering potential seriousness of the flood. In this system we make use of a Arduino Uno interfaced with 4 different sensors, named as Ultrasonic sensor for measuring water levels, float sensor detect full water, Flow sensor for knowing speed of water and humidity sensor. These combinations of sensor are used to predict flood and alert respective authorities with help of IOT and sound instant alarm in nearby villages to instantly transmit information about possible floods. These sensors provide information over the IOT using Wifi module. On detection of conditions of flooding the system predicts the quantity of your time it might take to arrive a specific area and alerts the villages/areas that would be affected by it. The system also calculates the time it might deem flood to succeed in them and provides a time to people in order that they will evacuate accordingly

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INTRODUCTION

CHAPTER -1

1.1 GENERAL OVERVIEW

- “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.

1.2 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.

CHAPTER-2

2.1 OBJECTIVE OF THE PROJECT

The main objective of this project is to develop and design a flood detection system that will detect flood automatically and send data to the Local Government Unit and to residents using an Arduino.

Specific Objectives :-

- ☐ To design a circuit and create a programming code using the aurdino uno
- ☐ To apply the Serial Communication in transmitting the data from one place to another place.
- ☐ To detect the current level of the flood and also temperature and humidity, raise of water, water flow .
- ☐ To warn residents about the flood water level.

2.2 MOTIVATION

This flood monitoring system is designed and developed to warn and alert both authority and the residents about the flood almost immediately. A water level sensor will be set at prescribed point

.When the water reaches this point, it trigger the buzzer that acts as an alarm to alert both authority and residents. All the readings of water level are shown in IOT Geecko that will connect through the

connection of a Wireless Fidelity (Wi-Fi) for reference. This project applied both, hardware and software programmingThis system has been implemented with the latest technology called the Internet of Things (IoT), that have this amazing capability of sending any information wirelessly. The objective of this project is to design, develop and build a flood warning system especially for residents near sea that will alert and warn themapart from developing an application that can be monitored effortlessly via a newest technology of wireless connection.

CHAPTER- 3**LITERATURE SURVEY**

TITLE	YEAR	CONCLUSION
Automatic water level controlling system	2013	In this paper author presents Automatic fluid level Control System. 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 introducing Automatic fluid level control system. It will be useful for those who are residing in remote corner of the world. The other important advantage in this paper motives and cares about the environmental circumstances and condition in such way to protect our future generation in water demand. In this paper Arduino acts as a main server to push the water into the tank and it allows to check the level of the water and it is used to control and maintain the fluid level.As it is automated the Arduino plays according to the water level of the tank when it is full it automatically detect the water level and display that the water is overflow through Liquid Crystal Display(LCD-screen) through Beep alarm. In such way when it becomes empty it fill the water into the tank and display underflow.As per the condition said before if any problem arises between any sensors inside the tank it will notify the users through beep alarm [1].
Design of automatic using mercury float switch	2014	In this paper author presents Design of an automatic water level controller using mercury float switch. It is used to control and maintain the water in an appropriate level in the tank in a way if the level of the water in the tank is empty it automatically pumps the water into the tank until it become full. Same like if the level of liquid is full in the tank it automatically reduce the amount of water until it become to the medium level. In this model the two important basics are implemented. The first main technique is overload relay, which provides in the case of heavy power supply in such situation it will automatically switch off the motor to save the power. The second technique is mercury float switch,, it is used to check the level of water in the

		<p>tank and mercury float switch keeps in touch with power in the form of switches ,according to the level of water in the tank respectively. It is eligible for using the high level preference of water in industrial level. It also be a good solution for free from water scarcity. The system also provides the neat and clear way of preferring water in both living and industrial areas[2].</p>
Water level monitoring using zigbee based wireless sensor n/w	2009	<p>In this paper author presents the Water quality 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 using the PH-level of the water, turbid using these parameters we can able to control and monitor the water level and the records which we have taken from these actions are managed and send to the controlling room. This techniques are very useful for those cannot able to afford. It will be a very userfriendly technique and in low cost. This module can be used in far distance by the help of connecting any android applications to check the status of the water and we can able to control and monitor from wherever we want using wireless sensor network. The important protocol IEE 802.15.4 are used in this module to make the efficient way of the ZIGBEE to measure the level and quality of the water and based on that we can able to manage it. The main applications of this module it can be used in Remote areas also where people find more difficulty to adopt and take care of water. It can be used to overcome the problems in the Remote areas using the wireless sensor network we can easily check the status and control the water</p>
Water level controlling using fuzzy logic	2015	<p>In this paper Author presents Automatic Water Level Controller With Short Messaging Service (SMS) this paper mainly focus on the Nepal side peoples where they are finding very difficulty to maintain and control the water. As the power supply is increasing day to day life they are facing very difficulty to handle this problem this technique will be the best example for that problems and give the</p>

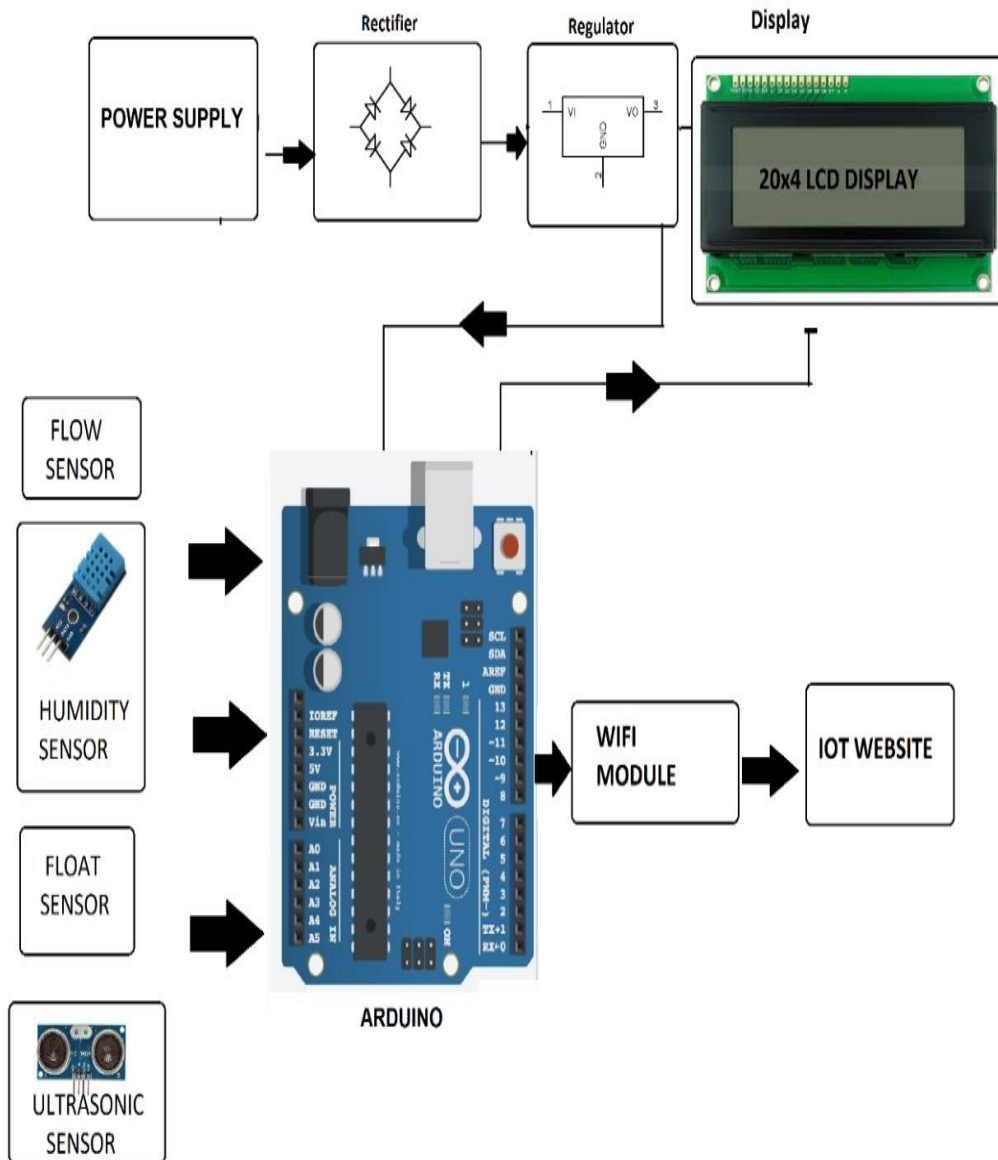
		<p>best solution One the sensor are connected or fixed into the tank and that sensor will look after the water level of the tank based upon the water condition. If the tank became empty the Automatic message will be notify to the user such way when the water overload message will be notify to the user. So it will be the best way of the users to take of their daily works. These module are the simple example of the SMART SYSTEMS. The two principles are carried out in this module are automatic water level controller and SMS system based on Micro-controller, it plays the vital role and give the command according to the status of the water. The Micro-controller controls all the sensor which goes wrong due to the moisturizer of the water. So the water level will be appropriate level and give the best solutions for the users[4].</p>
Liquid level monitoring using iot	2018	<p>In this paper author presents the Liquid level control using pid controller based on labview and matlab software. It is used to measure the continuous liquid level system at very low cost and to control them based on effective apparatus. Already many techniques are implemented based on liquid level management on the hardware side but all those are very costly and not in appropriate results but this technique gives us the exact level and quality of the liquid and most helpful for the physically challenged people. Many businesses and technological processes need more accurate results of the level of water and wants to know more about the liquid level monitoring system of tanks, dams, and other things. It also useful in the small scale industry those who are manufacturing waters, drinks, wines etc.. to know the level and quality of those liquids inside the container. So that it will result in the same level of quantity of liquids in all in all the bottles. So the time will be saved for all the workers and the same quantity of water will be distributed to all the containers, and it also done in manual testing in lab view</p>
Modelling and controlling of liquid level using pid controller	2016	<p>In this paper author presents the topic of Modelling and Controller of Liquid Level system using PID controller. Maintaining or controlling the appropriate level of water in tanks Is one of the major and severe problem in the form of large areas. This</p>

		<p>model talks about the design of PID controller which is used to maintain the sufficient level of water in the tanks. This model is designed and developed by Empirical Zeigler-Nichols Tuning designer model. It dealt with transformation method to control the level of water in tank with some delay. As the author said before this project is modeled and controlled by the PID controller or maintenance device which acts as main role in this model as well as fine tuned by the Zeigler-Nichols Tuning designer model. The PID server is represented in MATLAB software and then reviewed in Simulink to check the production by giving the load function. The output founds as a unchanging condition</p>
Automatic coneroller by short message service(sms)	2014	<p>In this paper author reports Tank Water Level Monitoring System using GSM Network. This paper mainly concentrates about the students who were facing the issue of water scarcity in their hostels. This problem occurs due to the improper maintenance of water in tank. The students who are living in hostels where facing the issues like sudden stoppage of water when they are pursuing it. The tank are normally placed at the top of the roof in our homes, industries as well as in college or school hostels. Due to that there is no proper checking of water level inside the tank. As we are in the busy schedule in today's world we have no time to maintain or check the liquid level in the tanks incase in our home too. In this situation it is more difficult to maintain the liquid levels in public places like theaters, malls but not only in hostels. This become a major issue for students as same as in colleges or schools when it comes to public holidays. So that students have to wait for the water to be continued to use for sometimes, this leads to decrease in their studies. 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. The dummy model is developed to check this model is working or not, but actually its worked successfully to decrease the unexpected</p>

CHAPTER-4

METHODOLOGY

4.1 BLOCK DIAGRAM



4.2 WORKING

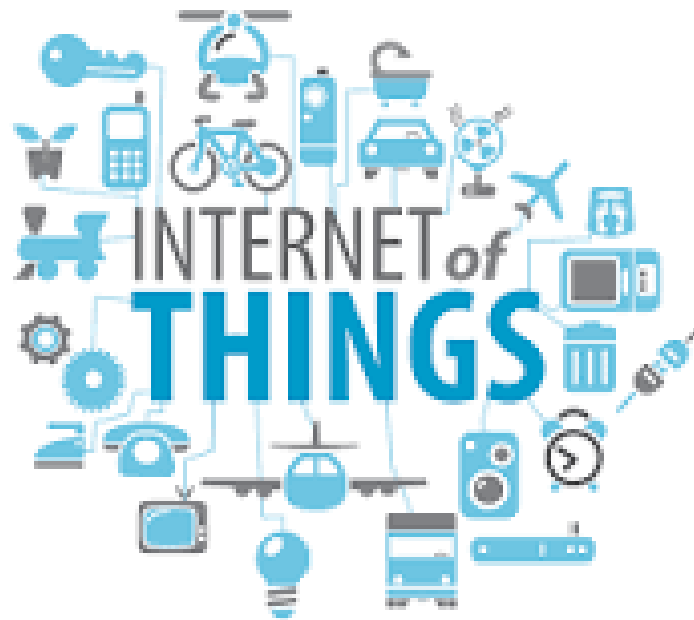
- To detect a flood the system observes various natural factors, which includes humidity, temperature, water level and flow level.
- To collect data of mentioned natural factors the system consist of different sensors which collects data for individual parameters.
- For detecting changes in humidity 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.

COMPONENTS REQUIRED

4.4 SOFTWARE REQUIREMENTS

- IOT Gecko
- Arduino Compiler
- MC Programming Language:

4.4.1 INTERNET OF THINGS (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.

4.4.2**ARDUINO COMPILER**

The Arduino integrated development environment is a cross-platform application that is written in the programming language Java. It is used to write and upload programs to Arduino board. The source code for the IDE is released under the GNU General Public License.

Easy to Program and Use. Efficiency in embedded development and embedded learning

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++ using special rules to organize code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides many common input and output procedures. A typical Arduino C/C++ sketch consists of two functions that are compiled and linked with a program stub `main()` into an executable cyclic executive pro

4.5 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
- ME
- Switch
- IC
- IC Sockets

ARDUINO UNO

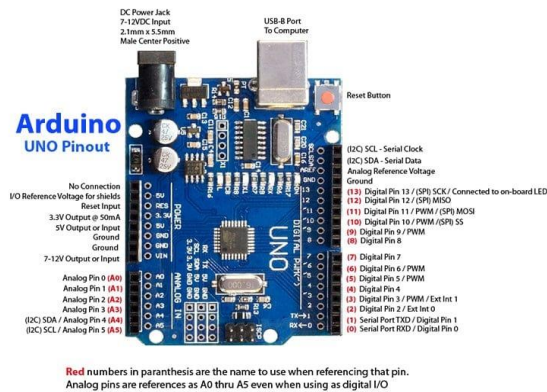


Figure no 4.5.1

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. 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. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website.

Layout and production files for some versions of the hardware are also available. The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software. ATmega328 on the board comes preprogrammed with a bootloader that allows uploading new code to it without the use of an external hardware programmer

AURDINO UNO SPECIFICATIONS

- 23 general purpose I/O lines
- A 6-channel 10-bit ADC (analog input)
- 6 output PWM channels(analog output)
- A serial programmable USART
- This allows very fast start-up combined with low power consumption

HC-SR04 Ultrasonic Module



Figure no_4.5.2

The HCSR04 measures object distance using ultrasonic ranging. It offers incredible range accuracy and stable readings in a simple to-use bundle. It 's working isn 't influenced by daylight or dark material like sharp range discoverers are (delicate materials like fabric can be hard to distinguish).

The fundamental basic principle of operation is beneath, use IO port TRIG to trigger running. It needs 10 us abnormal state signal in any event module will send eight 40kHz square wave automatically and will test if there is any signal returned. In the event that there is signal returned, yield will be abnormal state signal through IO port ECHO. The span of the abnormal state signal is the time from transmitter to getting with the ultrasonic. Testing separation = length of abnormal state x sound velocity(340m/s)/2 You can use the above figuring to discover the separation between the impediment and the ultrasonic module.

Water Flow Sensor



Figure no 4.5.3

Water flow sensor may be utilized to assess the flow of liquids, i.e. the usage of fluids in domestic or industrial use. By way of instance, you may earn a custom cocktail dispensing machine, also may use this sensor to accurately quantify components like Soda, Water, etc.. 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

Features

Lowest rated working voltage	DC4.5 5V-24V
Maximum operating current	15 mA (DC: 5V)
Working voltage range	DC 5~18V
Load capacity	≤ 10 mA (DC 5V)
Temperature	≤ 80 °C
Operating humidity range	35%~90%RH (no frost)
Allowed pressure	pressure 1.75Mpa
Temperature	-25~+80 °C
External threads	1/2"

DHT11 Digital Temperature Humidity Sensor

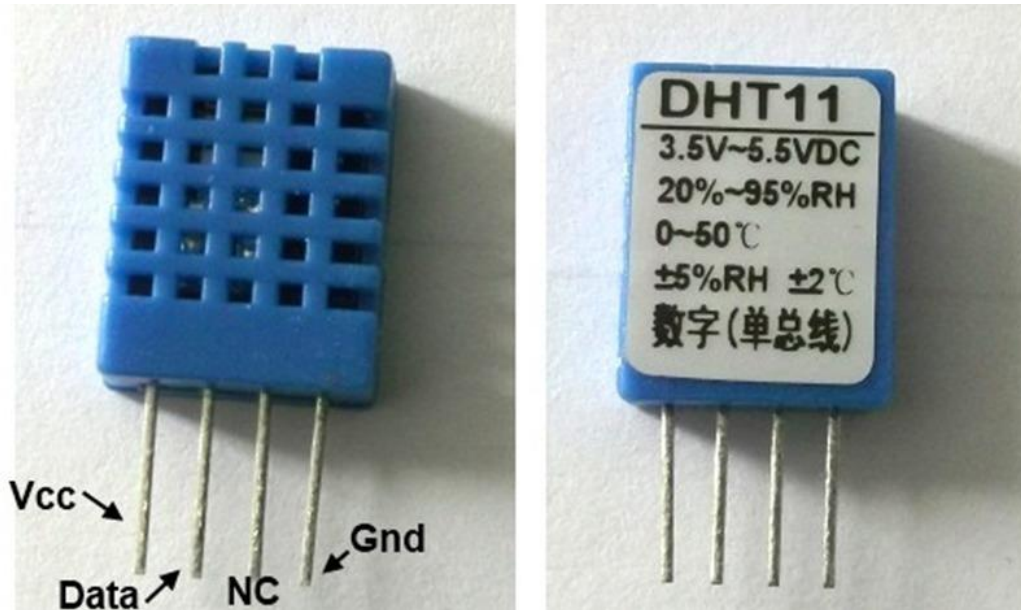


Figure no 4.5.4

The sensor module consists of resistive humidity detection components and ntc temperature testing. The perfect computerized temperature sensing sensor module is associated with 8-byte mcu.

The perusing made by DHT11 is extremely compact and stable; however, the client needs to refresh the perusing of the sensor in each 2 sec with a specific end goal to stay away from past signal gathering of information.

The sensor is versatile and very steady, can be utilized for embedded gadgets for weather observing and similar kinds of utilizations. Single information line is utilized for recovering the estimation made by the sensor.

DHT11 Specifications:

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: $\pm 1^\circ\text{C}$ and $\pm 1\%$

FLOAT SENSOR

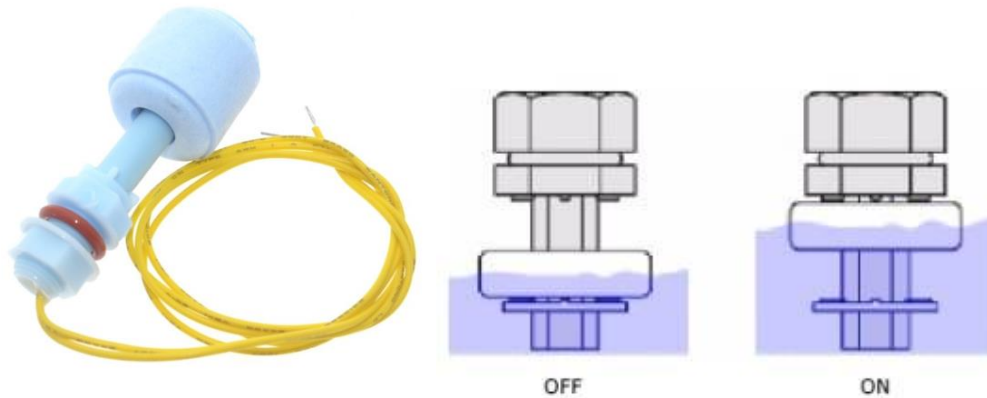


Figure no 4.5.5

The float sensor consists of an electromagnetic switch. It operates just like any other switch. Here a Magnetic reed switch is placed in the stem of the sensor. A magnet will be in the bulb structure of float sensor. When water fills up in a reservoir the bulb structure which has the magnet starts moving up once water reaches a certain level. It moves up close to stem near the reed switch. Due to the force of attraction from this magnet reed switch closes indicating water level is high.

When the water level goes down the bulb moves down and reed switch contact breaks and by this way the system detects that water level has gone down and acts accordingly.

The maximum switch current of the float is 0.5A and the switch voltage of 100V DC.

The temperature rating is about 10-85 degrees centigrade.

The power rating of this sensor is about 10W.

The entire body of this sensor is made up of plastic.

LCD Display



Figure no 4.5.6

An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 /20x4 LCD display is a very basic module commonly used in DIYs and circuits. In this LCD each character is displayed in pixel matrix. The command register stores the control directions given to the LCD. A command is an instruction given to LCD to perform a predefined task like initializing it, clearing its display, placing the cursor position, controlling screen etc. The data register stores the data to be displayed on the LCD. The information is the ASCII value of this character to be shown on the LCD.

Features

- Operating Voltage is 4.7V to 5.3V
- Current consumption is 1mA without backlight
- Alphanumeric LCD display module, meaning can display alphabets and numbers
- Consists of two rows and each row can print 16 characters.
- Each character is build by a 5×8 pixel box
- Can work on both 8-bit and 4-bit mode
- It can also display any custom generated characters
- Available in Green and Blue Backlight

ESP8266 WIFI Module



Figure no 4.5.7

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.

The chip at first grabbed the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer, Ai-Thinker.

Each ESP8266 module comes pre-customized with an AT command set firmware, which means, you can basically attach this to your Arduino gadget and get about as much WiFi-ability as a WiFi Shield offers (and that is simply out of the case)! The ESP8266 module is a to a great degree savvy board with a tremendous, and consistently developing, group.

Features

- Low cost, compact and powerful Wi-Fi Module
- Power Supply: +3.3V only
- Current Consumption: 100mA
- I/O Voltage: 3.6V (max)
- I/O source current: 12mA (max)
- Built-in low power 32-bit MCU @ 80MHz
- 512kB Flash Memory
- Can be used as Station or Access Point or both combined
- Supports Deep sleep (<10uA)
- Supports serial communication hence compatible with many development platform like Arduino
- Can be programmed using Arduino IDE or AT-commands or Lua Script

RESISTERS



Figure no 4.5.8

The resistor is a passive electrical component to create resistance in the flow of electric current. In almost all electrical networks and electronic circuits they can be found. The resistance is measured in ohms. An ohm is the resistance that occurs when a current of one ampere passes through a resistor with a one volt drop across its terminals. The current is proportional to the voltage across the terminal ends. This ratio is represented by Ohm's law:

formula with ohm's law: $R=V/I$. Resistors are used for many purposes. A few examples include delimit electric current, voltage division, heat generation, matching and loading circuits, control gain, and fix time constants. They are commercially available with resistance values over a range of more than nine orders of magnitude. They can be used to as electric brakes to dissipate kinetic energy from trains, or be smaller than a square millimeter for electronics

CAPACITORS

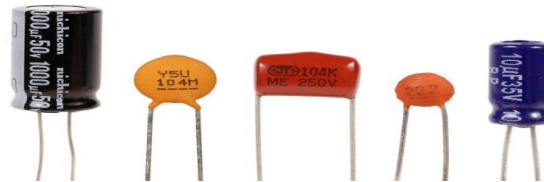


Figure no 4.5.9

The capacitor is a component which has the ability or “capacity” to store energy in the form of an electrical charge producing a potential difference (Static Voltage) across its plates, much like a small rechargeable battery. There are many different kinds of capacitors available from very small capacitor beads used in resonance circuits to large power factor correction capacitors, but they all do the same thing, they store charge. In its basic form, a capacitor consists of two or more parallel conductive (metal) plates which are not connected or touching each other, but are electrically separated either by air or by some form of a good insulating material such as waxed paper, mica, ceramic, plastic or some form of a liquid gel as used in electrolytic capacitors. The insulating layer between a capacitors plates is commonly called the Dielectric. to this insulating layer, DC current cannot flow through the capacitor as it blocks it allowing instead a voltage to be present across the plates in the form of an electrical charge.

The conductive metal plates of a capacitor can be either square, circular or rectangular, or they can be of a cylindrical or spherical shape with the general shape, size and construction of a parallel plate capacitor depending on its application and voltage rating.

DIODE



Figure no 4.5.10

A diode is a two-terminal electronic component that conducts current primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance in one direction, and high (ideally infinite) resistance in the other. A diode vacuum tube or thermionic diode is a vacuum tube with two electrodes, a heated cathode and a plate, in which electrons can flow in only one direction, from cathode to plate. A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals.[5] Semiconductor diodes were the first semiconductor electronic devices. The discovery of asymmetric electrical conduction across the contact between a crystalline mineral and a metal was made by German physicist Ferdinand Braun in 1874. Today, most diodes are made of silicon, but other materials such as gallium arsenide and germanium are used. The most common function of a diode is to allow an electric current to pass in one direction (called the diode's forward direction), while blocking it in the opposite direction (the reverse direction). As such, the diode can be viewed as an electronic version of a check valve.

Buttons & Switches



Figure no 4.5.11

A push-button (also spelled pushbutton) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.[1] The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching

CRYSTAL OSCILLATOR



Figure 4.5.12

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency. This frequency is often used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

A crystal oscillator, particularly one made of quartz crystal, works by being distorted by an electric field when voltage is applied to an electrode near or on the crystal. This property is known as electrostriction or inverse piezoelectricity. When the field is removed, the quartz - which oscillates in a precise frequency - generates an electric field as it returns to its previous shape, and this can generate a voltage. The result is that a quartz crystal behaves like an RLC circuit.

PCB – Printed Circuit Board

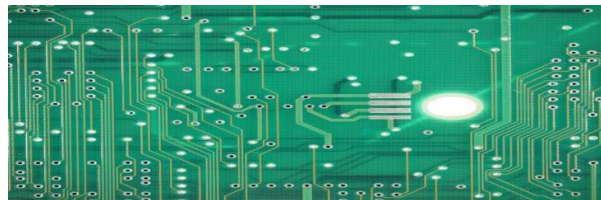


Figure no 4.5.13

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. Printed circuit boards are used in all but the simplest electronic products. They are also used in some electrical products, such as passive switch boxes. Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Specialized CAD software is available to do much of the work of layout. Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout only has to be done once. PCBs can also be made manually in small quantities, with reduced benefits.

Transformer & Adapters



figure no 4.5.14

A transformer is a static electrical device that transfers electrical energy between two or more circuits. A varying current in one coil of the transformer produces a varying magnetic flux, which, in turn, induces a varying electromotive force or "voltage" across a second coil wound around the same core. An AC adapter, AC/DC adapter, or AC/DC converter is a type of external power supply, often enclosed in a case similar to an AC plug. Other common names include plug pack, plug-in adapter, adapter block, domestic mains adapter, line power adapter, wall wart, power brick, and power adapter.

Tools Needed



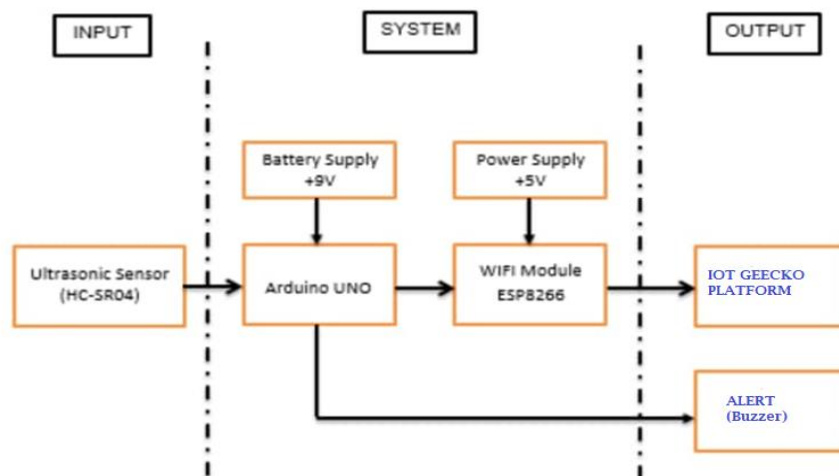
Figure no 4.5.14

Multimeter is needed for testing of electronics pcb based projects for voltage, connectivity and other issues.

Soldering iron is used along with soldering accessories to ensure proper connectivity between components and the pcb surface and ensure proper working of the system.

CHAPTER-5

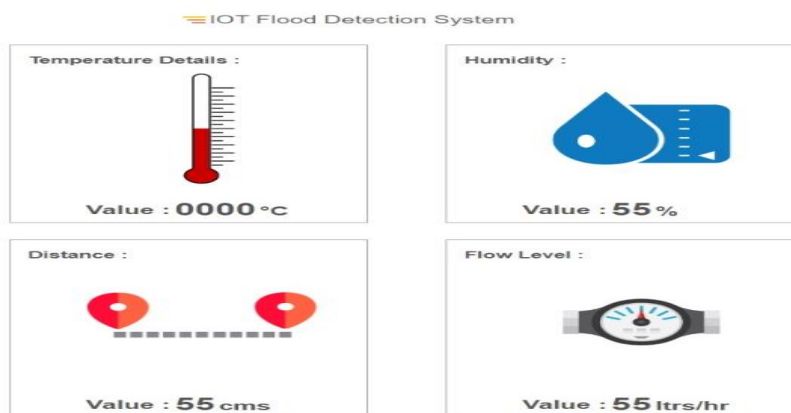
FLOW DIAGRAM



RESULT AND DISCUSSION

We have successfully created 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.

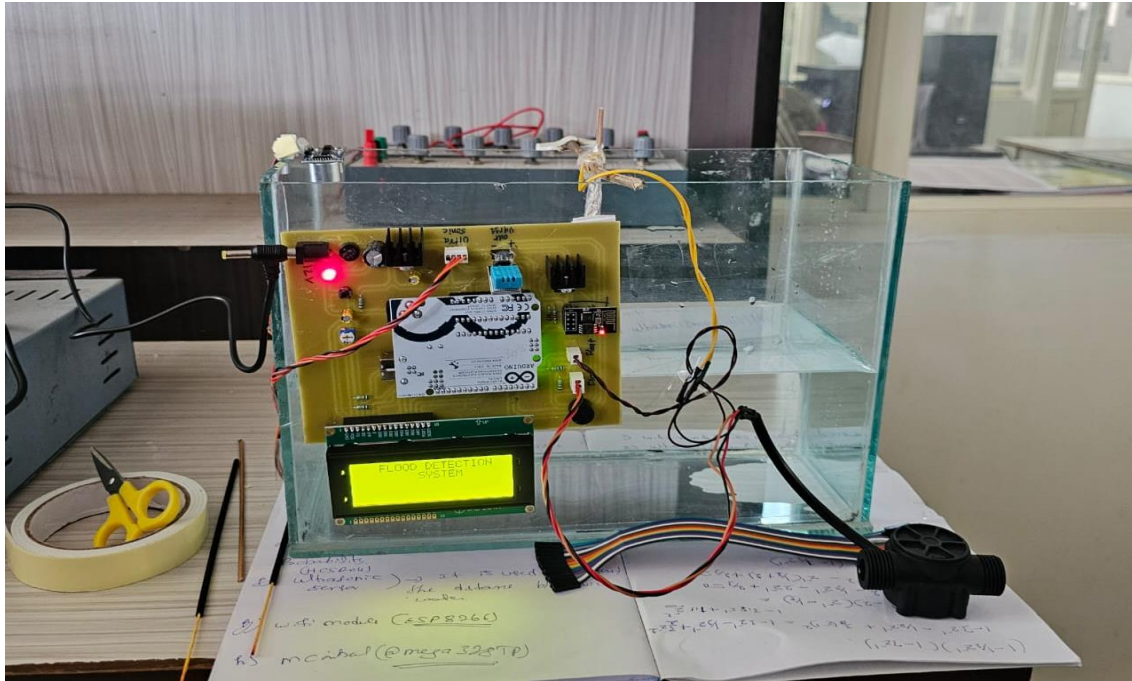
We have also implemented Alerts and Real-time readings on the LCD and IOT GEECKO which allows us for flood Monitoring of the system.



REFERENCES

- [1] Knoop, D. E., & Paustian, J. K. (1989). U.S. Patent No.4,835,991. Washington, DC: U.S. Patent and Trademark.
- [2] Band, E. J., & Anyasi, F. I. (2014). Design of an Automatic Water Level Controller Using Mercury Float Switch. IOSR Journal of Electronics and Communication Engineering, 9(2), 16-21.
- [3] Rasin, Z., & Abdullah, M. R. (2009). Water quality monitoring system using zigbee based wireless sensor network. International Journal of Engineering & Technology IJET Vol: 9 No: 10, 9(10), 24- 28.
- [4] Pudasaini, S., Pathak, A., Dhakal, S., & Paudel, M.(2014).Automatic Water Level Controller with Short Messaging Service (SMS) Notification. International Journal of Scientific and Research Publications, 4(9), 1-4.
- [5] Kumar, P., Pathan, S. S., & Mashilkar, B. (2014). Liquid Level Control using PID Controller Based on Labview & Matlab Software. International Journal of Engineering Research & Technology (IJERT), 3(10).
- [6] Parashar, M., Patil, R., Singh, S., VedMohan, V., & Rekha, K. (2018). Water level monitoring system in water dispensers using IoT. International Research Journal of Engineering and Technology (IRJET), 5(04), 2395-0056.
- [7] Jose, D. G., & George, K. S. (2016). Modelling and controller of liquid level system using PID controller. Int Res J Eng Technol, 3, 2222-2226.
- [8] Das, R., Dutta, S., Sarkar, A., & Samanta, K. (2013). Automation of tank level using Plc and establishment of Hmi by Scada. IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE), 7(2), 61-67.
- [9] Aydogmus, Z. (2009). Implementation of a fuzzybasedlevel control using SCADA. Expert Systems with Applications, 36(3), 6593- 6597. Johari, A., Wahab, M. H. A., Latif, N. S. A., Ayob, M. E., Ayob,
- [10] M. I., Ayob, M. A., & Mohd, M. N. H. (2011). Tank water level monitoring system using GSM network. International Journal of Computer Science and Information Technologies, 2(3), 1114-15.

APPENDIX – A



APPENDIX -B

Title: “EARLY FLOOD DETECTION AND AVOIDANCE USING IOT”

Team members: CHANDRASHEKAR V S(1SI20EE010),HARINI J M(1SI20EE013,YOGESH KRISHNA H M(1SI20EE042), G R SANTHOSHAREDDY (1SI21EE401)

Self- Assessment of the Project

Level				
Poor	Average	Good	V Good	Excellent
1	2	3	4	5
PO		Contribution from the project		
				Level
1	Engineering Knowledge: Apply the knowledge of mathematics, engineering fundamentals engineering specialization to form of complex engineering problems.	Learning about Arduino UNO Board, flow sensor, humidity sensor ,ultrasonic sensor and float sensor and their working characteristics.		
				5
2	Problem Analysis: Identify, formulate, review, research literature and analyse engineering problems reaching substantiated conclusions using first principles of mathematics, natural and engineering science	Literature survey is carried out to design the circuit and different projects on EARLY FLOOD DETECTION AND AVOIDANCE USING IOT that have been conducted earlier.		
				4
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or process that meet the specified needs with appropriate consideration for the public health, safety and the cultural and environmental considerations.	Study of different microcontroller-based board and programming language for the controller. To learn about Arduino IDE Programming to design the system.		
				5
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Study and analysis of flow sensor, humidity sensor ,ultrasonic sensor and float sensor Comparing actual and theoretical values		
				5
5	Modern tool usage: Create, insert and apply appropriate techniques, resources and modern engineering and tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	Project is carried out by understanding the suitable mechanism and different sensor to identify the natural parameters (temp, humidity, wave speed). Learning the software programming Arduino IDE to interface with Arduino UNO.		
				4

6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	“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 minimize the damage caused by the flood	4
7	Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.	To obtain the accurate sensitivity of sensors , place of flooding area ,where sensor sense the accurate data	4
8	Ethics: Apply ethical principles and commit to professional ethics and norms of the engineering practice.	Our project work is carried out and reported to the guide in provided time schedule, plagiarism check is done for the report, literatures are referred and all the sources have been acknowledged in the project report.	5
9	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.	Complete participation and involvement in individual and team-oriented works. All team members are involved in completion of the project work.	4
10	Communication: communicate effectively on complex engineering activities with the engineering community and with the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Effective documentation is done using Microsoft word. Results are presented using Microsoft Power point and documents are submitted to our guide.	5
11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	Cost optimization: Analysis and management is done to make the cost reduction of the project. Time management: completing the scheduled work in the allotted time. Project planning: Literature survey is carried out and implemented the project methodically.	4
12	Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in broadcast context of technological change.	The project is early flood detection technology and implemented on different area to avoid the property and live loss	4

	PSO	Contribution from the project	
1	Analyse, Design and Assess the performance of Electrical Power System and its constituent equipment	The project is to accurately sense the natural parameter . In order to reduce effect on human live\life and property loss	4
2	Analyse, Design and Develop Power Electronic Systems	-	