

Automatic IoT Fishing Management System

A report submitted to the Department of Mechanical Engineering, Sonargaon University of Bangladesh in partial fulfillment of the requirements for the Award of Degree of Bachelor of Science in Mechanical Engineering.

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September, 2022

LETTER OF TREANSMITTAL

September, 2022

To

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Subject: Submission of Project Report.

Dear Sir,

We are pleased to submit the project report on “**Automatic IoT Fishing Management System**”. It was a great pleasure to work on such an important topic. This project has been done as per instruction of your supervision and according to the requirements of the Sonargaon University.

We expect that the project will be accepted by the concerned authority we will remain happy to further explanation that you may feel necessary in this regard.

Thank You

Sincerely yours,

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DECLARATION

We do hereby solemnly declare that, the work presented here in this project report has been carried out by us and has not been previously submitted to any University/ Organization for award of any degree or certificate

We hereby ensure that the works that has been prevented here does not breach any existing copyright.

We further undertake to indemnify the university against any loss or damage arising from breach of the foregoing obligation.

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CIRTIIFICATE OF SUPERVISOR

This is to certify that the thesis paper on “**Automatic IoT Fishing Management System**” has been prepared as a part of completion of the BME program from Department of Mechanical Engineering , Sonargaon University (SU) carried out by Md. Zobayed Hossain, ID: BME 1803016379 , Md. Ariful Islam, ID: BME 1901017167, Md. Sofiqul Islam, ID: BME 1901017066, Shohel Fakir, ID: BME 1901017185, Mazidul Islam, ID: BME1901017224 under my supervision. The report or the information will not be used for any other purpose.

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ACKNOWLEDGEMENT

First, we started in the name of almighty Allah. This thesis is accomplished under the supervision of **Md. Sharful Insan**, Lecturer, Department of Mechanical, Sonargaon University. It is a great pleasure to acknowledge our profound gratitude and respect to our supervisor for this consistent guidance, encouragement, helpful suggestion, constructive criticism and endless patience through the progress of this work. The successful completion of this thesis would not have been possible without his persistent motivation and continuous guidance.

The author are also grateful to **Md. Mostofa Hossain**, Head of the Department of Mechanical Engineering and all respect teachers of the Mechanical Engineering Department for their co-operation and significant help for completing the thesis work successfully.

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ABSTRACT

Internet of Things (IoT) is a very fast growing technology and the field of IoT is extending its wings in every one of the areas today. With the progression in computers like Node MCU micro-controller the innovation is achieving the ground level with its application in farming and aquaculture. Sensor acquisition is conducted by Node MCU micro controller is used as data processing device as well as server. Here we use Node MCU, SMPS, Ultrasonic sensor, Temperature sensor, Rain sensor. A user can monitor the water condition, water temperature and weather condition (Rain) using an android app through Wi-Fi through Internet from anywhere in the world. Fish is a rich source of vitamins, minerals, protein, nutrients and micro nutrients. Farmers need real time and accurate information to monitor the farm surrounding condition. In previous this parameters was checked in manually. In this study, we proposed an Internet of Things (IoT) based smart fisharing management model that will measure water level, water temperature of pond and weather rain condition. In this work uses low cost and long range monitoring system. This system will be consume time and cost at a time and very helpful for this time.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In the recent years with advancement in monitoring and automation technology, research in aquaculture resulted in development of production technologies that improved the quality of the fish farming ponds, thus leading to improvement and increasing of fish production. Fish farming pond is an artificial man-made eco-system and on the most basic level we can differentiate two types of ponds, ponds that breed tropical fish that are used as pets commonly known as aquariums instead of ponds, and ponds that breed fish for food. Our focus in this paper are the ponds that breed fish for food, typically build and maintained in remote eco-clean areas, near to water springs, and any outside environmental stress will negatively impact on the fish production. This is due to the fact that fish are cold-blooded animals that regulate their temperature directly by the surrounding environment. Consequently on this, “temperature is one of the many key parameters that is needed to be monitored, combined with other important factors like light intensity, water level in the pond and etc”.

Therefore, the monitoring of this eco-system is a problem combined of some multiple sub problems that are linked between each other, and they are in constant interactions. Their interaction is a complex process that needs a lot of time, dedications and knowledge by humans to be controlled and maintained. Aquaculture, otherwise called water cultivating, is the cultivating of amphibian life forms, for example, fish, shellfish and crabs by utilizing the different sensors to lessen the dangers. IoT has effectively demonstrated its enormous measure of uses areas in the most recent years. Notwithstanding, little are the fish cultivates today outfitted with clever gadgets with real-time and associated water observing abilities. There are numerous precedents where IoT could assist aqua cultura lists with improving their working conditions. For instance, some fish ranches are far from the land and utilizing IoT to screen water at a separation could decrease their expenses. Another model is that adjustments in water quality can happen in all respects rapidly and whenever, so observing water continuously with cautions cannot miss a specific occasion.

Fisheries and aquaculture bolster the earnings and occupations of 660-820 million individuals, around 10-12 percent of the total populace. The part has an essential task to carry out in sexual orientation fairness, neediness and sustenance security. With worldwide fish supply more than 150 million tons, in excess of 85 percent of this supply is utilized straightforwardly for sustenance; providing 15 percent of the world's protein and fundamental nourishment for around 4.3 billion customers.

1.2 Motivation

Fishery management system is getting better day by day, if the management system is not digitized. Many things have to be done manually in many fishsering system. We can monitor various condition of pond. Mainly we can remotely collect weather reports such as water temperature, water volume and whether it is raining or not. Previous system has more limitation so we arrange more feature in this system. This system will be work very well. That's why we try to make this system.

1.3 Objectives

The objectives of this project are:

- a) To study about **Automatic IoT Fishing Management System**.
- b) To design and construct a **Automatic IoT Fishing Management System**
- c) To test the performance of the **Automatic IoT Fishing Management System**.

1.4 Organization of the Book

- **Chapter 1: Introduction.** This chapter is all about background study, motivation, Objectives and thesis book organization.
- **Chapter 2: Literature Review-** Here briefly describe about previous book review, Block diagram, Circuit Diagram, Components List and Summary of this chapter.
- **Chapter 3: Hardware and Software Analysis-** This chapter is discussed about our project hardware and Software . Here we describe our hole instrument details.

- **Chapter 4: Methodology**– Here briefly discuss about project methodology, working principle and our system overview.
- **Chapter 5: Results and Discussion**– Here briefly discuss about project discussion, result analysis, advantages, application and our system overview.
- **Chapter 6: Conclusion** – This chapter is all about our thesis future recommendation and this project conclusion.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter mainly reviews literature, reviews of various types of work and highlights the importance of IoT fishing management in such situations.

2.2 Literature Review

Fowler et.al. [1] proposed the concept of recirculating Aquaculture Systems. In this paper, “they used temperature, DO, and pH scale be monitored directly on a continuous basis since they have an inclination to alter quickly and have a big adverse result on the system if allowed to work out-of-range”. Therefore, these three parameters are chosen to be monitored in this system.

Merino et.al. [2] examined the achievability of supporting present and expanded per capita fish utilization rates in 2050 dependent on broad information: expectations of changes in worldwide and local atmosphere, marine biological system and fisheries creation gauges, human populace gauges, fishmeal and oil value estimations and projections of the innovative improvement in aquaculture innovation. They reason that gathering present and bigger utilization rates is possible, regardless of a developing populace and the effects of environmental change on potential fisheries creation. Notwithstanding, it is conceivable just if fish assets are overseen reasonably and fisheries the executives are powerful. The fisheries the executives depends absolutely on the water quality checking. Fish infections are successive and sway straightforwardly the collecting yield [3].

A low water quality can likewise affect the fish development and postpone the gather. Today, the water observing frameworks are over the top expensive and absence of affectability. Executing and keeping up this sort of framework is assets expending. A great deal of little maker decide not to utilize it and go out on a limb to get a littler yield. That is the reason water quality is the way to achievement in aquaculture and improves water quality is a major test, particularly in little fish cultivates in creating nations.

Ceong et. al [4] proposed partner degree eco water ranch framework that screens water temperature, broke down oxygen and saltiness. The framework may likewise send partner degree caution to the ranchers once the scopes of ecological data square measure observed to be anomalous.

Han et. al [5] exhibited style on setting watching framework for development ranches. The arranged framework offers omnipresent access to the checked information from the lake either from the net or on the cell phones. Shifeng et. al [6] examined and suggest a framework that is bolstered remote RF and GSM to gauge such parameters as disintegrated substance component and Pacheco.O [7] fish are cold-blooded animals, regulating their body temperature directly by the water environment. Changes in water temperature affect the amount of dissolved oxygen in the water and fish oxygen consumption. Although the fish can withstand a broad water temperature range, any sudden, extreme changes in water temperature will have a considerable impact on fish physiology. A chilling injury will cause the fish to rush into, paralysis with a loss of balance, leading to death. The reason may be the respiratory center, or osmotic regulation is affected at high temperatures. As the water temperature increases the fish suffer respiratory arrest.

Wen-Tsai Sung [8] found that the amount of dissolved oxygen in water increases/decreases based on seasons. When the amount of dissolved oxygen in water is reduced below certain limit then fish growth will be hindered. When amount of dissolved oxygen becomes lower than the fish survival conditions the fish will die. P. Bartolome [9] in general fish farming the acidity and alkaline of the water should be maintained between 6 to 8. Too acidic or alkaline will cause adverse effects, acid erosion of the gill tissue, tissue coagulation necrosis, increased mucus secretion, abdominal congestion and inflammation. If the PH value is less than 4.5, the fish will die. D.YusufMulge [10] temperature sensor are used to deliver the temperature information on a fire extinguishers to website, email-id, and mobile phone number.

In this manner, response to fire emergencies is made with in fraction of seconds. Paraguas M M [11] wireless networks have different security issues in the wireless communication. Wi-Fi Protected Access 2 (WPA2) uses Advanced Encryption Standard (AES) encryption an has more security compared to Wi-Fi Protected Access (WPA). Jayavardhana G [12] the buzzwords in Information Technology are Internet of Things (IoT). Internet of Things will transform real world objects into intelligent virtual objects. Aim of IoT is to unify world

under a common infrastructure, giving control of things around us. Gigli, M [13] the pH measurement is potentiometric that is, it explains the relationship between the electrode potential and the solution. The meter truthfully responds to the potential, it indirectly and mathematically converts it.

Fish farming refers to farming variety of marine species such as shellfish, sport fish, bait fish, ornamental fish, crustaceans, mollusks, algae, sea vegetables, and fish eggs to breed, rear and harvest in different water environments such as ponds, rivers, lakes, and ocean. Fish are coldblooded animals, regulating their body temperature directly by the water environment. Changes in water temperature affect the amount of dissolved oxygen in the water and fish oxygen consumption[14].

Although the fish can withstand a broad water temperature range, any sudden, extreme changes in water temperature will have a considerable impact on fish physiology. A chilling injury will cause the fish to rush into, paralysis with a loss of balance, leading to death. The reason may be the respiratory center, or osmotic regulation is affected at high temperatures. As the water temperature increases the fish suffer respiratory arrest. [15]Fish World magazine found that the amount of dissolved oxygen in water increases or decreases with the seasons.

When the water temperature rises, fish metabolic rate will be increased and results in less dissolved oxygen in the water. Low water temperature decreases fish metabolic rate and increases amount of dissolved oxygen in the water. If the amount of dissolved oxygen in water is reduced to below a certain limit fish growth will be hindered. When the amount of dissolved oxygen becomes lower than the fish survival conditions the fish will die[16].

2.3 Block Diagram

In our project we have set up an **Automatic IoT Fishing Management System**. In this circuit we have used one Node MCU micro controller for master controller unit. Here we also use a SMPS, ultrasonic sensor, temperature sensor, rain sensor, LCD display etc. In this diagram we will show by block the individual parts.

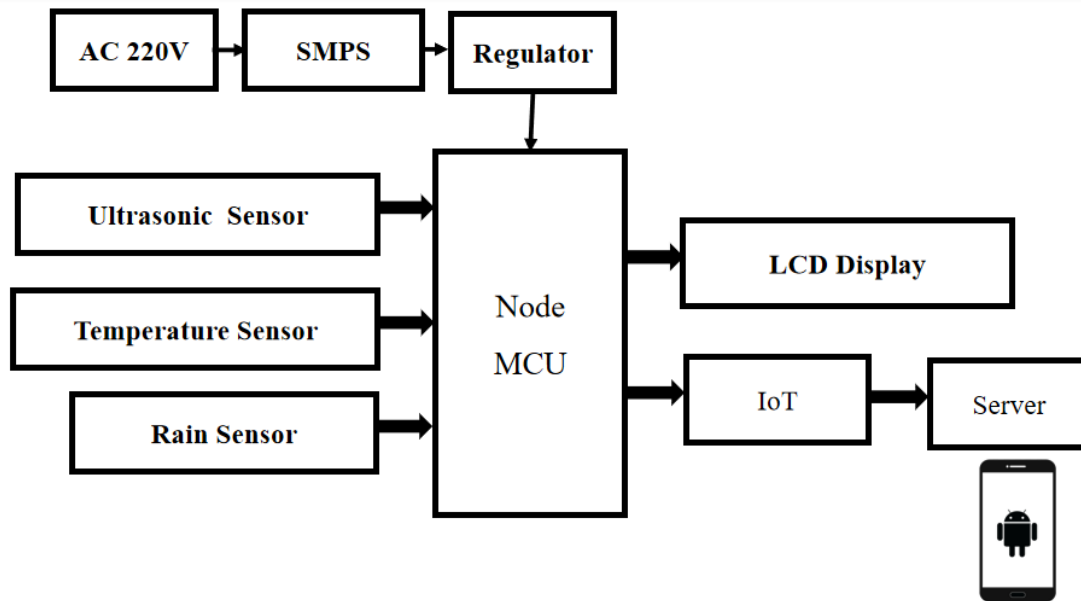


Figure 2.1: Block Diagram of Automatic IoT Fishing Management System.

2.4 Circuit Diagram

The schematic diagram here is representing the electrical circuit and the components of the **Automatic IoT Fishing Management System**. Here we connect equipment with the smart wire connection.

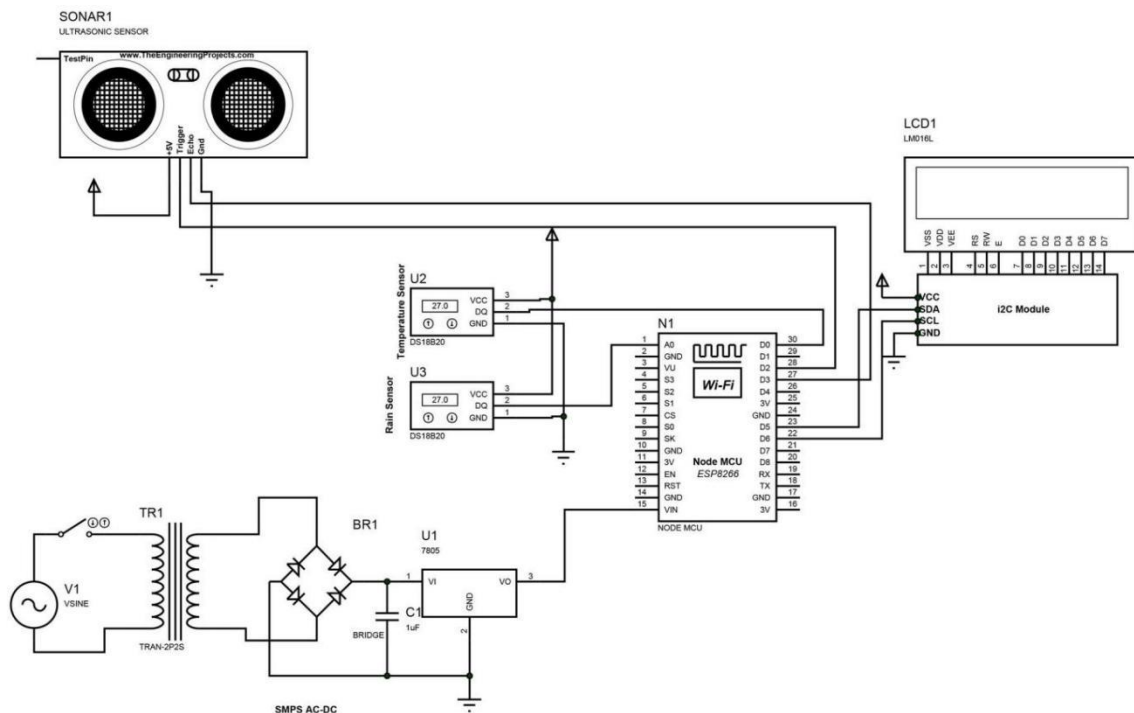


Figure 2.2: Schematic Diagram of Automatic IoT Fishing Management System.

2.5 Components List:

Hardware Part:

1. Node MCU
2. SMPS
3. Temperature Sensor
4. Rain Sensor
5. Ultrasonic Sensor
6. LCD Display
7. Voltage Regulator
8. Resistor

Software Part:

1. Arduino IDE
2. Proteus
3. Remote XY

2.6 Summary

The above discussion gives an idea about the Automatic IoT Fishing Management System. All that work on robots has already been done here, and the results of their work, the use of IoT Fishing Management System in the situation are described in detail. From this we also got the direction of work of the project.

CHAPTER 3

HARDWARE AND SOFTWARE ANALYSIS

3.1 Node MCU

Node MCU is an open-source firmware for which open-source prototyping board designs are available. The name "Node MCU" combines "node" and "MCU" (micro-controller unit). The term "Node MCU" strictly speaking refers to the firmware rather than the associated development kits.

Both the firmware and prototyping board designs are open source. The firmware uses the Lua scripting language. The firmware is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS. Due to resource constraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 has also been implemented.



Figure 3.1: Node MCU

The prototyping hardware typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The choice of the DIP format allows for easy prototyping on breadboards. The design was initially based on the ESP-12 module of the ESP8266, which is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications.

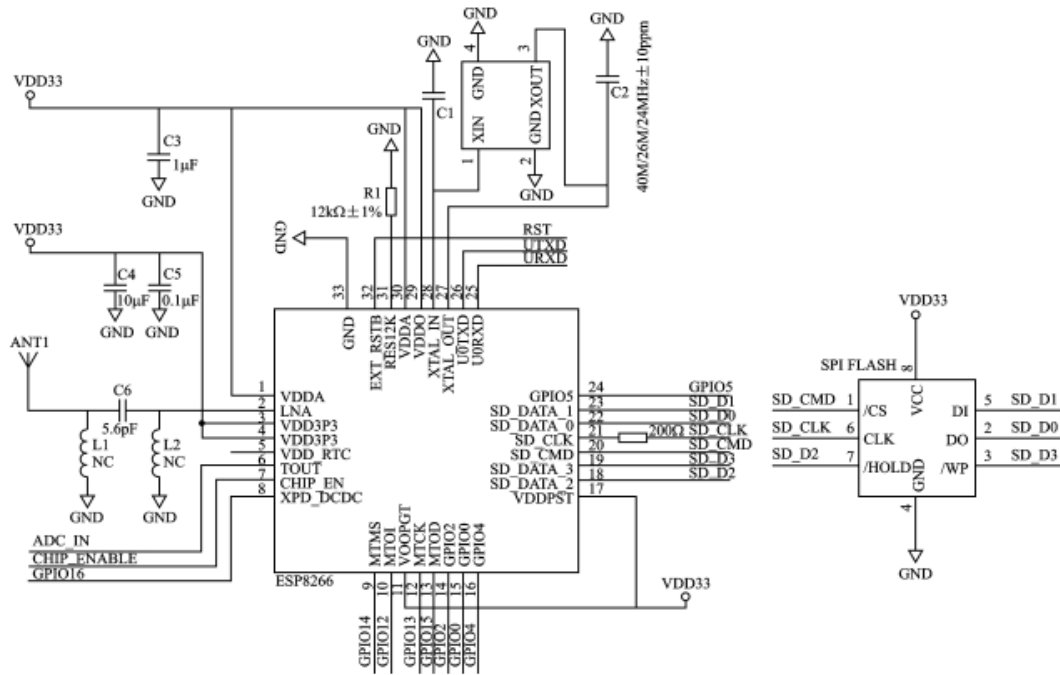


Figure 3.2: Node MCU Schematic Diagram

This is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. Node MCU was created shortly after the ESP8266 came out. On December 30, 2013, Espressif Systems began production of the ESP8266. The ESP8266 is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications (see related projects). Node MCU started on 13 Oct 2014, when Hong committed the first file of node-mcu-firmware to GitHub. Two months later, the project expanded to include an open-hardware platform when developer Huang R committed the gerber file of an ESP8266 board, named devkit v0.9. Later that month, Tuan PM ported MQTT client library from Contiki to the ESP8266 SoC platform, and committed to NodeMCU project, then Node MCU was able to support the MQTT IoT protocol, using Lua to access the MQTT broker. Another important update was made on 30 Jan 2015, when Devsaurus ported the u8glibto Node MCU project, enabling Node MCU to easily drive LCD, Screen, OLED, even VGA displays. In summer 2015 the creators abandoned the firmware project and a group of independent contributors took over.

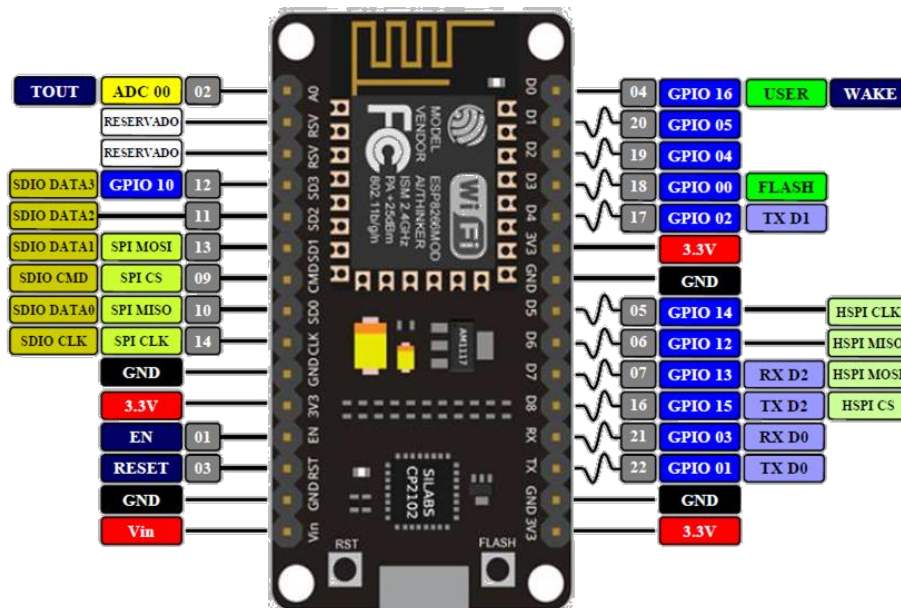


Figure 3.3: Node MCU Pin Out

Node MCU V3 ESP8266 ESP-12E is Wi-Fi development board that helps you to prototype your IoT product with few Lua script lines, or through Arduino IDE. The board is based on ESP8266 ESP-12E variant, unlike other ESP-12E, you won't need to buy a separate breakout board, USB to serial adapter, or even solder it to a PCB to get started, you will only need a USB cable (Micro USB).

Features

1. Communication interface voltage: 3.3V.
2. Antenna type: Built-in PCB antenna is available.
3. Wireless 802.11 b/g/n standard
4. WiFi at 2.4GHz, support WPA / WPA2 security mode
5. Support STA/AP/STA + AP three operating modes
6. Built-in TCP/IP protocol stack to support multiple TCP Client connections (5 MAX)
7. D0 ~ D8, SD1 ~ SD3: used as GPIO, PWM, IIC, etc., port driver capability 15mA
8. AD0: 1 channel ADC
9. Power input: 4.5V ~ 9V (10VMAX), USB-powered

10. Current: continuous transmission: $\approx 70\text{mA}$ (200mA MAX), Standby: $< 200\mu\text{A}$
11. Transfer rate: 110-460800bps

3.2 Switch Mode Power Supply (SMPS)

A switched-mode power supply (switching-mode power supply, switch-mode power supply, switched power supply, SMPS, or switcher) is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Unlike a linear power supply, the pass transistor of a switching-mode supply continually switches between low-dissipation, full-on and full-off states, and spends very little time in the high dissipation transitions, which minimizes wasted energy. A hypothetical ideal switched-mode power supply dissipates no power. Voltage regulation is achieved by varying the ratio of on-to-off time (also known as duty cycles).



Figure 3.4: SMPS

Switching regulators are used as replacements for linear regulators when higher efficiency, smaller size or lighter weight are required. They are, however, more complicated; their switching currents can cause electrical noise problems if not carefully suppressed, and simple designs may have a poor power factor. Switched-mode power supplies are classified according to the type of input and output voltages. The four major categories are:

- AC to DC
- DC to DC
- DC to AC
- AC to AC

A basic isolated AC to DC switched-mode power supply consists of:

- Input rectifier and filter
- Inverter consisting of switching devices such as MOSFETs
- Transformer
- Output rectifier and filter
- Feedback and control circuit

The input DC supply from a rectifier or battery is fed to the inverter where it is turned on and off at high frequencies of between 20 KHz and 200 KHz by the switching MOSFET or power transistors. The high-frequency voltage pulses from the inverter are fed to the transformer primary winding, and the secondary AC output is rectified and smoothed to produce the required DC voltages. A feedback circuit monitors the output voltage and instructs the control circuit to adjust the duty cycle to maintain the output at the desired level.

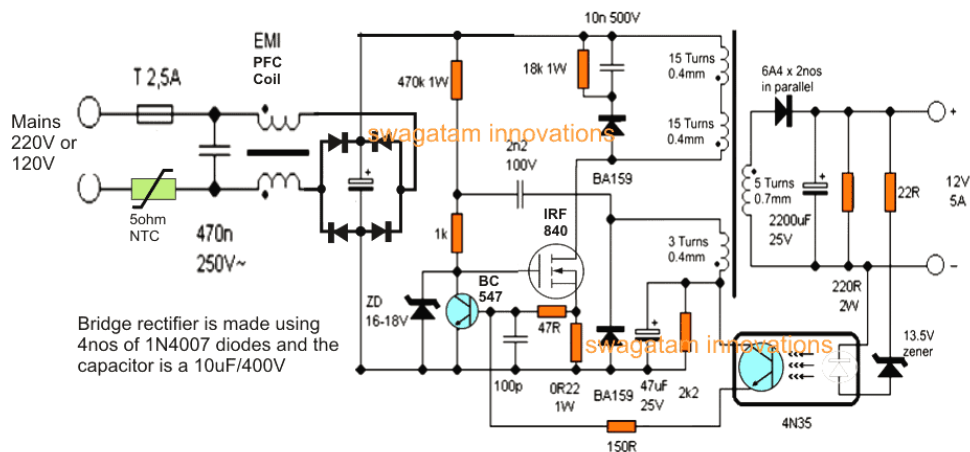


Figure 3.5: SMPS Circuit

Basic working concept of an SMPS

A switching regulator does the regulation in the SMPS. A series switching element turns the current supply to a smoothing capacitor on and off. The voltage on the capacitor controls the time the series element is turned. The continuous switching of the capacitor maintains the voltage at the required level.

Design basics

AC power first passes through fuses and a line filter. Then it is rectified by a full-wave bridge rectifier. The rectified voltage is next applied to the power factor correction (PFC) pre-regulator followed by the downstream DC-DC converter(s). Most computers and small appliances use the International Electrotechnical Commission (IEC) style input connector. As for output connectors and pinouts, except for some industries, such as PC and compact PCI, in general, they are not standardized and are left up to the manufacturer. There are different circuit configurations known as topologies, each having unique characteristics, advantages and modes of operation, which determines how the input power is transferred to the output. Most of the commonly used topologies such as flyback, push-pull, half bridge and full bridge, consist of a transformer to provide isolation, voltage scaling, and multiple output voltages. The non-isolated configurations do not have a transformer and the power conversion is provided by the inductive energy transfer.

Advantages of switched-mode power supplies:

- Higher efficiency of 68% to 90%
- Regulated and reliable outputs regardless of variations in input supply voltage
- Small size and lighter
- Flexible technology
- High power density

Disadvantages:

- Generates electromagnetic interference

- Complex circuit design
- Expensive compared to linear supplies

Switched-mode power supplies are used to power a wide variety of equipment such as computers, sensitive electronics, battery-operated devices and other equipment requiring high efficiency.

Switch Mode Power Supply

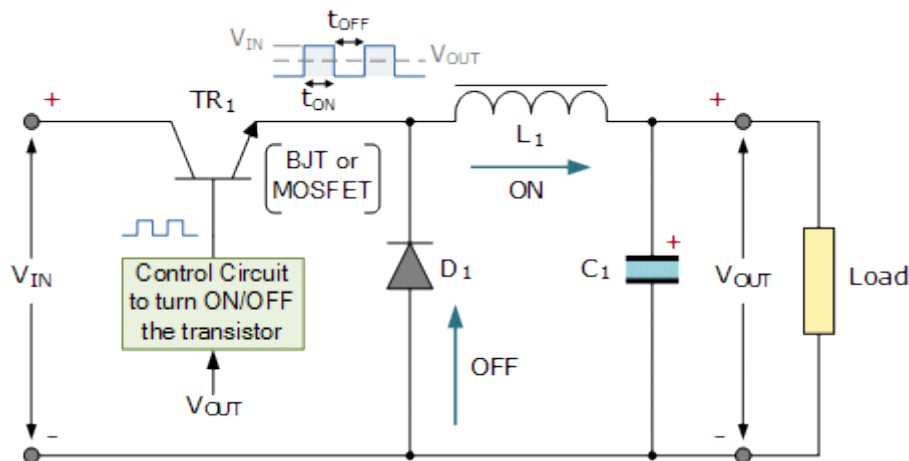
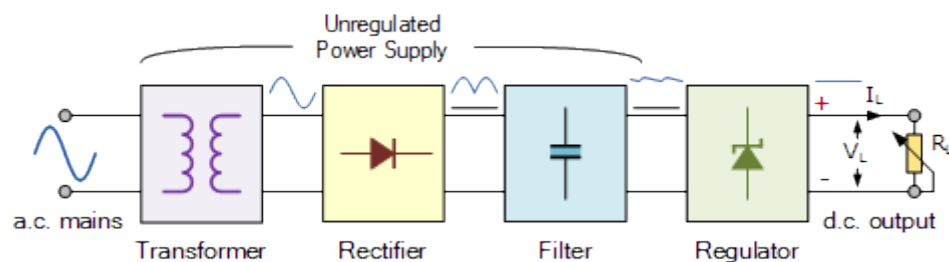


Figure 3.6: SMPS Circuit Connection

Linear voltage IC regulators have been the basis of power supply designs for many years as they are very good at supplying a continuous fixed voltage output. Linear voltage regulators are generally much more efficient and easier to use than equivalent voltage regulator circuits made from discrete components such as a zener diode and a resistor, or transistors and even op-amps. The most popular linear and fixed output voltage regulator types are by far the positive output voltage series, and the negative output voltage series. These two types of complementary voltage regulators produce a precise and stable voltage output ranging from about 5 volts up to about 24 volts for use in many electronic circuits. There is a wide range of these three-terminal fixed voltage regulators available each with its own built-in voltage regulation and current limiting circuits. This allows us to create a whole host of different power supply rails and outputs, either single or dual supply, suitable for most electronic circuits and applications. There are even variable voltage linear regulators available as well providing an output voltage which is continually variable from just above zero to a few volts below its maximum voltage output.

Most d.c. power supplies comprise of a large and heavy step-down mains transformer, diode rectification, either full-wave or half-wave, a filter circuit to remove any ripple content from the rectified d.c. producing a suitably smooth d.c. voltage, and some form of voltage regulator or stabiliser circuit, either linear or switching to ensure the correct regulation of the power supplies output voltage under varying load conditions. Then a typical d.c. power supply would look something like this:

Typical DC Power Supply



These typical power supply designs contain a large mains transformer (which also provides isolation between the input and output) and a dissipative series regulator circuit. The regulator circuit could consist of a single zener diode or a three-terminal linear series regulator to produce the required output voltage. The advantage of a linear regulator is that the power supply circuit only needs an input capacitor, output capacitor and some feedback resistors to set the output voltage.

3.3 5V Regulator IC

Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 IC, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC). The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.

7805 IC Rating:

- Input voltage range 7V- 35V
- Current rating $I_c = 1A$
- Output voltage range V. Max=5.2V ,V. Min=4.8V

LM7805 PINOUT DIAGRAM

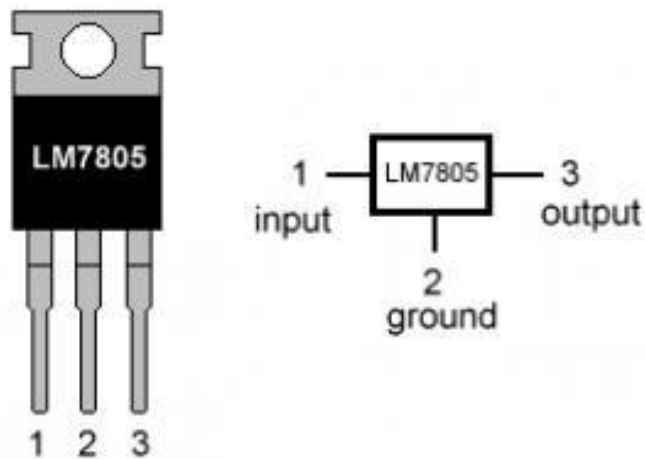


Figure 3.7: 5V Regulator IC

3.4 Ultrasonic Sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

HC-SR04 Ultrasonic Sensor - Working

As shown above the **HC-SR04 Ultrasonic (US) sensor** is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module

has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that

$$\text{Distance} = \text{Speed} \times \text{Time}$$

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module as shown in the picture below-

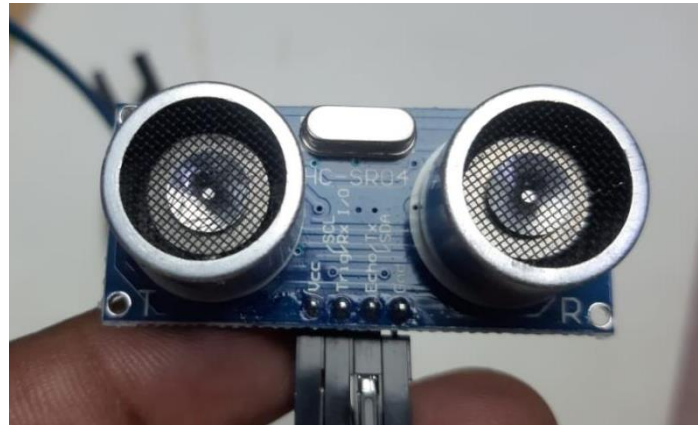


Figure 3.8: Working of sensor

Now, to calculate the distance using the above formulae, we should know the Speed and time. Since we are using the Ultrasonic wave we know the universal speed of US wave at room conditions which is 330m/s. The circuitry inbuilt on the module will calculate the time taken for the US wave to come back and turns on the echo pin high for that same particular amount of time, this way we can also know the time taken. Now simply calculate the distance using a microcontroller or microprocessor.

How to use the HC-SR04 Ultrasonic Sensor

HC-SR04 distance sensor is commonly used with both microcontroller and microprocessor platforms like Arduino, ARM, PIC, Raspberry Pie etc. The following guide is universally since it has to be followed irrespective of the type of computational device used. Power the Sensor using a regulated +5V through the Vcc and Ground pins of the sensor. The current consumed by the sensor is less than 15mA and hence can be directly powered by the on board 5V pins (If available). The Trigger and the Echo pins are both I/O pins and hence they can be connected to I/O pins of the microcontroller. To start the measurement, the trigger pin has to be made high for 10uS and then turned off. This action will trigger an

ultrasonic wave at frequency of 40Hz from the transmitter and the receiver will wait for the wave to return. Once the wave is returned after it getting reflected by any object the Echo pin goes high for a particular amount of time which will be equal to the time taken for the wave to return back to the sensor. The amount of time during which the Echo pin stays high is measured by the MCU/MPU as it gives the information about the time taken for the wave to return back to the Sensor. Using this information, the distance is measured as explained in the above heading.

Applications

- Used to avoid and detect obstacles with robots like biped robot, obstacle avoider robot, path finding robot etc.
- Used to measure the distance within a wide range of 2cm to 400cm
- Can be used to map the objects surrounding the sensor by rotating it
- Depth of certain places like wells, pits etc can be measured since the waves can penetrate through water

Ultrasonic Sensor Pin Configuration

Table 01: Ultrasonic Sensor Pin Description

Pin Number	Pin Name	Description
1	Vcc	The Vcc pin powers the sensor, typically with +5V
2	Trigger	Trigger pin is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.
3	Echo	Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.
4	Ground	This pin is connected to the Ground of the system.

HC-SR04 Sensor Features

- Operating voltage: +5V
- Theoretical Measuring Distance: 2cm to 450cm
- Practical Measuring Distance: 2cm to 80cm
- Accuracy: 3mm
- Measuring angle covered: $<15^\circ$
- Operating Current: $<15\text{mA}$
- Operating Frequency: 40Hz

3.5 Temperature 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). It's fairly simple to use, but requires careful timing to grab data.

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%



Figure 3.9: DHT11 Temperature Sensor

3.6 Rain sensor

A rain sensor is one kind of low-cost electronic sensor which is used to detect the rainfall or water drops. It works as a switch. Normally the switch is open condition. This sensor is consists of mainly two parts, one is Sensing Pad and another one is the Sensor Module. When rainfall or water drops fall on the Sensing Pad surface, then the switch will be closed. The Sensor Module reads data from the sensor pad and processes the data and converts it into a digital/analog output. So, the sensor can provide both types of output Digital output (DO) and Analog output(AO).



Figure 3.10: Rain Sensor Pin Diagram

The Rain Sensor Module's Sensing Pad consists of two nickel-coated series copper tracks. Also, it has **two Header pins**, these are internally connected to the two copper tracks of the Sensing Pad. These pins are used to connect the Sensing Pad to the rain sensor module circuit through two jumper wire. Always, one pin of the rain sensor circuit provides a +5v power supply to the one track of the sensing pad, and another pin is received the return power supply from another track of the sensing pad. Normally under dry conditions, the sensing pad provides high resistance and low conductive. So, the 5v power supply cannot be passed from one track to another track. Its resistance varies according to the amount of water on the surface of the sensing pad. When water drops fall on the sensor pad surface its resistance will decrease and conductivity will increase. So, when water drops increase on the pad surface it can pass more power supply through one track to another track.



Figure 3.11: Rain Sensor Pin Indication & Description

Table 02 : Rain sensor Pin Description

	Pin Name	Description	Sensor
1	VCC	+5 v power supply	
2	GND	Ground (-) power supply	
3	DO	Digital Output (0 or 1)	
4	AO	Analog Output (range 0 to 1023)	

Module Hardware Overview

The Sensor module is consists of some key components. These are LM393 Comparators, Variable Resistor (Trimpot), Power LED, output LED.

Rain Sensor Specifications

Table 03: Rain Sensor Specialization

Parameter	Value
Operating Voltage	3.3V – 5V
Operating Current	15 mA
Comparator chip	LM393

Sensitivity	Adjustable via Trimpot
Output type	Analog output voltage (AO) and Digital switching voltage (DO)
LED lights indicators	Power (red/green) and Output (red/green)
Sensing pad	5cm x 4 cm nickel plate on one side.
Module PCB Size	3.2cm x 1.4cm

Applications

- Rainfall detection
- It's used in an irrigation system, when rainfall is started it shut down the watering system automatically.

3.7 LCD Display

The 16×2 LCD pin shown below:

- Pin1 (Low / Source PIN): This is a GND display pin, used to connect the GND end of a microcontroller unit or power source.
- Pin2 (VCC / Source Pin): This is a display power supply pin, used to connect a power supply pin.
- Pin3 (V0 / VEE / Control Pin): This pin controls the difference of the display, which is used to connect a flexible POT that can deliver 0 to 5V.
- Pin4 (Register Select / Control Pin): This pin turns between a command or data register, which is used to connect a microcontroller unit pin and gets 0 or 1 (0 = data mode, and 1 = command mode) .
- Pin5 (Read / Write / Control Pin): This pin shifts the display between the read or written function, and is connected to the microcontroller unit pin to get 0 or 1 (0 = Write Task, and 1 = Read Task).
- Pin 6 (Enable / Manage Pin): This pin should be held at the top to perform the reading / writing process, and is connected to the microcontroller unit and kept kept high.
- 7-14 Anchors (Data Anchors): These anchors are used to send data to the display.

These pins are connected to two wiring modes such as 4-wire mode and 8-wire mode. In 4-wire mode, only four pins are connected to the microcontroller unit such as 0 to 3, and in 8-wire mode, 8 pins are connected to the microcontroller unit as 0 to 7.

- Pin15 (+ ve LED pin): This pin is connected to + 5V
- Pin 16 (-ve LED pin): This pin is connected to GND.

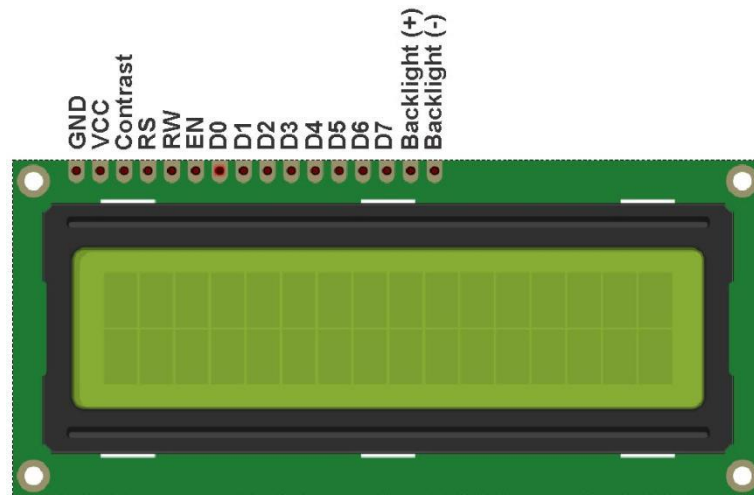


Figure 3.12: LCD Display

Features of LCD 16x2

The features of this LCD mainly include the following.

- The operating voltage of this LCD is 4.7V-5.3V
- It includes two rows where each row can produce 16-characters.
- The utilization of current is 1mA with no backlight
- Every character can be built with a 5×8-pixel box
- The alphanumeric LCDs alphabets & numbers
- Is display can work on two modes like 4-bit & 8-bit
- These are obtainable in Blue & Green Backlight
- It displays a few custom generated characters

3.8 Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the sometime, act to lower voltage levels within circuits. Resistors may have fixed resistances or variable resistances, such as those founding thermostats, visitors, trimmers, photo resistors, hamsters and potentiometers. The current through a resistor is in direct proportion to the voltage across the resistor's terminals. This relationship is represented by Ohm's law.



Figure 3.13: Resistor

Theory of operation:

The behavior of an ideal resistor is dictated by the relationship specified by Ohm 'slaw:

$$V = I.R$$

Ohm's law states that the voltage (V) across a resistor is proportional to the current (I), where the constant of proportionality is the resistance (R).

Equivalently, Ohm's law can be stated:

$$I = V/R$$

This formulation states that the current (I) is proportional to the voltage (V) and inversely proportional to the resistance (R). This is directly used in practical computations. For example, if a 300 ohm resistor is attached across the terminals of a 12 volt battery, then a current of $12 / 300 = 0.04$ amperes flows through that resistor.

3.9 Arduino IDE

The digital microcontroller unit named as Arduino Nano can be programmed with the Arduino software IDE. There is no any requirement for installing other software rather than Arduino. Firstly, Select "Arduino Nano from the Tools, Board menu (according to the microcontroller on our board). The IC used named as ATmega328 on the Arduino Nano comes pre burned with a boot loader that allows us to upload new code to it without the use of an external hardware programmer.

Communication is using the original STK500 protocol (reference, C header files). We can also bypass the boot loader and programs the microcontroller through the ICSP (In Circuit Serial Programming) header. The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available. The ATmega16U2/8U2 is loaded with a DFU boot loader, which can be activated by:

On Rev1 boards: connecting the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2. On Rev2 or later boards: there is a resistor that pulling the 8U2/16U2 HWB line to ground, making it easier to put into DFU mode.

The Arduino Nano is one of the latest digital microcontroller units and has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL at (5V) with serial communication, which is available on digital pins 0 -(RX) for receive the data and pin no.1 (TX) for transmit the data. An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, an .in file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board.

The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial Communication on pins 0 and 1). A Software Serial library allows for serial communication on any of the Nano's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication.

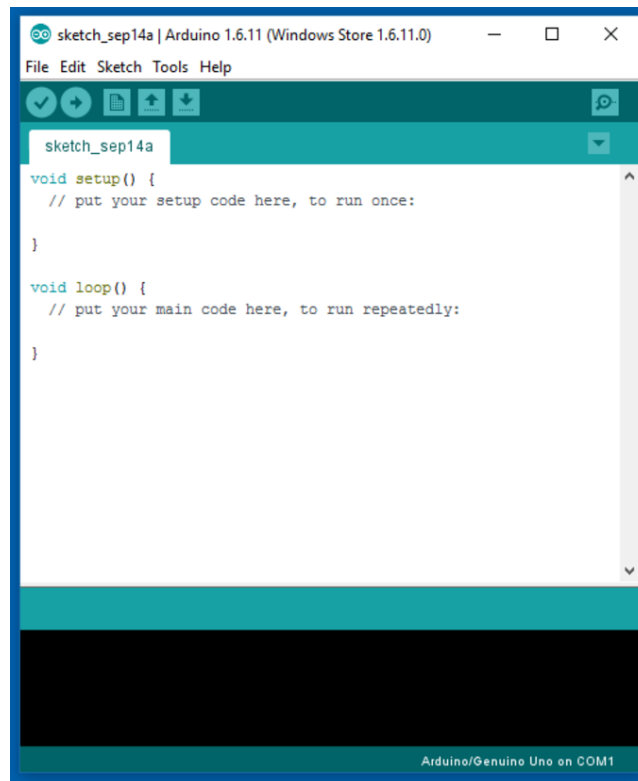


Figure 3.14: Arduino Software Interface IDE

The Arduino software includes a Wire library to simplify use of the I2C bus. Arduino programs are written in C or C++ and the program code written for Arduino is called sketch. The Arduino IDE uses the GNU tool chain and AVR Lab to compile programs, and for uploading the programs it uses avrdude. As the Arduino platform uses Atmel microcontrollers, Atmel's development environment, AVR Studio or the newer Atmel Studio, may also be used to develop software for the Arduino. The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

Writing Sketches

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the

Arduino Software (IDE), including complete error messages and other information. The bottom right hand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Sketchbook

The Arduino Software (IDE) uses the concept of a sketchbook: a standard place to store your programs (or sketches). The sketches in your sketchbook can be opened from the File > Sketchbook menu or from the Open button on the toolbar. The first time you run the Arduino software, it will automatically create a directory for your sketchbook. You can view or change the location of the sketchbook location from with the Preferences dialog. Beginning with version 1.0, files are saved with a .ino file extension. Previous versions use the .pde extension. You may still open .pde named files in version 1.0 and later, the software will automatically rename the extension to .ino.

Tabs, Multiple Files, and Compilation

Allows you to manage sketches with more than one file (each of which appears in its own tab). These can be normal Arduino code files (no visible extension), C files (.c extension), C++ files (.cpp), or header files (.h).

Uploading

Before uploading your sketch, you need to select the correct items from the Tools > Board and Tools > Port menus. The boards are described below. On the Mac, the serial port is probably something like /dev/tty.usbmodem241 (for a Uno or Mega2560 or Leonardo) or /dev/tty.usbserial-1B1 (for a Duemilanove or earlier USB board), or /dev/tty.USA19QW1b1P1.1 (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be /dev/ttyACMx , /dev/ttyUSBx or similar. Once you've selected the correct serial port and board, press the upload button in the toolbar or select the Upload item from the Sketch menu. Current Arduino boards will reset automatically and begin the upload. With older boards (pre-Diecimila) that lack auto-reset, you'll need to press the reset button on the board just before

starting the upload. On most boards, you'll see the RX and TX LEDs blink as the sketch is uploaded. The Arduino Software (IDE) will display a message when the upload is complete, or show an error.

When you upload a sketch, you're using the Arduino Bootloader, a small program that has been loaded on to the microcontroller on your board. It allows you to upload code without using any additional hardware. The Bootloader is active for a few seconds when the board resets; then it starts whichever sketch was most recently uploaded to the microcontroller. The Bootloader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).

Libraries

Libraries provide extra functionality for use in sketches, e.g. working with hardware or manipulating data. To use a library in a sketch, select it from the Sketch > Import Library menu. This will insert one or more `#include` statements at the top of the sketch and compile the library with your sketch. Because libraries are uploaded to the board with your sketch, they increase the amount of space it takes up. If a sketch no longer needs a library, simply delete its `#include` statements from the top of your code. There is a list of libraries in the reference. Some libraries are included with the Arduino software. Others can be downloaded from a variety of sources or through the Library Manager. Starting with version 1.0.5 of the IDE, you do can import a library from a zip file and use it in an open sketch. See these instructions for installing a third-party library.

Third-Party Hardware

Support for third-party hardware can be added to the hardware directory of your sketchbook directory. Platforms installed there may include board definitions (which appear in the board menu), core libraries, Bootloaders, and programmer definitions. To install, create the hardware directory, then unzip the third-party platform into its own sub-directory. (Don't use "Arduino" as the sub-directory name or you'll override the built-in Arduino platform.) To uninstall, simply delete its directory. For details on creating packages for third-party hardware, see the Arduino IDE 1.5 3rd party Hardware specification.

Serial Monitor

This displays serial sent from the Arduino or Genuino board over USB or serial connector. To send data to the board, enter text and click on the "send" button or press enter. Choose the baud rate from the drop-down menu that matches the rate passed to Serial begin in your sketch. Note that on Windows, Mac or Linux the board will reset (it will rerun your sketch) when you connect with the serial monitor.

3.10 Proteus Software

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronics design engineers and technicians to create schematics and electronics prints for manufacturing printed circuit boards. The first version of what is now the Proteus Design Suite was called PC-B and was written by the company chairman, John Jameson, for DOS in 1988.

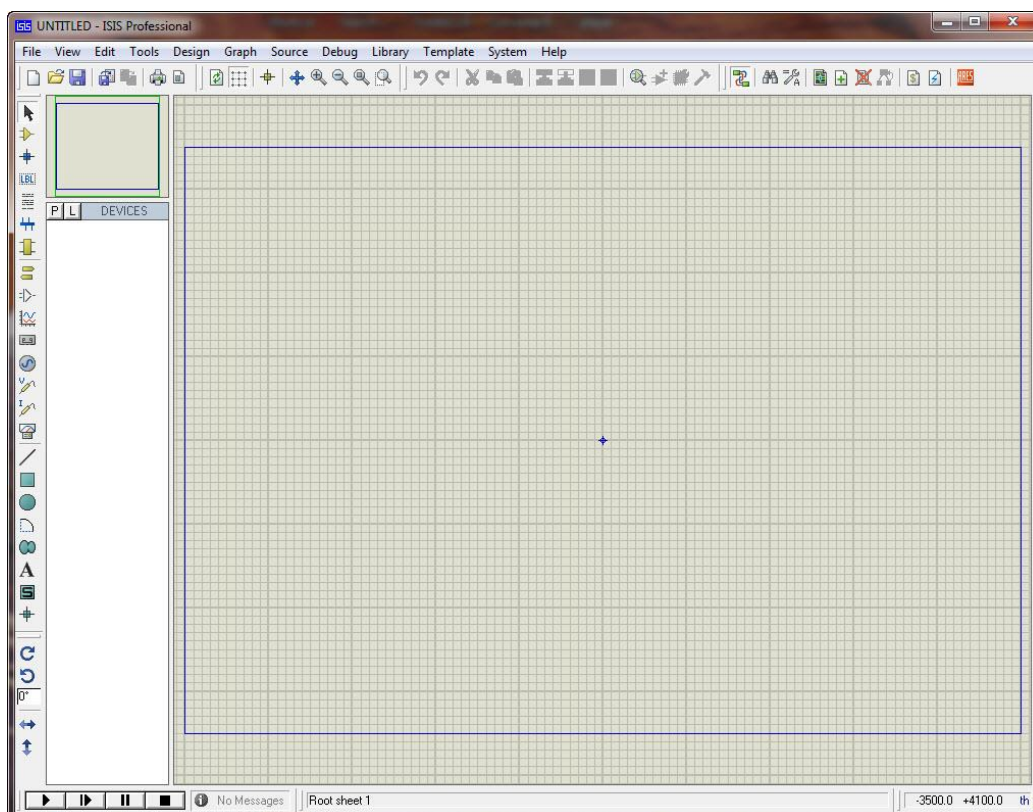


Figure 3.15: Proteus Software Interface

Schematic Capture support followed in 1990 with a port to the Windows environment shortly thereafter. Mixed mode SPICE Simulation was first integrated into Proteus in 1996 and microcontroller simulation then arrived in Proteus in 1998. Shape based auto routing was added in 2002 and 2006 saw another major product update with 3D Board Visualization. More recently, a dedicated IDE for simulation was added in 2011 and MCAD import/export was included in 2015. Support for high speed design was added in 2017. Feature led product releases are typically biannual, while maintenance-based service packs are released as required.

3.11 Remote XY:

Remote XY is easy way to make and use a mobile graphical user interface for controller boards to control via smartphone or tablet. The system includes:

- Editor of mobile graphical interfaces for controller boards, located on the site remotexy.com
- Mobile app Remote XY that allows to connect to the controller and control it via graphical interface. Download app.

Distinctive features:

- The interface structure is stored in the controller. When connected, there is no interaction with servers to download the interface. The interface structure is downloaded to the mobile application from the controller.
- One mobile application can manage all your devices. The number of devices is not limited.

Supported connection methods:

- Internet over Cloud Server;
- Wi-Fi client and access point;
- Bluetooth;
- Ethernet by IP or URL;
- USB OTG (Android only that support USB OTG);

Supported boards:

- Arduino UNO, MEGA, Leonardo, Pro Mini, Nano, MICRO and compatible AVR boards;
- ESP8266 boards;
- ESP32 boards;
- Chip KIT UNO32, Chip KIT uC32, Chip KIT Max32;

Supported communication modules:

- Bluetooth HC-05, HC-06 or compatible;
- Bluetooth BLE HM-10 or compatible;
- ESP8266 as modem;
- Ethernet W5100;

Supported IDE:

- Arduino IDE;
- FLProg IDE;
- MPIDE;

Supported mobile OS:

- Android;
- iOS;

Remote XY is easy way to make a unique graphical interface to control microcontroller device via mobile application, Arduino for example.

Remote XY allows:

- To develop any graphical management interface, using the control, display and decoration elements any combination thereof. You can develop the graphical interface for any task, placing the elements on the screen using the online editor. Online editor posted on the website remotexy.com.

- After the development of the graphical interface, you get the source code for the microcontroller that implements your interface. The source code provides a structure for interaction between your program with the controls and display. Thus you can easily integrate the control system into your task for which you are developing the device.
- To manage microcontroller device using your smartphone or tablet with the graphical interface. For manage used mobile application Remote XY.
- Using one mobile application, you can manage a large number of devices with different graphical management interfaces. As the interface description is stored on board the microcontroller device.

the source code for the microcontroller, for example a sketch for the Arduino, you opened it in the IDE. In the simplest case, you can download the sketch in Arduino board and test your interface immediately, connecting via a smartphone. But often you need to integrate the developed graphical interface with your problem you want to solve it using the Arduino. Next, we will show how it is easy to do.

The generated source code have a part that is starts with tag **Remote XY include library** and ends with tag **END Remote XY include**. This part of the code defines the structure of the graphical interface that you have created. In turn, this structure is also divided into parts. Consider the order.

Select connection mode and include library

The code contains a definition of how you use the connection of interface. This definition of the form `REMOTEXY_MODE__ XXX`. For example, if you use Software Serial, this definition would be `REMOTEXY_MODE__SOFTWARESERIAL`, if you use Hardware Serial - `REMOTEXY_MODE__SERIAL` respectively.

Additionally this section of code contains the necessary includes libraries to provide the necessary functionality. Also connects library `Remote XY.h`. There is no need to change this part of code.

Connection settings

This part of the code in more detail defines the characteristics of the selected connection. For example, if you are using a connection via Software Serial, you can determine which pins microcontroller will be connected to the Bluetooth module. You can also determine the rate of exchange with the Bluetooth module, if it is different from the default 9600 baud. All definitions are set by default, but you can change them as you need. This is the only section of code in the included section of Remote XY that you can change.

ESP8266 Wi-Fi module

ESP8266 module allows to use RemoteXY with microcontroller device for Wi-Fi. Implemented support for all Arduino boards. The source code of GUI can be download for the Arduino IDE and PLProg.

Remote XY allows to configure module for operate in one of two modes: access point and client. Client allows to connect the module to an existing Wi-Fi access point. Access point mode of ESP8266 configures the module as an access point and allows to connect Arduino directly to this point. The access point is available to connect to it from smartphone or tablet within a radius of availability of the radio signal. It does not require any other network infrastructure. This connection mode can be used in the far away place where there is no computer networks and the Internet. To configure this mode in the configuration properties of editor need to select the type of connection "Wi-Fi access point."

Client mode of ESP8266 configures the module for automatically connect to an existing Wi-Fi access point, such as a home router or enterprise access point. At the same time connected to the Arduino module ESP8266 must be located in the physical availability of the radio signal of access point. Connecting to the device from smartphone or tablet will be not directly, but through the Ethernet network, an IP address provided by the DHCP server to ESP8266 module. It allows to connect to the Arduino device from anywhere in the local network as well as from the Internet.

CHAPTER 4

METHODOLOGY

4.1 Our methodologies for the project:

- Creating an idea for the design and construction of **Automatic IoT Fishing Management System**. And designing a block diagram to know which components we need to construct it.
- Collecting all the components for our desired system.
- Setting up all the components in a system. Then assembling all the blocks in a system and finally running the system to check if it actually works or not.

4.2 Our Final System view

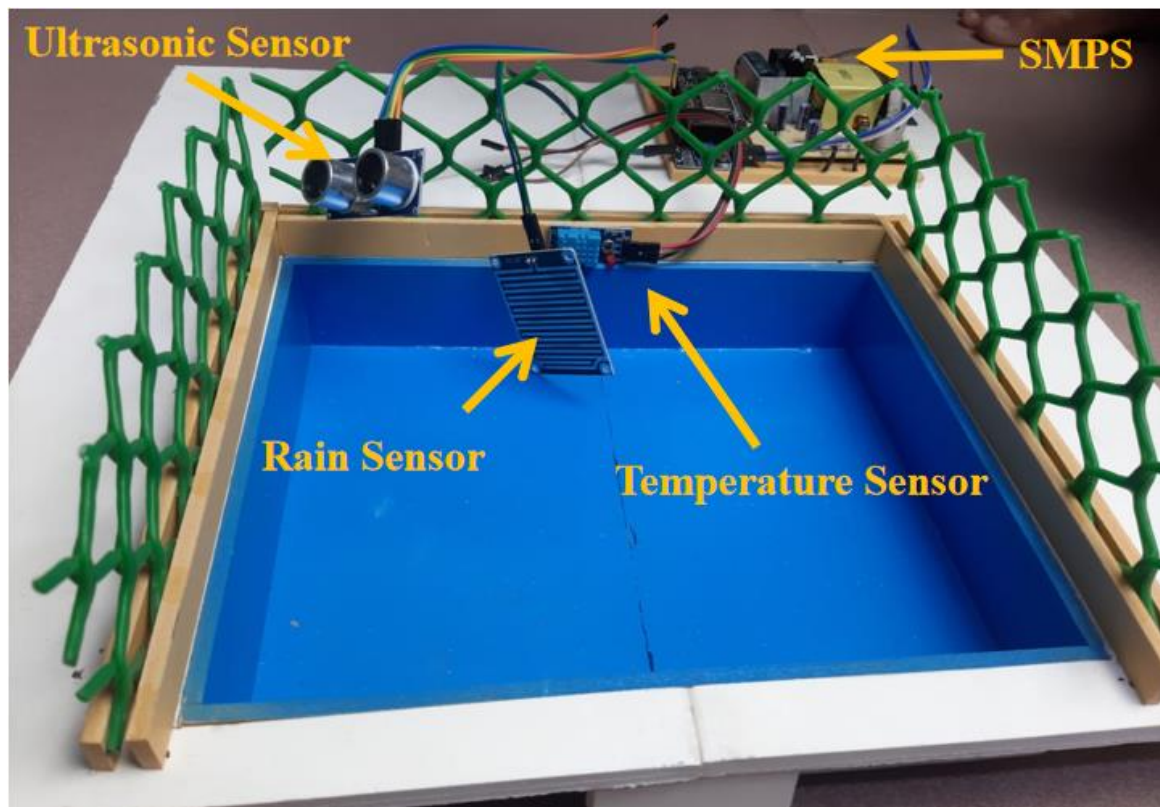


Figure 4.1: Our Final System Overview (Side View)

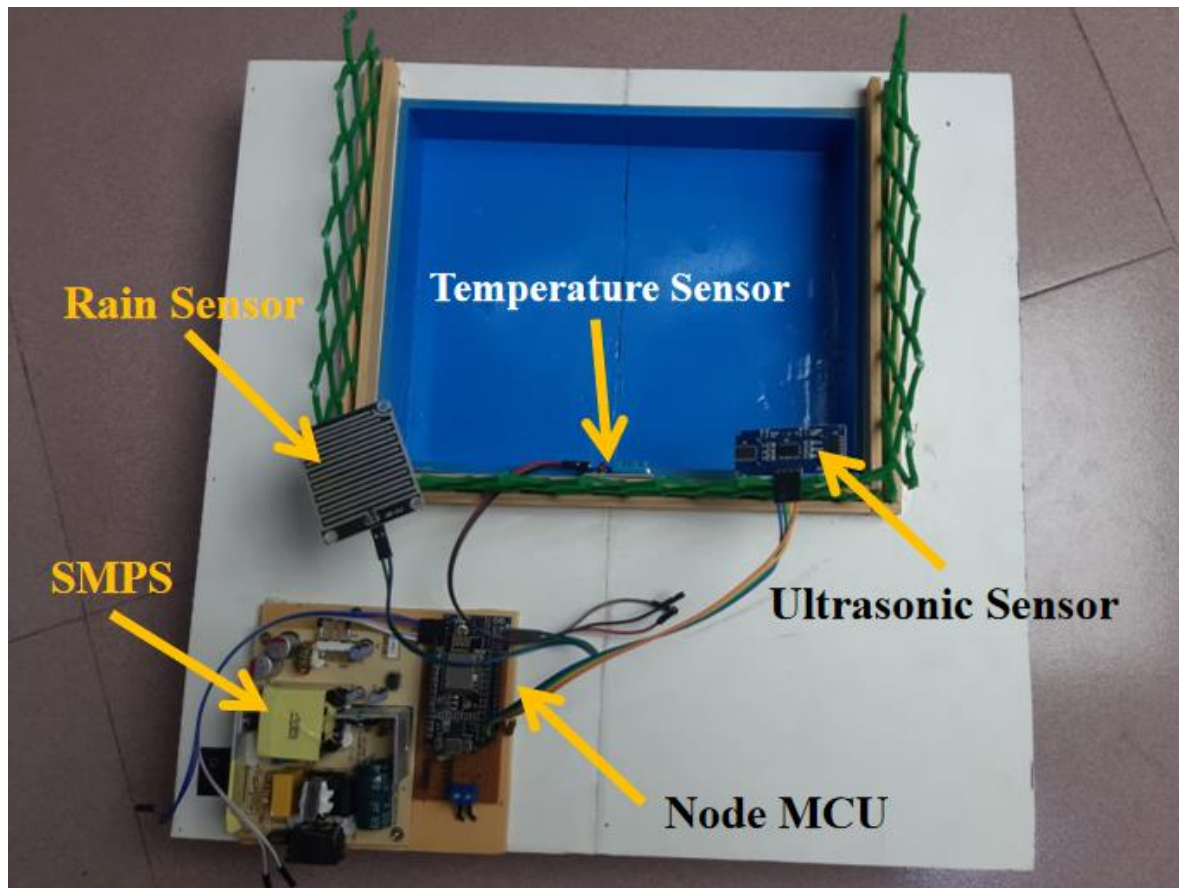


Figure 4.2: Our Final System Overview (Top View)

4.3 Working Principle

Our Project is Automatic IoT Fishing Management System. In this project we used a Node MCU as the brain of the whole project. As an input we used three sensors. In this project we used a LCD Display and mobile for output device. We used SMPS and rectifiers to power the entire project. At first SMPS convert AC to AC step down voltage & this voltage convert AC to DC via rectifier Circuit. Here we use ultrasonic sensor for measure the water level of the pond. Here also use a temperature sensor which will detect water temperature and rain sensor will observe the weather condition of the pond area. All data will show in LCD display and mobile display through IoT. This is the main procedure off our system.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Discussion

In this project we added all of this equipment and setup it properly. Then observe our system. In the very beginning time, we can't do it properly, after a great teamwork we solve our problem and finally able to measure water level, water temperature and weather condition like rain and end notification in our phone, After using this system we really know our pond condition.

5.2 Results

Types of Sensors	Minimum Value	Maximum Value
Temperature Sensor	26°C	34°C
Rain Sensor	No Rain	Rain Detected
Ultrasonic Sensor	Level 6	Level 14

5.3 Advantages

There are certainly many advantages of our project and some of the major ones have been given below:

- Check temperature automatically.
- No Oil consumption.
- The project is compact, cheap and user friendly.
- The whole system consumes very little energy.
- Less skill technicians is sufficient to operate.
- Simple construction
- Ease of operation

5.4 Applications

This project has applications in many fields due its necessity. We have selected a few of them and they are given below:

- It can be used for Smart Poultry and Fishery Farm work.
- It can be used for maintain temperature and weather monitoring automatically.

CHAPTER 6

CONCLUSION

6.1 Conclusion:

IoT is an innovative technology for Zoology environmental condition management especially fishery farming which can be changed from the routine traditional farm into smart automated fishery farm. In this paper we have presented IoT based fishery management smart system for managing and improve the fish productions in fish farming ponds. The current implemented system consists from the most vital sensors that are needed to monitor the water quantity and notify the fish pond manager on-site. In future we plan to expand the IoT water monitoring system by adding a variety of other sensors, like sensors that will measure pH or dissolved oxygen vital for the fish life cycle. This work represents the design and implementation of fishery system monitoring system. IOT technology is applied while developing this system. It is scalable, mobile and accurate. This will help to increase the fish production to a significant level. Further there is no need for manual testing, reduction of losses saves the labour cost, and also prevention of critical condition. It is difficult to manage the fish farms with traditional and non-technical methods. The developed model provides the technological solution which would monitor the quality of the water in real time.

6.2 Future Scope

As we have already discussed about the limitations of our project so definitely there's room for improvement and thus, we have lots of future scope of work available to us for this project. Some of these are listed below:

- In future, we are thinking about adding record for save some data.
- In future, we are thinking about 100% accuracy.
- In future development this project can be develop by more gas sensor, thermal image sensing, camera etc. for security.
- In the future we will use anti thief alarming system.

Reference

- [1] P. Fowler, D. Baird, R. Bucklin, S. Yerlan, C. Watson and F. Chapman, “Microcontrollers in Recirculating Aquaculture Systems”, Florida Cooperative Extension Service, University of Florida. 1994.
- [2] G. Merino et al., “Can marine fisheries and aquaculture meet fish demand from a growing human population in a changing climate”, *Glob. Environ. Change*, vol. 22, no. 4, pp. 795–806, Oct. 2012.
- [3] K. D. Lafferty et al., “Infectious Diseases Affect Marine Fisheries and Aquaculture Economics,” *Annu. Rev. Mar. Sci.*, vol. 7, no. 1, pp. 471–496, Jan. 2015.
- [4] H. Ceong, J-S. Park, and S. Han, "IT convergence application system for eco aquafarm", in *Conf. Rec. 2007 IEEE Frontiers In The Convergence of Bioscience and Information Technologies (FBIT 2007)*, pp. 878-883.
- [5] S. Han, Y. Kang, K. Park, and M. Jang. "Design of environment monitoring system for aquaculture farms", in *Conf. Rec. 2007 IEEE Frontiers In The Convergence of Bioscience and Information Technologies (FBIT 2007)*, pp. 889-893.
- [6] Y. Shifeng, K. Jing, and Z. Jimin, "Wireless monitoring system for agriculture System”, 2012.
- [7] J. Pacheco, O. Outcome of “Water temperature on fish culture”, 2013.
- [8] T. Sung, “Effects of Dissolved oxygen on aquaculture”, 2012.
- [9] P. Bartolome, S. Fallout of “PH value in fish farming”, 2014.
- [10] Y.M. Poonam, and Y. Mulge, “Remote temperature monitoring using LM35 sensor and intimate android user via C2DM service”, *International Journal of Computer Science and Mobile Computing* 2 (6) (2013) 32- 36.

- [11] M. M. Dey, F.J. Paraguas, P. Kambewa, And D. E. Pems, “The impact of integrated aquaculture– agriculture on small-scale farms in Southern Malawi”, *Agricultural Economics* 41 (1) (2010) 67-79.
- [12] J. Gubbi, R. Buyya, S. Marusic, and M. Palaniswami, “Internet of Things (IoT): A vision, architectural elements, and future directions”, *Future generation computer systems* 29 (7) (2013) 1645-1660.
- [13] M. Gigli, and S. Koo, Internet of Things, “Services and Applications Categorization”, *Advances in Internet of Things* (2011).
- [14] P. G. Lee, “A review of automated control systems for aquaculture and design criteria for their implementation”, *Aqua cultural Engineering* 14 (3) (1995) 205-227.
- [15] P. Bartolome, “Fallout of PH value in fish farming”, 2014.
- [16] Y. M. Poonam, and Y. Mulge, “Remote temperature monitoring using LM35 sensor and intimate android user via C2DM service”, *International Journal of Computer Science and Mobile Computing* 2 (6) (2013) 32- 36.