Design and Implementation of an IoT based Smart Weather Monitoring System in Poultry Farm

A project and thesis presented to partially satisfy the criteria for obtaining a Bachelor of Science degree in Electrical and Electronics Engineering.

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January, 2025

DECLARATION

I hereby declare that this project **"Design and Implementation of an IoT-Based Smart Weather Monitoring System in a Poultry Farm"** is part of my own research completed in the laboratory of the Department of Electrical and Electronics Engineering, Faculty of Engineering, Daffodil International University, fulfilling the requirements for a Bachelor of Science in Electrical and Electronics Engineering and has not previously been included in a thesis or dissertation submitted to this institution or any other institution for the award of a degree, diploma, or other qualification. I have endeavored to identify any risks associated with this study that may arise in conducting this research and have obtained the appropriate ethical and safety approvals and acknowledged my responsibilities and the rights of the participants.

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APPROVAL

The project and thesis entitled "**Design and Implementation of an IoT based Smart Weather Monitoring System in Poultry Farm**" Submitted by Name: Abu Rashel, ID: 211-33-5387, Name: Md. Mehedi Hasan, ID:211-33-5381 Session: Fall 2021 has been accepted as satisfactory in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering in December, 2024.

Signed

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COMMITTED
TO
OUR TEACHER

TABLE OF SUBSTANCE

LIST OF FIGURES

Figure

LIST OF TABLE

Table

LIST OF ABBREVIATIONS

PCB Printed Circuit Board IoT Internet of Things

SMPS Switch Mood Power Supply AC Alternating Current

DC Direct Current

USB Universal Serial Bus Tx Transmitter

Rx Receiver

IDE Integrated Development Environment MCU Micro Controller Unit

ACKNOWLEDGEMENT

To start with, we need to explicit our honest gratitude to the Almighty. With His blessings, we were capable of correctly whole our paintings to the first-rate of our abilities.

We additionally need to take this possibility to explicit my gratitude to our undertaking and thesis supervisor, **Dr. Md Rezwanul Ahsan, Associate Professor with inside the Department of EEE at Daffodil International University**, for his steady support, encouragement, and steering all through this undertaking. This enterprise might now no longer were plausible without his insightful recommendation and assistance. I am genuinely grateful for the risk to select this undertaking.

Furthermore , We desire to well-known **Dr. Md. Shahid Ullah, Professor and Head of the Department of EEE at Daffodil International University**, for his support, steering, and regular encouragement. I might additionally want to thank all our buddies for sharing their know-how and insights and for his or her contributions to the achievement of this undertaking. My appreciation extends to individuals who lent us diverse equipment and equipment. To our liked family, We provide our inner most love and thank you for his or her steadfast support, in addition to for the foundation and motivation they furnished all through our instructional adventure at this University.

ABSTRACT

The incorporation of Internet of Things (IoT) technology in chicken farming provides creative approaches to enhance environmental conditions essential for animal well-being and efficiency. This research introduces an intelligent weather monitoring system designed specifically for poultry farms, utilizing IoT devices to gather real-time information on temperature, humidity, air quality, and light levels. The system employs wireless sensors, cloud-based data storage, and machine learning algorithms to provide predictive insights and automated control for maintaining optimal conditions. These capabilities minimize human intervention, enhance energy efficiency, and reduce operational costs while ensuring precise environmental regulation. Alerts for anomalies, such as extreme temperatures or poor air quality, enable timely corrective actions, reducing the risk of disease and mortality. This IoT-driven approach demonstrates significant potential to improve the sustainability and productivity of poultry farms, aligning with modern agricultural advancements and the growing demand for intelligent farming solutions.

Keyword: Smart Poultry Farm, Temperature Monitoring, Gas Detection, Rain Fall Detection and Air Quality Monitoring, IoT monitoring.

CHAPTER 1
INTRODUCTION

1.1 Background Study

Temperature and humidity are vital elements in broiler poultry farming, significantly influencing the health, growth, and productivity of the birds. Proper temperature regulation is essential for achieving optimal growth rates, as extreme heat or cold can induce stress, diminish feed consumption, and weaken immunity. Humidity levels are also important for respiratory health and feed utilization. Excessive humidity can result in respiratory diseases and the proliferation of mold, whereas insufficient humidity can lead to dehydration. Achieving the correct balance of temperature and humidity enhances the overall welfare of poultry, lowers the risk of disease, and promotes better feed conversion rates, contributing to increased profits.

Fig1.1.1: Smart poultry Farm

Raising domesticated birds, which incorporates chickens, ducks, turkeys, and geese, for the production of Meat and Eggs for consumption. Poultry production serves as a crucial source of income for many rural communities, as it provides high-quality protein and enhances profitability.

There are three main categories of poultry breeds:

- Laying breeds – primarily raised for meat production
- Meat breeds – mainly kept for egg production
- Dual breeds – utilized for breeding to get fertilized eggs.

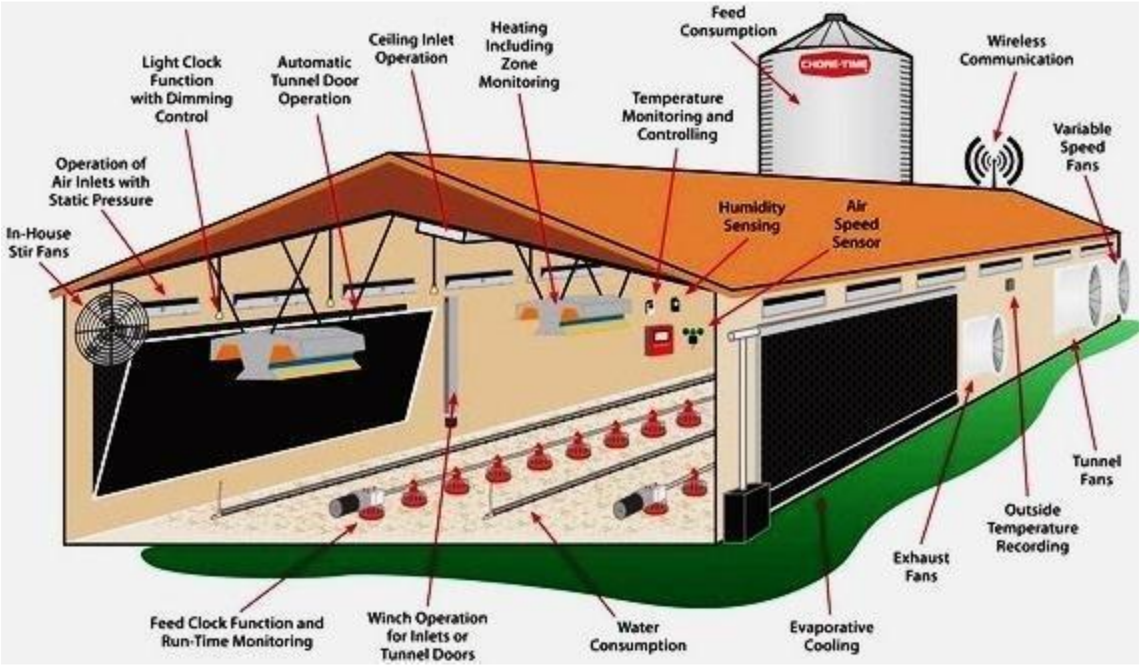

Fig 1.1.2 : Wireless Connectivity of Smart Farm

Our initiative focuses on raising poultry chickens. A smart poultry farm significantly influences the growth of chickens to offer higher-quality food. In today's world, automation is crucial. The automation of a poultry farm utilizes the Internet of Things and Global System for Mobile Communication. Chicken is a preferred product globally due to its nutrient density, boasting high protein, low fat, and lower cholesterol compared to other poultry. Environmental factors in a poultry farm, including temperature, humidity, ammonia levels, and light intensity, are monitored and adjusted automatically to boost chicken productivity. The feeding valves are also regulated and managed using a servo motor, eliminating the need for human intervention. By linking all the sensor modules to the Node MCU, all sensor readings are gathered and subsequently uploaded to a web page using the Wi-Fi module. The person responsible for the poultry farm can monitor the internal environmental conditions of the farm through a computer or mobile device via the internet. This system regulates temperature, humidity, ammonia levels, and light intensity through the use of a cooling fan and automatic light control, all without human intervention. Based on predefined threshold values, it will activate or deactivate the devices.

The system design enables automated poultry management, reduces the need for manual labor, and enhances the production of healthy chickens.

1.2 Problem Statement

The issue of proficient poultry cultivating is basic for guaranteeing nourishment security and decreasing operational costs. Conventional strategies of observing climate conditions in poultry ranches are labor-intensive and need accuracy, frequently driving to imperfect situations for poultry wellbeing and efficiency. Varieties in temperature, stickiness, and discuss quality can essentially affect poultry welfare, egg generation, and nourish proficiency. An IoT-based keen climate checking framework can address these challenges by giving real-time information, mechanized cautions, and prescient analytics. Such a framework empowers agriculturists to preserve ideal conditions with negligible manual mediation, in this manner moving forward maintainability, lessening mortality rates, and improving generally cultivate proficiency.

1.3 Objectives

Our goals are pointed out underneath:

- The most objective of this venture is to create an IoT Based Shrewd Climate Observing for Keen Poultry Cultivate, which keep up the internal temperature, Discuss Quality, Gas Identify, Rain falt identify of the poultry cultivate.

- To plan and develop of a IoT Based Savvy Poultry Farm.

- To manufacture a remote Savvy Poultry Cultivate utilizing sensors and microcontroller.

1.4 Scope of the Ponder

The scope of this think about centers on creating an Plan and Usage of an IoT based Keen Climate Checking Framework in a Keen Broiler Poultry Ranches, coordination temperature, stickiness, discuss quality, and lighting sensors. It points to improve poultry wellbeing, optimize natural conditions, diminish vitality utilization, and progress efficiency through real-time observing and robotized control frameworks.

1.4.1 Topographical Impediments

The topographical confinements of an Plan and Execution of an IoT based Savvy Climate Observing Framework in a Keen Broiler Poultry Cultivate incorporate changing climate conditions, which may require distinctive sensor arrangements to guarantee exact information collection in different situations. In locales with extraordinary climate, such as tall stickiness or temperature variances, the framework may require extra calibration or assurance. Constrained or questionable web network in inaccessible or provincial regions can disturb real-time information transmission and framework usefulness. Moreover, territorial foundation varieties, such as control supply consistency and accessibility of specialized bolster, might influence the system's unwavering quality and execution. Neighborhood cultivating hones and directions may too impact framework appropriation and adaptability.

1.4.2 Innovative Restrictions

Innovative impediments of an Plan and Execution of an IoT based Savvy Climate Checking Framework in a Keen Broiler Poultry Ranches incorporate sensor precision and unwavering quality, which may change depending on natural variables, influencing information accuracy. Network issues in farther regions with constrained web get to seem disturb real-time information transmission and framework usefulness. Control supply challenges, such as control blackouts or insufficient power framework, can prevent ceaseless operation. Overseeing huge volumes of real-time information may require progressed information capacity and handling arrangements, expanding complexity and taken a toll. Moreover, coordination the framework with existing cultivate innovations seem include customization and compatibility challenges, making it troublesome for littler ranches to embrace.

1.5 Significance of the Study

The significance of this study lies in its potential to revolutionize poultry farming through the integration of IoT technology for environmental monitoring. By ensuring optimal conditions for poultry health, growth, and productivity, the system addresses key challenges such as temperature stress, diseases, and inefficient resource use. It empowers farmers with real-time data, automated control, and predictive insights, leading to informed decision-making and cost reduction. The study aims to improve animal welfare, enhance farm efficiency, and boost profitability. Ultimately, this project contributes to sustainable and smart farming practices, offering a scalable solution to modernize poultry operations globally.

1.6 Report Structure

This venture book comprises of 5(five) Chapter. The primary Chapter, explanation with Presentation, Back Ground Problem Explanation for the extend, goals & think about, Scope of The Study Significance of the Ponder and the Inquire about Diagram. Chapter two contains framework Writing Survey in Points of interest. Chapter three depicts Framework Diagram Graph, Circuit Graph with component points of interest and the program which we have utilized for our work. Chapter four bargains with the Usage & result discourse, advantage, application and appears the total model of the venture that we have built. Within the last chapter, examined the conclusion and future scope of the venture additionally almost a few angles we had to overcome whereas doing the extend & finally, we gave the Conclusion of the Book.

CHAPTER 2
WRITING AUDIT

2.1 Introduction

In this chapter we talk about our framework outline. In this paper we are moreover work almost Plan and Usage of an IoT based Keen Climate Checking Framework in Poultry Cultivate. In underneath area we'll portray a few past writing audit. From past writing we assemble more information to construct this venture and we effectively made it .

2.2 Writing Audit

T. Malini; D. L. Aswath;-This article offers guidance on how to arrange a Web of Things (IoT) based shrewd poultry cultivating framework with IoT components within the most effective way. The information is exchanged to the cloud by the ESP32 Wi-Fi Module, whereas the Arduino Nano interatomic with numerous sensors to decide the disadvantages of clearly characterized borders. [1]

R. Sandhiya; T. Vamshi Mohana; -To address each trouble, the ponder proposed a shrewd chicken framework. Natural components have a noteworthy affect on poultry birds' wellbeing, hence stickiness and temperature are continually checked and followed. The site was made so that people who care for poultry might get correct data almost the wellbeing of their winged creatures and utilize it to create educated choices. [2]

Mohammed Hanif ashari Ali AsgharMemon; - The given based on computer program equipment may screen natural measurements such as discuss temperature, mugginess, oxygen substance, CO_2 concentration, and NH_3 concentration. The remote sensor is in charge of source coordination and control, as well as successful information collection for the previously mentioned parameters. The hardware has been effectively set in numerous areas all through the chicken shed. The exploratory setup demonstrated to be exceedingly exact and productive[3]

R. Sasirekha; Kaviya R - The objective of this venture is to robotize management duties on a chicken cultivate utilizing IoT innovations. Temperature and mugginess are two environmental components that impact chicken well-being. By checking the chicks concurring to their cycle, the proprietor is kept educated. When making high-quality things, the weight of the fowl is critical. In the event that these conditions stay reliable, the number and quality of chicken will increment. [4]

Mangesh Kale; Sarita Charkha - The paper clarifies that the Raspberry Pi and Arduino Uno may communicate by means of the USB interface and serial peripherals. The Arduino Uno is utilized to studied sensor information, whereas the Raspberry Pi capacities as an inserted web server. An inserted web server empowers the selection of Web of Things (IoT) standards. This extend points to screen and oversee natural parameters in chicken ranches such as temperature, stickiness, light concentrated, and discuss quality. [5]

FatriaJumaraAdha; MdGaparMdJohar; - Computerization is vital in today's world, and the concept of the Web of Things (IOT) is always extending. There are endeavors underway to change over manual operations to mechanized ones. The paper centers on robotizing chicken ranches with Web of Things innovations to total a assortment of administration chores. A assortment of natural components impact chicken wellbeing, counting temperature, mugginess, light, and smelling salts gas levels. Manual chores such as cleaning, bolstering, and water supply are all overseen. [6]

Shubham Mitkari1, AshwiniPingle- The strategy proposed is appropriate to both cultivating and chicken ranches. It is utilized to get ready the soil, shower plants, and treat them. In a chicken cultivate, it is used to supply nourishment in holders, direct temperature with a water sprinkler and evacuate discuss with a soil blend. The client will benefit from the proposed system[7]

G. Dency Greenery; R. Sandhiya; P. Santhiya; - The objective is to decrease chicken mortality whereas expanding sound hen generation in arrange to boost efficiency by computerising the perception and control prepare and using the Web of Things (IoT). The cycles that begin naturally when the previously mentioned parameters surpass the edge levels can offer assistance to moderate the rate at which hens die on the farm. In expansion, the system sends the client a preprogrammed preparation caution by SMS, mail, and online informing apps. A Web point of interaction is essentially planned to screen and show these boundaries. [8]

NoridayuManshor; Amir Rizaan Abdul Rahiman - To guarantee that the framework works viably, screen the temperature and stickiness levels in a chicken house on a visit premise. To dodge scenarios that result in tall temperature increments, it must be checked around the clock. This article centers on an Online of Things (IoT) arrangement for checking temperature and mugginess anyplace, at any time, as well as vitality network. [9]

Dr.ZuhaibBaig , Pallavi M - The industry's labour concerns can be addressed by employing the recommended technology to feed the hens rather than hiring workers, and a semi-automated strategy can be executed within the poultry trade. Worldwide chicken yield has ceaselessly expanded as a result of progressed fabricating forms and uniform cultivating hones. Concurring to the world's rural product report, chicken is the foremost well known deliver since it contains more protein, less fat and cholesterol, and less calories than other poultry species.Mahale and Sonaavane [10]

presented an imaginative framework for keen poultry cultivate checking utilizing IoT and remote sensor systems. Their arrangement, leveraging Raspberry Pi 2, Arduino UNO, and inaccessible sensors, revolutionizes conventional cultivating strategies by giving real-time information on basic parameters such as temperature,humidity, light, and gas levels through remote networks.Goud and Sudharsan [11]

Proposed an internet-based shrewd poultry cultivate coordination remote sensors and versatile framework systems. This framework encourages farther checking of basic parameters like temperature and mugginess, with notices sent to enrolled portable numbers, guaranteeing incite mediations by cultivate staff. So-In, Poolsanguan, and Rujirakull [12]

Talked about keen versatile poultry cultivating frameworks utilizing Tmote Sky WSNs. Their accentuation on joining electronic and mechanical components in cultivate foundations improves versatility and adaptability, empowering productive administration of key components such as temperature, mugginess, light, and populace thickness, nearby nourishment and hereditary selection.Amir et al. [13]

displayed a comprehensive chicken farm monitoring framework utilizing remote communication units and sensors to identify temperature, stickiness, light, and water levels. Checking and control are encouraged through an Arduino microcontroller, guaranteeing productive administration hones and optimal conditions for poultry development. [14]

The creators proposed a cloud-based poultry cultivate checking framework, joining IoT gadgets and cloud computing for real-time information investigation and decision-making. This framework offers upgraded adaptability, adaptability, and openness, enabling poultry ranchers with noteworthy experiences for progressed cultivate administration. [15]

The creators created a keen broiler house checking framework utilizing remote sensor systems and machine learning calculations for prescient analytics. Their framework empowers proactive distinguishing proof of potential issues, permitting for opportune intercessions to optimize broiler generation effectiveness and welfare. [16]

the creators presented a accuracy poultry cultivating framework joining IoT, AI, and edge computing for real-time checking and choice bolster. This framework offers personalized administration arrangements custom-made to person feathered creature needs, maximizing efficiency whereas minimizing asset wastage. [17]

the creators proposed a keen poultry cultivate administration framework utilizing RFID innovation for computerized following and checking of poultry wellbeing and behavior. Their framework upgrades traceability and empowers early location of health issues, guaranteeing convenient intercessions to avoid malady episodes.[18]

the creators created a remote sensor-based poultry cultivate computerization framework for farther checking and control of natural parameters and bolstering frameworks. Their framework progresses operational proficiency, diminishes labor costs, and improves in general cultivate efficiency. [19]

2.3 Compare and Contrast

Feature	WSN-Based Systems	Cloud-Based IoT Systems	Edge Computing Systems
Real-Time Monitoring	Limited by network disruptions	Highly effective via cloud	Reliable due to local processing
Scalability	Moderate scalability	Highly scalable	Limited scalability
Latency	High latency	Moderate latency	Low latency
Energy Efficiency	Moderate	High (depends on connectivity)	High (local processing)
Cost	Low	Moderate	High
Complexity	Low	High (integration required)	Moderate
Reliability	Moderate (network dependent)	Low (connectivity dependent)	High

2.4 Rundown

This writing is offer assistance us to a brief concept of IoT based Keen Climate Checking Framework in a Keen Poultry Cultivate and Angling Framework. Numerous individuals are attempting to make venture. We besides endeavor this wander. This is a challenge we are also embracing. We've included four additional sites that will be highly beneficial to you.

CHAPTER 3
METHODOLOGY

3.1 Framework Diagram

The Plan and Execution of an IoT based Shrewd Climate Observing Framework in a Shrewd Broiler Poultry Cultivate s coordinating sensors to track temperature, mugginess, discuss quality, and lighting. It gives real-time information through a portable or web dashboard, robotizes natural controls, and sends cautions for deviations. This guarantees ideal poultry wellbeing, asset effectiveness, and made strides cultivate efficiency.

3.2 Block Diagram

Here is the piece chart of the Plan and Execution of an IoT based Keen Climate Checking Framework in a Savvy Broiler Poultry Cultivate and Angling Framework with all the fundamental components. All of the components are appeared in underneath as a square in this chart. Here we utilize Hub MCU for fundamental micro-controller which is work the framework consequently and give online data of our extend. Other equipment's are joined with this micro-controller and work together for perform as our want result.

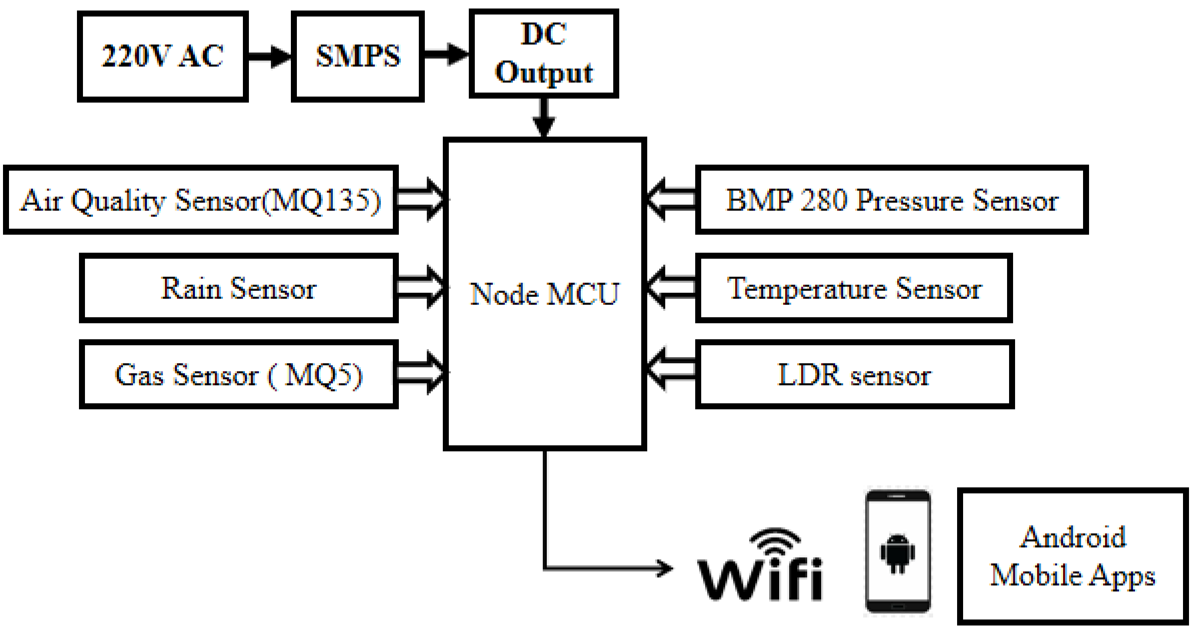

Fig 3.2.1: Piece Chart of Our Extend

3.3 List of Components

Hardware

- SMPS.
- Node MCU.
- Temperature Sensor (DHT11)
- Air Quality Sensor (MQ135)
- Rain Sensor
- Gas Sensor (MQ5)
- Barometric Pressure Sensor (BMP280)
- LDR Sensor

3.4 NodeMCU

Node Micro-Controller Unit is an opensource firmware and opensource templates available for prototyping boards. The term “Node MCU” merges “node” and “MCU” (microcontroller unit). Strictly speaking, “Node MCU” refers to the firmware itself, not the development kit that comes with it. The firmware and the proto-typing board template are available as open source. Lua is the scripting language used to execute the firmware. It is constructed using the Express if Non-OS SDK for the ESP8266 and is based on the e Lua project. The firmware incorporates a number of opensource initiatives, such as SPIFFS and Leucosin. Users must select the right components for their project and design a unique firmware while taking resource limitations into account. Additionally, 32-bit ESP32 support has been incorporated.

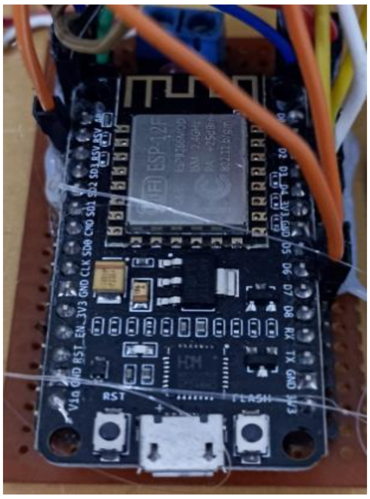

Fig 3.4.1: Node MCU

Typical proto-typing hard-ware used is a printed circuit-board that serves as a dual inline package (DIP), combining a USB controller with a compact surface mount board that includes an MCU and antenna. The DIP format makes it easy to create prototypes on a breadboard.

The original design was based on the ESP8266 ESP-12 module, a Wi-Fi system on a chip (SoC) that integrates IoT applications frequently employ the Tensilica-Xtensa LX106 core.

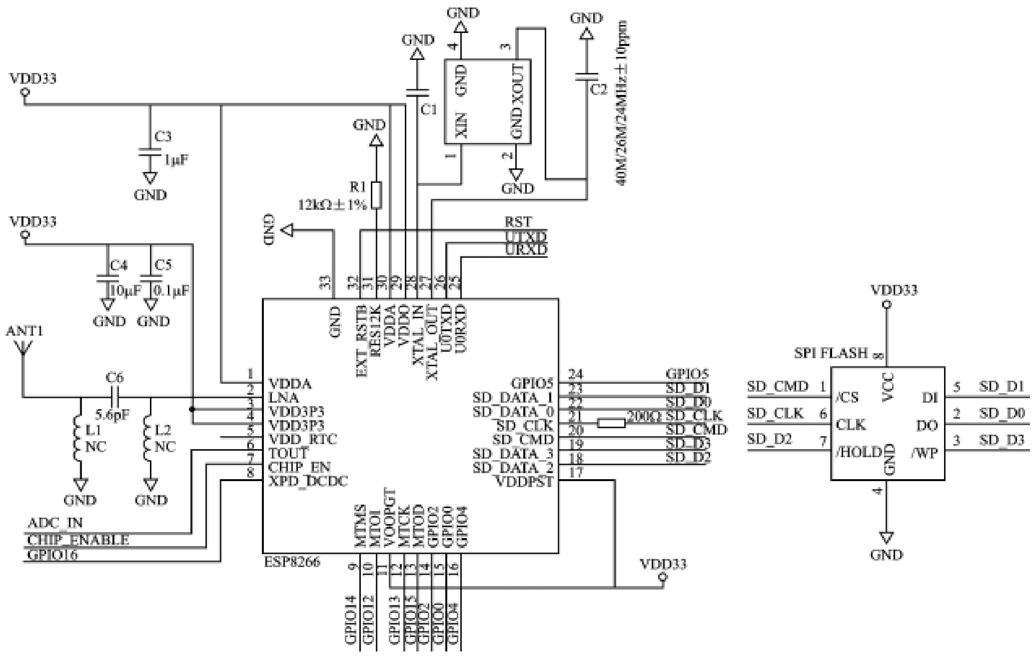

Fig 3.4.2: MCU Schematic Diagram

The IoT platform in question is open-source. Espressif Systems' ESP8266 Wi-Fi SoC powers its firmware, while the ESP-12 module serves as the foundation for its hardware. The firmware is referred to as "Node MCU" more often than the hardware development kit. Built with the non-OS Espressif SDK for the ESP8266, the firmware is based on the eLua project and is written in the Lua programming language. The Hub created in no time after presentation of the

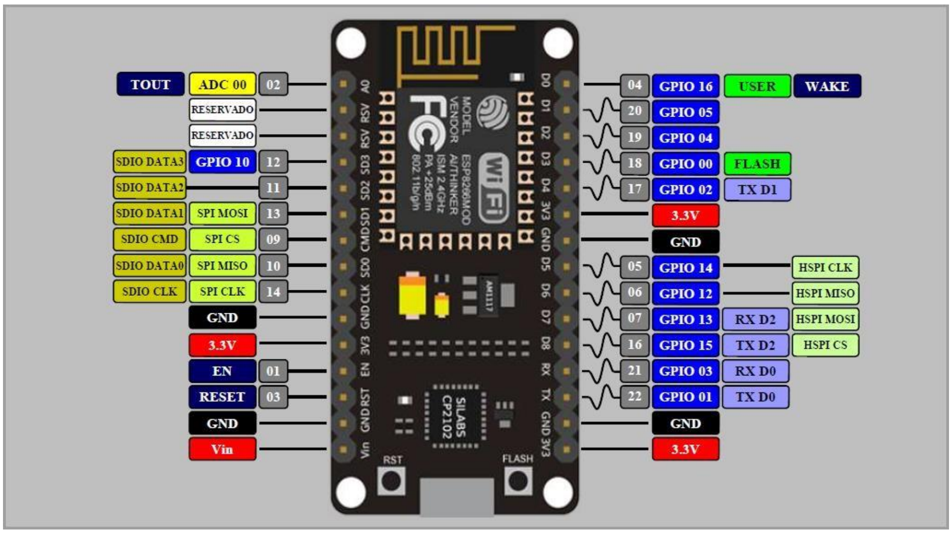

Fig 3.4.3: Hub MCU Stick Out

Center MCU-V3(ESP8266 ESP-12E) may be a Wi-Fi Advancement Board that permits to model IoT thing with a couple of lines of Lua script & through the Arduino-IDE. This board based onESP8266 ESP-12E variation, not at all like other ESP-12Es, you won't have to be purchase a apportioned break-out board, a USB serial converter or in fact fix it to PCB to encourage started, you reasonable require a USB cable (microUSB).

Highlights:

- Voltage for the Communication Interface: 3.3V.
- Remote cable classification: Get to the getting cable of the included circuit board.
- 802.eleven b/g/n faraway standard
- 2.4GHz Wi Fi, WPA/WPA2 security mode
- Bolster 3 running modes STA/AP/STA+AP
- Built-in TCP/IP convention stack helping more than one TCP buyer associations (as much as 5)
- (D0~D8) and (SD1~SD3): Utilized GPIO, PWM, IIC, Etc, 15mA driving constrain memory capacity
- AD0 : Channel ADC 1
- Control Input :- 4.5V~9V (max 10V), fueled by means of way of implies of USB
- Current: Ceaseless transmission: around 70mA (max 200mA), standby

3.5 Switching Power Supply (SMPS):

A switching Power supply(SMPS or switch) an electronically switched Power supply with a switching regulator for efficient power regulation. On other switching Power supplies, SMPSs transfer control from a DC or AC source (usually a main control power supply) to a DC load such as a PC, while varying the Electrical Voltage and Current Behavior. Unlike a direct switching Power supply, The control transistors in a switch-mode power supply switch continuously between the fully on, fully on and fully off diffuse states, spending very little time in the highly diffuse movements, thus minimizing energy waste. A perfect switching Power Supply has out of control. Voltage regulation is done by changing the duration of the on and off periods ratio (called the duty cycle). Contrast, switching power supplies directly regulate the output voltage by continuously diffusing control to the output transistors. This high switching efficiency is a major advantage of switching power supplies. Switching power supplies are much more compact and lighter than direct power supplies because of the reduced size and weight of the transformer.

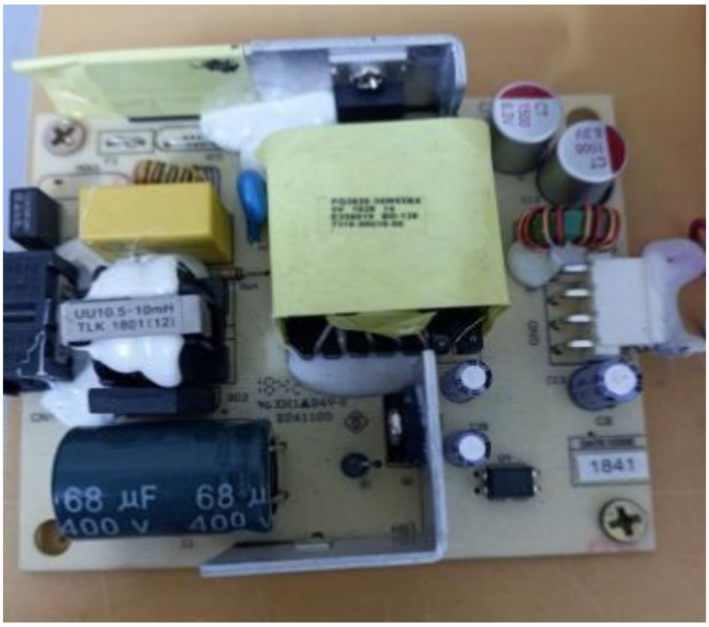

Fig3.5.1: Smps

Switching power supplies are used as an alternative to direct drives when higher performance, smaller footprint, or lighter weight are required. However, they are more complex; their switching currents can cause electrical noise problems if not carefully attenuated, and simple planes can have missing check digits.

Switching power supplies are classified based on input and output voltage types. English The four main types are:

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

The basic disconnected AC to DC converter consists of:

- Rectifier and input channel
- Inverter including Changing Devices like MOSFET
- Transformer
- Rectifier and output channel
- Control & critical circuits

Enter DC energy the output from the Rectifier or battery is supplied to the inverter. wherein it's far switched on and stale via way of means of MOSFET switching or manage transistors at a excessive frequency of 20 kHz to 2 hundred kHz. The excessive inverter produces voltage pulses at a certain frequency despatched to number one winding of the transformer which corrects and smooths the auxiliary AC output to supply the desired DC voltage. The input circuit oversees the output voltage and manages the control circuit to modify the duty cycle in order to uphold performance at the necessary standard.

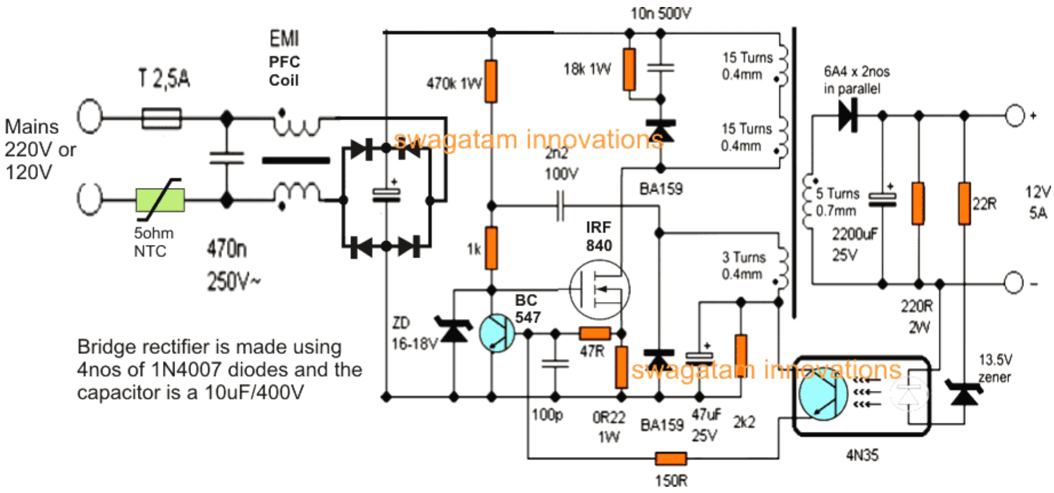

Fig 3.5.2: SMPS Circuit

3.5.1 Fundamental Working Concept of an SMPS

The switching controller gives path in SMPS . A configurable switching element turns electricity to a smoothing capacitor on & off. The voltage at some stage in the Capacitor is controlled at the same time as the switching element is activated. The repetitive toggling of the Capacitor keeps the voltage at the targeted level.

3.5.2 Plan Nuts and Bolts

The AC manipulate first passes thru the conductors and the road channel. At this factor it's far rectified with the aid of using a Full-Wave Bridge rectifier. The Rectified voltage is then related to a pre-managed cost regulator (PFC), observed with the aid of using downstream DC-DC converters. Most computer systems and small machines use International Electrotechnical Commission (IEC) kind enter connectors. As for the connectors for output and their corresponding pin configurations, besides for a few manufacturers along with PC and PCI compact, they may be normally now no longer standardized and are furnished with the aid of using the Manufacturer.

There are incredible circuit arrangements known as topologies., every with its very own characteristics, preferences, and mode of operation, which decide how enter instructions are exchanged with outputs. The most commonly used topologies, such as flyback, push-pull, half-bridge, and full-bridge, include a transformer to provide limiting, voltage regulation, and varying output voltages. Non-isolated configurations do not have a transformer, and control changes are made by exchanging inductive energy.

Preferences of switched-mode control supplies:

• Higher productivity of 68% to 90D44 • Controlled and solid yields in any case of varieties in input supply voltage

• Little measure and lighter

• Adaptable innovation

• Tall control thickness

Drawbacks:

• Produces electromagnetic obstructions

• Complex circuit plan

• Costly compared to straight supplies

Switching strength components are used to manipulate a huge type of hardware consisting of computers, touchy hardware, battery-powered devices, and different hardware that calls for excessive strength. The IC ahead voltage controller has been the inspiration of manipulate strength deliver plans for decades due to the fact it's miles in particular powerful at supplying consistent, consistent voltage output. Forward voltage controllers are regularly a good deal greater green & easier to apply than proportional voltage controller circuits crafted from discrete additives consisting of Zener diodes and resistors, or transistors or even operational amplifiers. By a long way the maximum famous kinds of ahead and consistent voltage controllers are the seventy eight tremendous voltage scheme and the 79negative voltage scheme. These voltage controller types work together to provide accuracy., consistent voltage outputs starting from approximately five volts to approximately 24 volts to be used in a huge type of digital circuits. There are a huge variety of those three-terminal consistent voltage controllers available, every with its personal integrated voltage manipulate and present day proscribing circuitry. This lets in us to have a complete variety of strength rails and uniqueness manipulate outputs, both unmarried or twin powered, to in shape maximum digital circuits and applications. In fact, direct variable voltage regulators also are available, which give a constantly variable output voltage from simply above 0 to 3 volts under its most output voltage.

Power Supply in Switch Mode

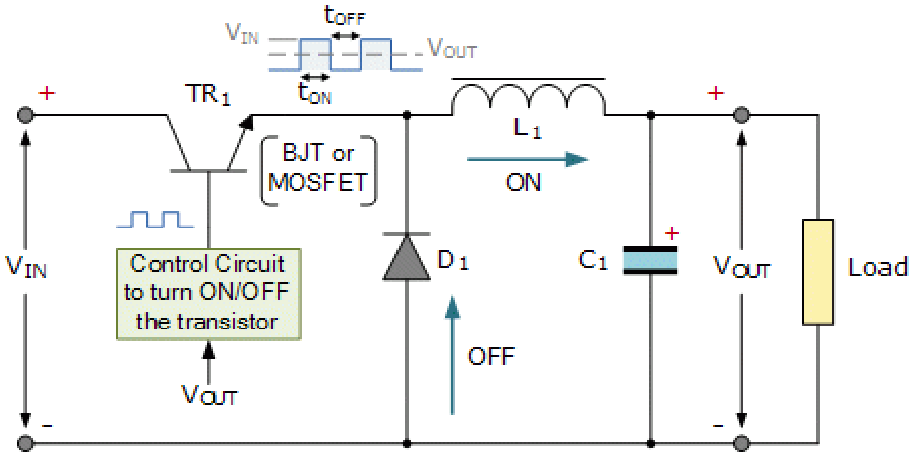

Fig 3.5.2.1: SMPS Circuit Connection

Most DC strength resources include a cumbersome and heavy step-down transformer for mains voltage, diode rectification that may be both Full-Wave or Half-Wave, a filtering device designed to dispose of any ripple withinside the Rectified DC to supply a sufficiently easy voltage output, and a few sort of voltage law or stabilization circuit, which may be both linear or switching, to make certain the strength deliver output voltage stays solid beneathneath numerous load conditions. Generally, an ordinary DC strength deliver could resemble something like this:

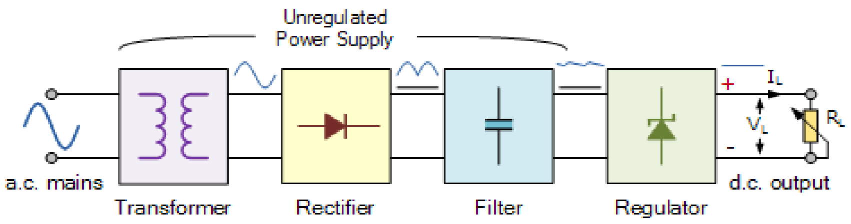

Fig 3.5.2.2: DC Power Supply Method

These traditional manage energy deliver schemes include a Large energy Transformer (which additionally separates the enter and output) and a dissipative manage circuit. The control circuit also can moreover embody a single Zener diode or a three-terminal direct-configure controller to generate the popular output voltage. The gain of an instantaneous controller is that the control circuit requires best an input capacitor, an output capacitor, and a few resistors to alter the output voltage.

3.6 Temperature Sensors

DHT11 is a basic, extraordinarily cost-powerful superior humidity and temperature detector. It makes use of a thermistor and a capacitive humidity sensor to degree the ambient voltage and mechanically generate a demonstration at the facts bar (no analog enter pins required). It is enormously easy to apply however calls for cautious timing to go into information.

DHT11 Determinations:

- Working Voltage : 3.5V - 5.5V
- Working Current: 0.3mA (measuring 60uA standby)
- Yield : serial information
- Temperature Run: 0°C - 50°C
- Stickiness Run: 20% to 90D44
- Determination: Temperature and Stickiness both 16-bit
- Precision: ±1°C and ±1D

Fig 3.6.1: DHT11 Temperature Sensor

3.7 LDR Sensor

The LDR sensor module is used to determine the light distance/measure the increasing level of light. The efficiency of the module increases when there is light and decreases when there is no light. The sensitivity of the flag detection may be balanced via way of means of the use of a potentiometer.

Highlights:

- Flexible Sensitivity (using blue enhanced potentiometer)
- Voltage Range: 3.3V to 5V
- Output Format: Analog voltage output - A0
- Microcomputer switching efficiency (0 and 1) -D0
- With set-up recoil gap for easy adjustment
- Compact PCB dimensions: 3cm x 1.6cm
- Control pointer (red) and enhanced switching efficiency pointer (green)
- Using LM393 comparator chip, stable

Fig 3.7.1: LDR

Pin configurations:

- External VCC ranging from 3.3V to 5V
- External GND connection
- DO serves as a digital output interface, providing binary signals (0 and 1)
- AO functions as an analog output interface
- Capable of measuring surrounding brightness and light intensity

3.8 Discuss Quality Sensor (MQ135)

The MQ-135 gas sensor demonstrates **decrease** conductivity in **easy** aireter.. It is dependable and appropriate for a range of uses. This module operates on 5V, features a resistance of 33Ω ± 5%, and draws about 150mA of current. The sensor is equipped with four pins: two for analog outputs and two for digital outputs, which assess the concentration of gases present in the air. When the level of a particular gas surpasses a predetermined threshold, the digital output signal is triggered. The threshold fee may be changed the usage of the onboard potentiometer.to three volts beneath its most output voltage.

Fig 3.8.1: MQ135 Sensor

Highlights MQ-135 Sensor

1. Broad viewing scope, Quick reaction, and Tall affectability
2. Long lifestyles anticipation
3. Radiator Voltage: 0V
4. It carries Analog give up and high & low advanced abdicate
5.TTL give up hail is probably a moo level
6. The running Voltage is + 5V
7. Identify/Quantify Ammonia, nitrogen oxides, ethanol, benzene, soot, carbon dioxide., and different compounds.
8. Area Run: 10 – three hundred PPM NH3,10 – a thousand PPM Benzene, 10 – three hundred alcohol.

3.8.1 Working Instrument

Enter DC electricity from the inverter receives power from either a rectifier or a battery in which miles switch On and rancid through MOSFET switching or manipulate transistors at a excessive frequency of 20 kHz to two hundred kHz.

The inverter sends high-frequency voltage pulses to the primary winding of the transformer, which helps to regulate and refine the auxiliary AC output to achieve the required DC voltage.

3.8.2 Adhere Out of MQ135

The MQ-one hundred thirty five sensor module has 4 pins, with the primary parcel being An adaptable Potentiometer.

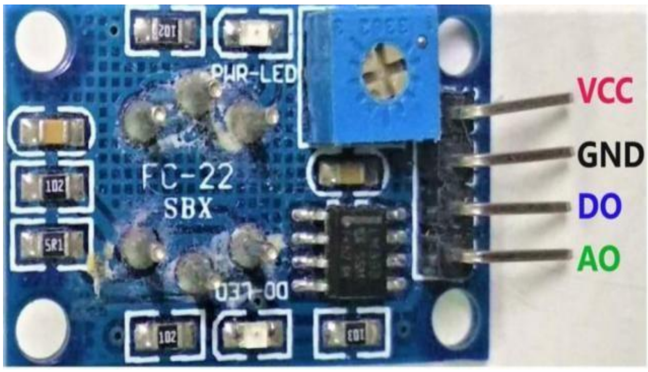

Fig 3.8.2.1: MQ-135 Pin

The MQ-135 Gas sensor can distinguish gasses such as alkali (NH_3), sulfur (S), benzene (C_6H_6), and carbon dioxide (CO_2), at the side different other hazardous gasses and smoke. Comparative to other gas sensors within the MQ arrangement, this sensor highlights both a computerized and an analog yield stick.

Table 1: Stick Setup of MQ135

Pin Number	Pin name	Details
1	VCC Stick	The Stick calls for 5V to govern the module.
2	Ground Stick	To placed via the module to the system`s not unusual place Ground
3	Computerized Yield Stick	This pin units the brink esteem through using a potentiometer.

4	Analog Yield Stick	The Analog Voltage stick is primarily based totally on the attention of the gas

3.9 Gas Sensor (MQ5)

The utility display can be used for gas leak detection devices in homes and industrial facilities, suitable for detecting condensed Petroleum gas, Butane, Propane, Methane, Hydrogen, Smoke, etc. Usually an awfully simple to utilize moo fetched semiconductor Gas sensor Module with analog and advanced yield.

Fig 3.9.1: MQ5 Smoke Sensor

Highlights:

• Receive tall quality twofold board plan, with control sign and TTL flag yield sign.

• It's DO transfer flag (TTL) yield and AO Analog flag yield.

• TTL yield big flag is moo Level. When yield is moo, the flag mild is on and Micro-controller or switch Module may be specially associated.

• The Analog yield Voltage increments with the focus, better voltage.

• It's advanced affectability to melted Petroleum fueloline, function fueloline, city fueloline and smoke.

• MQ-five MQ5 Sensor for Smoke, Gas, LPG, Butane, and Methane Finder Module

• Screw gaps 4, easy To find.

• Item estimate Dimensions: 32 inches (Length), 20 inches (Width), 22 inches (Height)

• Lengthy gain existence & reliable steadiness.

• Quick Response restoration highlights

Determinations:

• Voltage input : DC(5V)

• Control scattering (Current) : 150mA

• Do yield: Numbers, TTL, and 1 (0.1 and 5V)

• Ao yield: normally pollution-free, between 0.1 and 0.3V, with the highest concentration observed at around 4V voltage.

Uncommon update:

When the sensor is activated, you should preheat it for around 20 seconds to ensure that the data is consistent. Sensor warming might be a common miracle, but if it gets too hot, it's not.

3.10 Rain Sensor

Rain sensor is a form of reasonably-priced digital sensor used to differentiate the quantity of rain (water) droplets. Works like a transfer. Normal way the transfer may be open. Those sensor specifically includes all parts , One is the sensor pad & the alternative is the component used for detection. Rain or Water droplets falling at the floor of the se nsor pad, the transfer may closed. Sensor module read statistics from The sensor board and converts it right into Digital/Analog sign. Thus, the sensor can offer each styles of signals, an enhanced (Do) sign and an analog (Ao) sign . The detector plate of the rain sensor module includes nickel-plated copper tracks. It additionally has header pins, It may have an internal connection to the sensor plate's two copper tracks. Through the use of jumper wires, the sensor plate is connected to the rain sensor module circuit via these pins. Continuously, 1 bar of the Rain sensor circuit supplies +5V - one groove of the sensor plate and some other bar gets remarks manipulate electricity from some other groove of the sensor plate. Normally, in dry conditions, the sensor plate has excessive resistance and coffee conductivity. So the 5V manipulate electricity can not be transferred from one groove to some other. The sum of water at the sensor plate's floor influences its resistance. The sensor plate's conductivity rises and its resistance falls as water beads arrive on its floor. So as water droplets collect at the pad floor, they could switch extra manipulate pressure from one groove to some other.

Fig 3.10.1: Rain Sensor

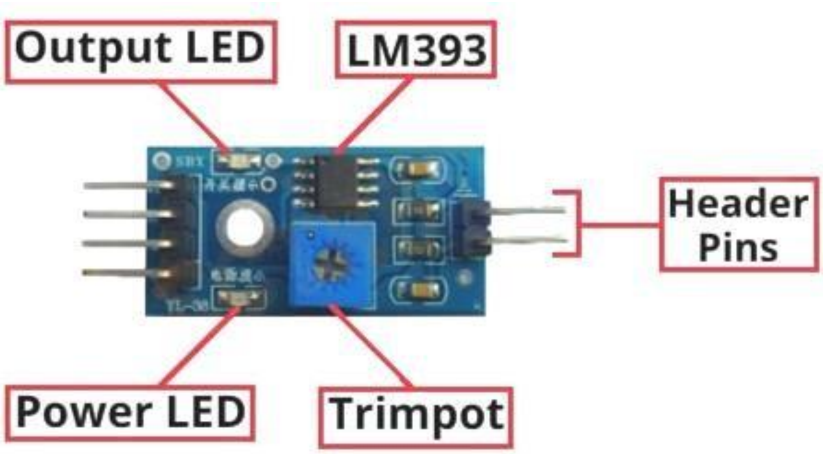

Figure 3.10.2: Identification and Explanation of Rain Sensor Pins

Table 2: Description of Rain Sensor Pins

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

Rain Sensor Details:

Table 3: Rain Sensor Details

Parameter	Value
Working Voltage	3.3V – 5V
Working Current	15 mA
Comparator chip	LM393
Affectability	Flexible through Trimpot
Yield sort	Analog yield voltage (AO) and Computerized exchanging voltage (DO)
LED lights indicators	show power (red/green) and output (red/green).
The sensing pad	consists of a nickel plate measuring 5cm x 4cm on one side.
The dimensions of the module	PCB are 3.2cm x 1.4cm.

3.11 Barometric Weight Sensor (BMP280)

The BMP280 may be a high-precision advanced barometric weight sensor planned for exact estimations of climatic weight and temperature. It is broadly utilized in climate stations, altimeters, and other applications requiring weight information. With a little shape calculate and moo control utilization, the BMP280 offers tall exactness in recognizing weight changes, which can be utilized to decide elevation or screen natural conditions. It highlights an I2C or SPI interface for simple integration with microcontrollers and other gadgets. Its compact plan and dependable execution make it perfect for convenient gadgets, rambles, and IoT applications requiring exact natural observing.

Fig 3.11.1: BMP 280

Highlights:

- Weight extend:300 ~ 1100hPa (elevation 9000 m ~ -500 m);
- Control supply voltage:1.71V ~ 3.6V;
- LCC8 Bundle: Lead-free ceramic carrier bundle (LCC);
- Estimate:1.5cm × 1.15cm;
- Moo control utilization:2.7µA;
- Tall exactness: a low-power mode, the determination of 0.06hPa (0.5 meters);
- The tall linearity mode at a determination of 0.2Pa (1.7 cm);
- The temperature yield;
- I2C Interface, SPI interfacing;

3.12 Framework Plan

In this venture, we have utilized a SMPS area to deliver control within the framework. Here we utilize micro-controller. All kind of controlling framework work beneath Hub MCU. Here we too utilize Discuss Quality Sensor (MQ135), Rain Sensor, Gas Sensor (MQ5), Temperature Sensor (DHT11), BMP 280 Weight Sensor etc. All of this equipment's are associated like circuit plan and it full our want result.

3.13 Circuit Chart

In this portion we appear our venture circuit plan and interface out instrument through standard wire.

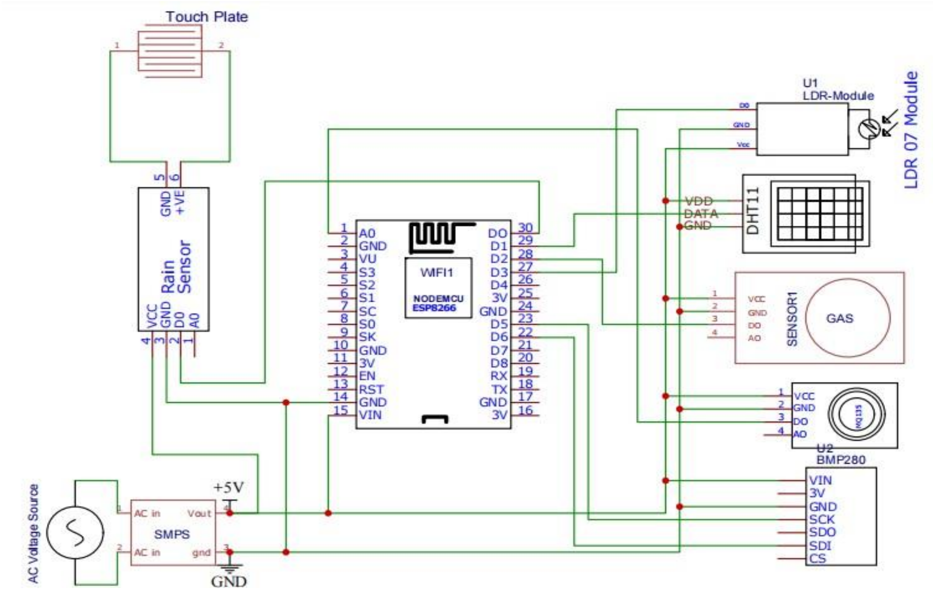

Fig 3.13.1: Circuit Diagram for Our Project System

3.14 Working Rule

The Plan and Usage of an IoT based Savvy Climate Checking Framework in a Savvy Broiler Poultry Cultivate guarantees ideal conditions for poultry by coordination different sensors and IoT components. The temperature sensor (e.g., DHT11) screens natural temperature, whereas the BMP280 weight sensor measures climatic weight and gives climate bits of knowledge. The gas sensor (MQ5) recognizes gasses like methane and carbon monoxide, activating an caution in the event that risky levels are recognized. The discuss quality sensor (MQ135) screens destructive discuss poisons, guaranteeing clean discuss for the poultry. Guaranteeing appropriate ventilation within the cultivate. The rain sensor identifies precipitation, permitting the framework to alter based on climate conditions. The LDR sensor measures light concentrated, controlling cultivate lighting for ideal poultry wellbeing. These sensors are associated to a NodeMCU microcontroller, which forms the information and sends it to a cloud stage for real-time checking. An SMPS (Switched-Mode Control Supply) powers the framework components. This IoT setup makes a difference in productive cultivate administration by giving convenient cautions and information.

3.15 Computer Program Design

3.15.1ArduinoIDE

The Arduino Nano is a sophisticated microcontroller unit that may be programmed the usage of the Arduino IDE.There isn`t anyt any requirement to put in any extra software program except Arduino.First, pick out Arduino Nano from the Devices, Board menu, which corresponds to the microcontroller at the board.The ATmega328 IC at the Arduino Nano comes pre-loaded with a bootloader that permits us to add new code without having an outside hardware programmer. We also can pass the bootloader and software the microcontroller through the ICSP (In Circuit Serial Programming) header. The firmware supply code for the ATmega16U2 (or 8U2 in rev1 and rev2 versions) is available The ATmega328 offers UART TTL at (5V) with serial communique, which is available on automatic pins -(RX) for get the records and stick no. 1 (TX) for transmit the records.An ATmega16U2 at the board channels this serial communique over USB and indicates up as a digital com harbour to application at the computer. The `16U2 firmware employments the same old USB COM drivers, and no outdoor driving force is required. In any case, on Windows, an . in report is required. The Arduino program incorporates a serial screen which allows straightforward printed information to be sent to and from the Arduino board.

The serial programming library permits serial verbal exchange on any of the Nano`s superior pins.

Arduino packages make use of the Wire library to facilitate I2C transmission.

Given that the Arduino platform is constructed on Atmel microcontrollers, Atmel`s improvement environments, AVR Studio or the more moderen Atmel Studio, also can be used to write down packages for the Arduino.

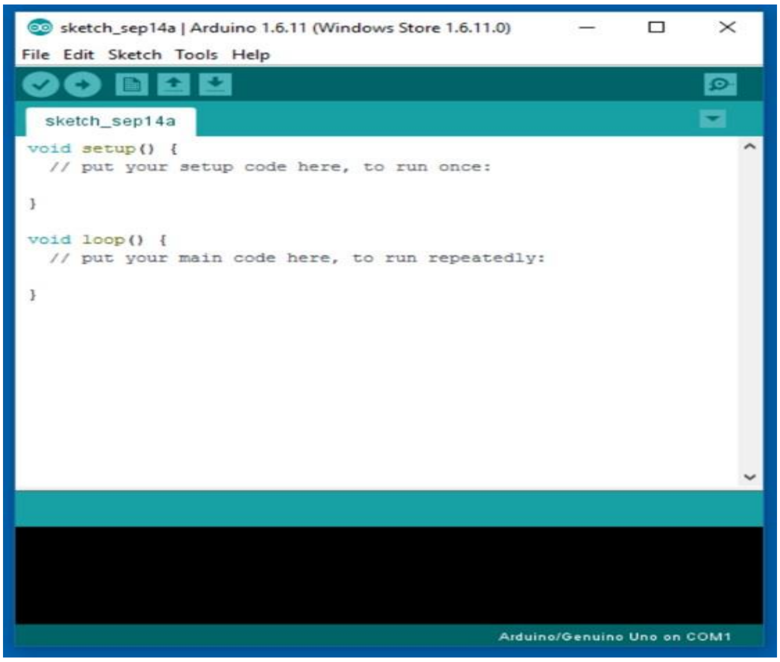

Fig 3.15.1.1: Arduino Computer program Interface IDE

The Arduino Integrated Development Environment, also known as the Arduino software (IDE), includes a code editor, a message display area, a text panel, a toolbar with commonly used buttons, and various menus. It communicates with Arduino and Genuine hardware to add applications and allow verbal exchange with them. The AVR Studio or the greater cutting-edge Atmel Studio also can be used to expand applications for the Arduino.

Composing Portrays

Programs composed using Arduino Computer software (IDE) are referred to as outlines. These outlines are composed in the content material editor and are spared with the report growth ino. The editor has highlights for cutting/pasting and for searching/changing content material. The message area offers complaint whilst saving and buying and selling conjointly suggests mistakes. The consolation suggests content material yield via way of means of the Arduino Program (IDE), counting overall mistake messages and different data. The foot righthand nook of the window suggests the organized board and serial harbour. The buttons on the toolbar allow you to check and change programs, create, open, and save outlines, as well as access the serial screen.

Sketchbook

The Arduino Program (IDE) employments the idea of a sketchbook:

a stylish positioned to preserve your programs (or outlines). The portrays in your sketchbook may be opened from the Record > Sketchbook menu or from the Open button at the toolbar. The number one time you run the Arduino software program software, it`ll therefore make a registry in your sketchbook. You`ll see or modify the vicinity of the sketchbook vicinity from with the Inclinations exchange. Starting with version 1.zero, statistics are spared with a .ino document boom. Past variations hire the .pde boom. You will open the . pde report known as information in version 1. zero, after which the software program will rename the report to . ino.

Tabs, Other Files, and Compilation.Permits you to supervise outlines with a couple of report (every of which suggests up in its own tab). These may also encompass fashionable Arduino code files (with out considerable enhancements), C files (.c extensions), C++ files (.cpp), or header files (.h).

Uploading

After figuring out the suitable serial port and board, click on the add button at the toolbar or choose the Upload alternative from the File menu.

For older boards (pre-Diecimila) that require auto-reset, you can want to manually press the reset button at the board simply earlier than hitting add.The bootloader is dynamic for some of seconds at the same time as the board resets; at that element it starts offevolved whichever painting become maximum as of past due transferred to the microcontroller. The bootloader will flicker the on-board (pin 13) Driven even because it starts offevolved (i. e. at the same time as the board resets).

Libraries

Libraries deliver greater usefulness for employ in outlines, e. g. walking with tool or controlling information.This will embed one or greater #incorporate motives at the brilliant of the portray and convey collectively the library on the facet of your outline
Eliminate the #incorporate motives from the brilliant of your code if an outline does not require a library. A list of libraries may be included in the reference. Check out the ones that provide information on setting up a library for a third birthday celebration

Third Party Equipment

Support- third-celebration gadget may be introduced the tool catalog to sketchbook registry. Stages protected there may also incorporate board definitions (displayed withinside board Menu), middle Libraries, firmware definitions and bootloaders. To set up and create tool catalog, clearly Unzip the Third-celebration bundle into its special subdirectory. (Do now no longer use "Arduino" because the subdirectory name, or you can overwrite the integrated Arduino library.) To remove it, just eliminate its folder. For more information on creating applications for third-party systems, please talk over with the Arduino IDE`s documentation on third-celebration gadget.

Serial Monitor

The Serial Monitor shows statistics despatched from the Arduino or well suited board thru a USB or serial connection. To ship statistics to the board, kind your message and press the "Send" button or hit Enter. Select the baud price from the drop-down menu to fit the price specific withinside the `Serial.begin()` characteristic of your caricature. Note that after connecting to the Serial Monitor on Windows, Mac, or Linux, the board will reset (and your caricature will rerun). Please be conscious that the Serial Monitor does now no longer take care of manipulate characters. If your caricature calls for complete manipulate of serial verbal exchange with manipulate characters, you could use an outside terminal application connected to the COM port designated for your Arduino board.

3.15.2 Simple EDA

Straightforward EDA is an online-based Electronic Plan Robotization (EDA) toolset that empowers equipment engineers to plan, reenact, share both freely and secretly, and analyze schematics, reenactments, and printed circuit sheets (PCBs). Its extra highlights incorporate producing a charge of materials, making Gerber records, and trading components and documentation in PDF, PNG, and SVG designs. Simple EDA permits for the creation and alteration of schematic graphs, the recreation of blended analog and advanced circuits, and the plan and altering of PCB formats, with choices for manufacturing printed circuit sheets.

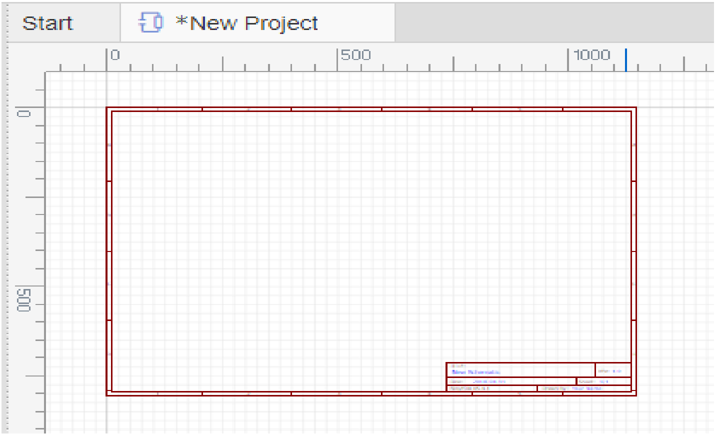

Fig 3.15.2.1: Simple EDA Computer program Interface

The amount of private ventures can be expanded by contributing in high-quality open ventures, schematic charts, and PCB formats, and/or by paying a month to month expense.

3.15.3 Blynk App

Blynk could be a stage for the Web of Things outlined to encourage the improvement and execution of keen gadgets rapidly and effortlessly.

The Web of Things has been a hot theme recently, with more gadgets interfacing to the web each day.

A few of the most concerns with respect to IoT incorporate: • On the off chance that IoT gadgets are transmitting your information over the web, the communication must be secure and encrypted, which isn`t doable without a devoted and secure server that's quite challenging to oversee.

• Moreover, IoT gadgets have to be be responsive, which once more isn't achievable without a server that has moo inactivity and tall responsiveness.

• The stage for IoT must be consistent with different sorts of equipment designs and gadgets to maintain a strategic distance from limiting clients to a single sort of equipment with restricted functionalities.Given the issues laid out over, Blynk serves as the perfect arrangement for all these challenges.

Fig 3.15.3.1: Blynk App

Blynk App –

The **transportable** app created **through** Blynk Work as a **manipulate** board for Screening and controlling equipment. Blynk works on a **coins** of its **declare referred to as** vitality.

Blynk Server –

Blynk provides a safe, efficient, and centralized cloud solution through its server, enabling seamless communication between devices.

Blynk Library –

Getting your framework up and running in a squint is made conceivable with the Blynk Library.
The library secures the Arduino, ESP8266, Raspberry Pi, and other special framework gadgets.

Highlights

- Comparable API & UI For All bolstered equipment & gadgets
- Association to the cloud utilizing:
    - Wi-Fi
    - Bluetooth and BLE
    - Ethernet
    - USB (Serial)
    - GSM
- Coordinate stick control with no code composing
- Simple to coordinated and include unused usefulness utilizing virtual pins
- History information checking through Super Chart gadget
- Device-to-Device communication utilizing Bridge Gadget
- Sending emails, tweets, thrust notices, etc.

3.16 Technique

Our technique for the venture:

- Making an thought for plan and development of a Plan and Usage of an IoT based Savvy Climate Checking Framework in a Savvy Broiler Poultry Cultivate with the combination of Arduino miniaturized scale controller.

- And making plans a chunk chart & circuit graph to recognise which additives we must be expand it amassing all of the additives & Programming the small scale Controller to govern the overall framework.

- Preparing all of the components for a PCB board and then proceeding with the patching process. Ultimately, assembling all the sections on the board to operate the system and for verification purposes.

CHAPTER 4
IMPLEMENTATION & RESULTS

4.1 System Implementation

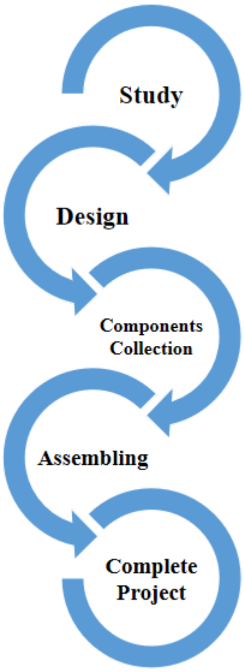

Figure 4.1.1: Working Flow Diagram

The diagram shows a process flow for completing a project, broken down into five sequential steps, each represented as part of a continuous loop to signify iterative progress. Here's an explanation of each step:

Study:

This step involves researching and understanding the problem or project requirements. It includes analyzing the objectives, gathering relevant data, and understanding the technical and practical aspects of the project.

Design:

After studying the problem, this stage focuses on creating a blueprint or plan for the solution. This includes technical schematics, system architecture, and selecting methodologies or algorithms for implementation.

Components Collection:

Once the design is finalized, the necessary components or materials required for building the project are identified and procured. This ensures everything needed for the assembly is available.

Assembling:

In this step, the collected components are put together according to the design plan. This could involve tasks like hardware assembly, circuit integration, software development, and initial testing.

Complete Project:

This is the final stage where the project is reviewed, tested for functionality and reliability, and finalized. Any errors or bugs identified during testing are fixed to ensure the project is ready for deployment or presentation.

4.2 Finalize the Project prototype

Fig 4.2.1: Finalize the Project Prototype

4.3 Result Analysis

Now it's time to talk about the outcomes. The Arduino IDE was used to write our commands, and the following results are possible: When this extend is run at that point it'll sense the BMP280 barometric weight sensor measures climatic weight and temperature, whereas the DHT11 or LM35 temperature sensors screen surrounding temperature. An MQ-135 Sensor and MQ-5 sensor detects harmful gases, ensuring safe air quality in the poultry environment. A Rain Sensor detects rainfall. The gathered data is displayed on an indicator or sent to a cloud-based dashboard, enabling farmers to make informed decisions.

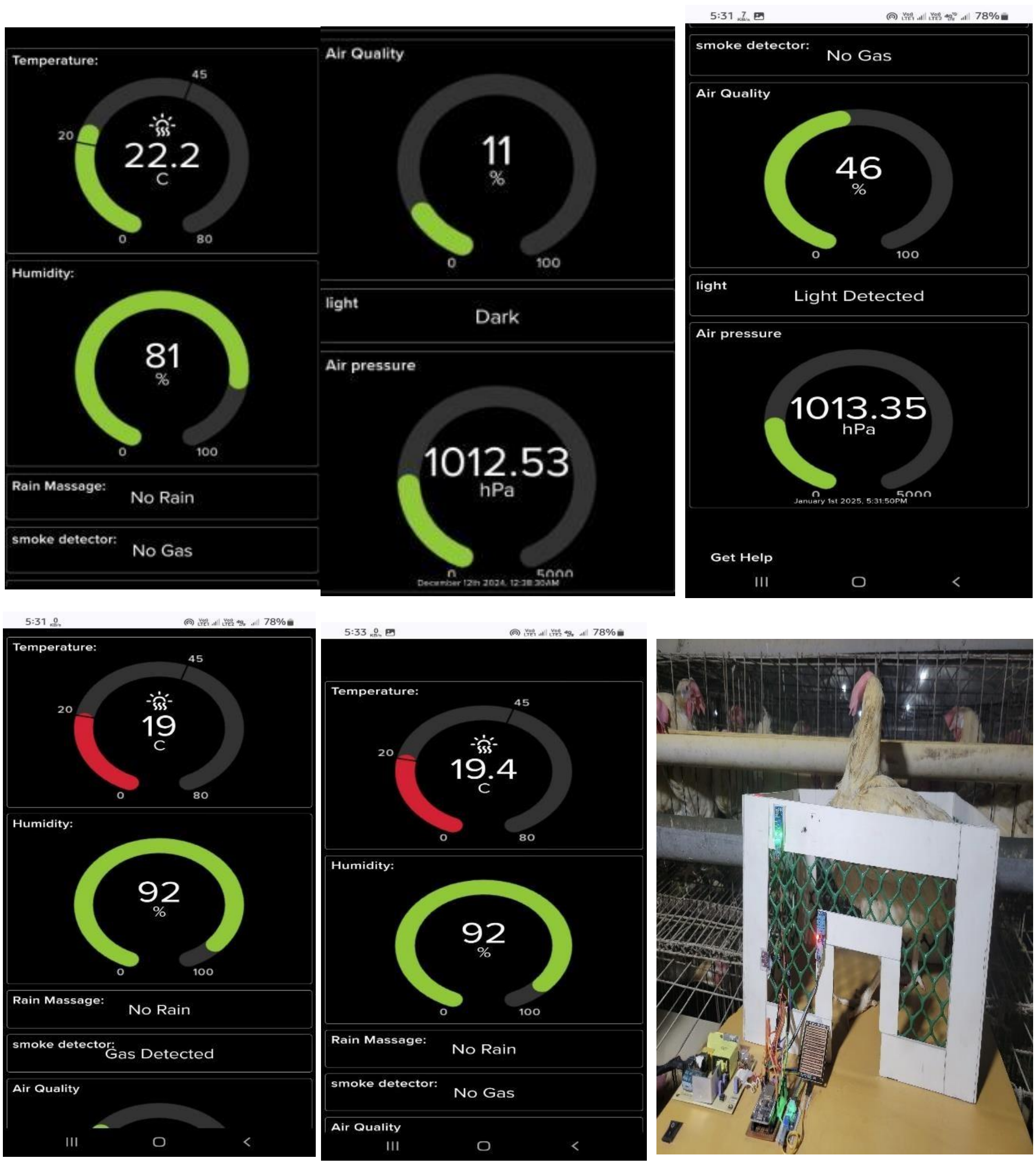

Fig 4.3.1 : Result Analysis

4.3 Focal points

Although our venture has many preferences, the following list includes some of the most important ones:

- Able to check inside Temperature, Discuss Quality, Gas Distinguish, Rain Identify, consequently.
- The entire framework is programmed framework.
- Simple to utilize.
- Real-Time Information allow
- Brought down Operation Costs
- The extend is compact, cheap and client inviting.
- The complete framework devours exceptionally small vitality.
- Less aptitude professionals is adequate to function.

4.5 Application

Because of its necessity, this extension has applications in many other fields. We have selected many of them, which are listed below:

• It can used for work related to Savvy poultry Cultivate.

• As a result, it can be utilized to regulate the climate.

4.6 Confinements

No extend is without its impediments and our own is no exemption from that but the ultimate yield we received from our extend is very palatable. Recorded underneath, are a few of the restrictions we have:

• It may take time when it is beginning.

• It'll give 95% adjust perusing in this venture.

- To urge all notice portable and extend must be associated with the web.

4.7 Project Expense Assessment

Table 4: Below, we have outlined the expenses related to our project.

Sl. No	Particulars	Detail	Qty	Unit Cost (Taka)	Add up to Cost (Taka)
1	Hub MCU	ESP8266	1	850	850
2	SMPS	5V 7A	1	550	550
3	Temperature Sensor	DHT11	1	380	380
4	Air Discuss Quality Sensor	MQ135	1	250	250
5	Gas Sensor	MQ5	1	250	250
6	Rain Sensor		1	300	300
7	Barometric Pressure Sensor	BMP280	1	350	350
8	LDR		1	30	30
9	Others				1650
				Total =	4610/=

CHAPTER 5
FUTURE WORK & CONCLUSION

5.1 Summary of Findings

The discoveries of the Plan and Execution of an IoT based Keen Climate Checking Framework in a Savvy Broiler Poultry Cultivate highlight its capacity to viably screen and control natural conditions such as temperature, stickiness, and discuss quality. Genuine- time information collection, mechanized controls, and alarms guarantee ideal poultry wellbeing, decreasing push and mortality rates. The system enhances resource efficiency, minimizes operational costs, and allows remote monitoring. These features improve productivity and profitability, promoting sustainable and technology-driven poultry farming practices.

5.2 Conclusion

The development and execution of an IoT-enabled Smart Weather Monitoring System in a Smart Broiler Poultry Farm transforms farm management by delivering immediate data on crucial environmental conditions. Temperature and humidity monitoring ensure the poultry are kept in optimal conditions, promoting health and productivity. Gas detection with indicators helps identify hazardous gases like ammonia or carbon dioxide, triggering alerts for timely corrective action, protecting both livestock and workers. Wind speed monitoring and rainfall detection ensure farm infrastructure can withstand environmental changes, preventing damage and ensuring the safety of the animals. Air quality sensors further enhance the living conditions by tracking pollutants, maintaining a healthy atmosphere for the poultry. Additionally, Light Dependent Resistor (LDR) sensors with indicators help regulate lighting, which is crucial for the poultry's growth cycle and overall well-being. This IoT-driven system provides automated, data-driven insights, reducing manual labor, improving decision-making, and ensuring a sustainable, efficient, and high-performing poultry farm. It significantly enhances productivity and animal welfare while minimizing operational risks.

5.3 Future Scope of Work

As we have as of now examined approximately the impediments of our extend so unquestionably there room for advancement in this way, We have parts of Future Scope of Work accessible to us this extend. A few of these are recorded underneath:

- In Future, We are considering around including record spare a few information.
- In future Conceivable advancements and improvements to the framework.
- In future advancement this extend can be create by warm picture Sensing, Camera Etc for security.
- Within future we'll utilize hostile to cheat disturbing framework.
- Within the future Integration of extra sensors (e.g., CO_2, alkali sensors etc.)

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Appendix

```
#include
<ESP8266
WiFi.h>
#include
<DHT.h>
#include
<Adafruit_MQTT.h>
#include
<Adafruit_MQTT_Cl
ient.h>          #include
<Wire.h>
#include
<Adafruit_Sens
or.h>     #include
<Adafruit_BMP
280.h>  #include
<LiquidCrystal_
I2C.h>

// WiFi credentials
#define WIFI_SSID        "abcde" #define WIFI_PASS                  "123456789"

// Adafruit IO credentials
#define         AIO_SERVER

"io.adafruit.com"      #define
AIO_SERVERPORT  1883
#define AIO_USERNAME      "arrroman"
#define AIO_KEY           "aio_pGGe73z7PaXfIi0VwPLQOdVHOIaA"

// Pin Definitions
#define
DHTPIN                     D3 #define DHTTYPE                  DHT11
#define RAIN_PIN         D4        //       Pin
connected to rain sensor #define GAS_PIN
                             D5        //       Pin
connected to gas sensor
#define MQ135_PIN         A0  // Pin connected to MQ-
135 (analog input) #define LDR_PIND6          //         Pin
connected to LDR (digital input)

// MQTT topics
#define TEMP_FEED        AIO_USERNAME
"/feeds/temperature" #define HUMID_FEED
                                  AIO_USERNAME
"/feeds/humidity" #define RAIN_FEED
```

```
AIO_USERNAME
"/feeds/rain"
#define GAS_FEED        AIO_USERNAME "/feeds/gas"
#define AIR_QUALITY_FEED AIO_USERNAME
"/feeds/airquality" #define LIGHT_FEED
AIO_USERNAME
"/feeds/light"
#define  PRESSURE_FEED     AIO_USERNAME  "/feeds/pressure"
//  New  feed  for BMP280 pressure

// Global
variables
WiFiClient
client;
Adafruit_MQTT_Client      mqtt(&client,      AIO_SERVER,
AIO_SERVERPORT,
AIO_USERNAME, AIO_KEY);
Adafruit_MQTT_Publish tempFeed =
Adafruit_MQTT_Publish(&mqtt, TEMP_FEED);
Adafruit_MQTT_Publish        humidFeed        =
Adafruit_MQTT_Publish(&mqtt,
HUMID_FEED);
Adafruit_MQTT_Publish rainFeed = Adafruit_MQTT_Publish(&mqtt,
RAIN_FEED); Adafruit_MQTT_Publish gasFeed =
Adafruit_MQTT_Publish(&mqtt, GAS_FEED);
Adafruit_MQTT_Publish      airQualityFeed =         Adafruit_MQTT_Publish(&mqtt,
AIR_QUALITY_FEED);
Adafruit_MQTT_Publish         lightFeed         =
Adafruit_MQTT_Publish(&mqtt,
LIGHT_FEED);
Adafruit_MQTT_Publish       pressureFeed       =
Adafruit_MQTT_Publish(&mqtt,
PRESSURE_FEED);

DHT dht(DHTPIN, DHTTYPE);
Adafruit_BMP280 bmp;  // I2C interface
LiquidCrystal_I2C lcd(0x27, 16, 2); // Address 0x27, 16 columns, 2 rows

void connectWiFi() {
  Serial.println("Connec
  ting to WiFi...");
  WiFi.begin(WIFI_SSI
  D, WIFI_PASS);
while (WiFi.status() !=
WL_CONNECTED) { delay(500);
    Serial.print(".");
  }
  Serial.println();
  Serial.println("
  WiFi
```

```
  connected");
  Serial.println("IP address: " + WiFi.localIP().toString());
}

void connectToAdafruitIO() {
  Serial.println("Connecting to
  Adafruit IO..."); int8_t ret;
  while ((ret = mqtt.connect()) != 0) {
    Serial.println(mqtt.connectErrorString(r
    et)); Serial.println("Retrying Adafruit
    IO connection..."); delay(5000);
  }
  Serial.println("Connected to Adafruit IO");
}

void setup() {
  Serial.begin(1
  15200);
  dht.begin();
  pinMode(RAIN_PIN, INPUT); // Initialize the rain
  sensor pin as input pinMode(GAS_PIN, INPUT); //
  Initialize the gas sensor pin as input
  pinMode(LDR_PIN, INPUT); // Initialize the LDR
  pin as input connectWiFi();

  // Initialize BMP280
  if (!bmp.begin(0x76)) {
    Serial.println("Could not find a valid BMP280 sensor,
    check wiring!"); while (1);
  }
  lcd.init(); //
  Initialize the LCD
  lcd.backlight(); // Turn
  on the backlight
```

```
}

void loop() {
 if
  (!mqtt.conne
  cted())       {
  connectToAd
  afruitIO();
 }

 // Read sensors
 float      temperature      =
 dht.readTemperature();
 int         humidity         =
 dht.readHumidity();
 int rainStatus = digitalRead(RAIN_PIN);  //
 Read    rain    sensor    int    gasStatus    =
 digitalRead(GAS_PIN);                      //
 Read gas sensor
 int  mq135Value  =  analogRead(MQ135_PIN);   //
 Read      MQ-135      value      int      ldrStatus      =
 digitalRead(LDR_PIN);                     //      Read
 LDR sensor
 float pressure = bmp.readPressure() / 100.0F;  // Read pressure in hPa

 // Convert MQ-135 value to air quality percentage
 int airQualityPercentage = map(mq135Value, 0, 1023, 0, 100);

 // Determine rain status message
 String rainMessage = (rainStatus == HIGH) ? "No Rain" : "Rain Detected";

 // Determine gas status message
 String gasMessage = (gasStatus == HIGH) ? "No Gas" : "Gas Detected";

 // Determine light status message
 String lightMessage = (ldrStatus == LOW) ? "Light Detected" : "Dark";

 //     Print     sensor
 values    to    Serial
 Monitor
 Serial.print("Tempe
 rature:               ");
 Serial.print(tempera
 ture);
 Serial.println("
 °C");

 Serial.pri
 nt("Humi
```

```
dity:    ");
Serial.pri
nt(humidi
ty);
Serial.pri
ntln("
%");

Serial.println("Rain Status: "
+                 rainMessage);
Serial.println("Gas  Status:  "
+                  gasMessage);
Serial.print("Air Quality: ");
Serial.print(airQualityPercen
tage); Serial.println(" %");
Serial.pr
int("Pre
ssure:
");
Serial.pr
int(press
ure);
Serial.pr
intln("
hPa");
Serial.println("Light Status: " + lightMessage);
//Display onLCD lcd.clear(); lcd.setCursor(0, 0);
```

```
lcd.print("T:
");
lcd.print(te
mperature);
lcd.print("C
");
lcd.setCusor
(9,          0);
lcd.print("H:
");
lcd.print(hu
midity);
lcd.print("%
");
lcd.setCurso
r(0,         1);
lcd.print("P:
");
lcd.print(pre
ssure);
lcd.print("hP
a");

  //    Publish    data    to    Adafruit    IO
  tempFeed.publish(temperature);
  humidFeed.publish(humidity);
  rainFeed.publish(rainMessage.c_str());
  gasFeed.publish(gasMessage.c_str());
  airQualityFeed.publish(airQualityPercent
  age);
  lightFeed.publish(lightMessage.c_str());
  pressureFeed.publish(pressure);

  delay(15000); // Wait 15 seconds before publishing again
 }
```

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