



# REVOLUTIONIZING POULTRY FARMING THROUGH IOT TECHNOLOGY

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## ABSTRACT

The IoT based Smart Poultry Farm is a revolutionary approach to the traditional method of poultry farming. This system uses advanced technology to monitor and control various aspects of the farm, such as temperature, humidity, lighting, feeding, and watering systems. The IoT sensors and devices are connected to a central platform, which allows real-time monitoring and control of the farm's environment. The system ensures that the poultry farm's conditions are optimal for the birds' health and well-being, leading to increased productivity and profitability. The farmers can remotely monitor the farm's conditions and receive alerts in case of any abnormal changes, enabling timely action to be taken. This IoT-based system also incorporates machine learning algorithms that analyze the data collected from the sensors to provide actionable insights for the farmers. These insights enable the farmers to make informed decisions regarding the farm's management, including the optimal time to harvest the birds.

Automation is extremely important in today's environment. This study focuses on poultry farm automation utilizing a wireless sensor network and a mobile communication system. Chicken is the most popular products in today's globe since it is a nutrient-dense food with more protein, less fat, and less cholesterol than other poultry. In this study, environmental characteristics of a poultry farm such as temperature, moisture are automatically monitored and regulated in order to promote chicken development. The sensor module is also used to manage and monitor the water level. By connecting all of the sensor modules to the microcontroller, two sensor data are obtained and then posted to the web page via the IOT module. The person in charge of the poultry farm can obtain information on the farm's internal environmental state by accessing the internet on a Computer or a mobile phone. This system will manage temperature, humidity, ammonia gas, and water level without the use of a human interface by using a cooling fan, heater, water motor. It will turn on the gadgets based on the threshold values.

The bulk of poultry farms in India, particularly broiler farms, rely on human monitoring and management. The chicken poultry sector is critical to our country's long-term food supply. The invention of an automatic chicken feeding equipment might be extremely beneficial to the poultry industry's growth. Temperature, fan, moisture, heater, food and water distribution are the major criteria in chicken production. These variables have a significant impact on broiler output. This study presents an IoT-based monitoring system for chicken farms, as well as tools to regulate such parameters. The bulk of

poultry farms in India, particularly broiler farms, are manually monitored and controlled. The suggested system will be beneficial to the user. IOT is an innovative technology for poultry farming which can be changes a traditional farm into modern automated poultry farm. Various environmental parameters have been continuously monitored to improve health and growth of the chicken. The Proposed system can be applicable in Poultry Farm and agriculture sector. In poultry farm , it is use to feed the food in container, maintain the temperature using water sprinkler, remove the gas using soil mixture and in Agriculture it is use to Preparation of soil , Spraying to plants, Fertilizer to plants. Through this proposed system it will be helpful to the user.

Keywords: ARDUINO,SENSORS,IOT,FOODBOX

## INTRODUCTION

Poultry farming has been a critical part of the agricultural industry for centuries, providing an essential source of protein to the global population. However, traditional poultry farming methods have several limitations, including the inability to monitor and control the environment effectively. This lack of control can lead to poor animal welfare, reduced productivity, and increased mortality rates. The introduction of the Internet of Things (IoT) technology in agriculture has enabled farmers to overcome some of these limitations by providing real-time monitoring and control of various aspects of the farming process. The IoT-based Smart Poultry Farm is a new approach to poultry farming that utilizes this technology to create a more efficient and sustainable system. The system incorporates various sensors and devices that are interconnected and communicate with a central platform. These sensors monitor the farm's environment, such as temperature, humidity, lighting, and feeding and watering systems. The data collected from the sensors are analyzed by machine learning algorithms, providing actionable insights to the farmers. This analysis enables them to make informed decisions about the optimal conditions required for the birds' health and productivity. The IoT-based Smart Poultry Farm also allows farmers to remotely monitor the farm's conditions and receive alerts in case of any abnormalities, enabling them to take timely action to prevent any negative impacts on the birds' welfare.

Nowadays, chicken poultry industry is an important industry for sustainable food supply in our country. The development of an automatic chicken feeding machine can be very useful to the growth of the poultry industry, the Soil mixture for healthy environment and also water sprinkler for control the temperature is most important task and labor-intensive task. These manual processes are needed in normal poultry farm. In order to replace manual Activities and poultry work easier with making smart poultry farm.

For implementation of smart poultry farm to use one kind of smart system for Automatic Food Feeder in container and water sprinkler for control the temperature of environment and also use the soil mixture for reducing the Gas in poultry environment. System is designed in such way that user can remotely control to the system through android mobile application. Using this prototype Human work is also reducible and smart work will be done. Throughout the last few decades, there has been an increased degree of knowledge about food safety around the world, as well as a strong demand for higher quality food. Several governments have been pushed to implement new procedures in order to convert all manual farms into automated farms. In this approach, smart poultry farms have a significant influence on chicken growth. This research focused on new technology for poultry farming that regulate all environmental elements such as temperature, humidity, and ammonia gas, all of which impact chicken growth. If the environmental conditions are not suitable, the hens may have digestive, respiratory, and behavioral changes. If chickens can be provided with an appropriate environment and adequate water, Climate has a significant impact on chicken growth. The environment of a smart poultry farm may be modified using heater, cooling fans.

**LITERATURE SURVEY**

[1] Poultry Farming is a potential developing segment in Indian animal husbandry business. Imbibing automation into traditional poultry farming methods provides the advantages of improving productivity, quality, and safety while avoiding wastage..

[2] The current thinking on calculations necessary by Internet of Things (IoT) programs is changing toward fog computing rather than cloud computing, allowing IoT devices to do the majority of their calculations at the network edge. This paper mainly focused on transforming a traditional farm into a contemporary farm with numerous automated features.

[3] With the essence of state of art technologies, the modern era has emerged with new directions to the human life where the sole purpose is to make the human life more comfortable and convenient. Smart control over poultry farming is getting acceptable by the mass and this sector is flourishing due to its eminent necessity in mass scale. Automated poultry farm in one where different features are incorporated such as food and water distribution, egg collection etc

[4] Advancement in technology has made regular life more easy and convenient. In every aspect of life, it is essential to be updated that ensures that progress of mass interest. With the growing demand, automated poultry farming has become eminent that contributes enormously in economic growth. Smart poultry farms can emancipate the farmers from the traditionally tedious procedures which were outdated and time consuming.

[5] Chicken or poultry farms increase its production as the population in the Philippines demanded more supply of food resources. The livestock production is a billion-peso industry where many Filipinos are depending on. The researchers pursued this delving to address the need in providing an updated technology, to help poultry farmers. This study tackles Poultry Management System, an IOT system that automates the process of giving feeds and water to poultry animals.

[6] This project presents a flexible answer in a trial of up the accuracy in observation the environmental conditions like temperature, water level, food feeding and reducing work force for industrial households poultry farm. A wireless sensor network (WSN) was accustomed monitor the essential environmental conditions and every one the management processes square measure finished the assistance of a Aurdino ATmega2560 microcontroller.

[7] With the essence of state of art technologies, the modern era has emerged with new directions to the human life where the sole purpose is to make the human life more comfortable and convenient. Smart control over poultry farming is getting acceptable by the mass and this sector is flourishing due to its eminent necessity in mass scale. microcontroller device is Arduino Uno as data processing, the encoder sensor is to calculate the angular speed, and the motor driver is L298.

[8] In contemporary world automation plays a vital role. This paper focuses on an automation of poultry farm by using Arduino and network monitoring. In this paper environmental parameters of poultry farm such as temperature and humidity, are monitored and controlled automatically in order to increase the growth of chicken. By connecting all the sensor modules to the Arduino all sensor values are acquired then using Wi-Fi module it will be uploaded to the web page.

[9] The world's growing population is highly dependent on animal agriculture. Animal products provide nutrient-packed meals that help to sustain individuals of all ages in communities across the globe. As the human demand for animal proteins grows, the agricultural industry must continue to advance its efficiency and quality of production. One of the most commonly farmed livestock is poultry and their significance is felt on a global scale. Current poultry farming practices result in the premature death and rejection of billions of chickens on an annual basis before they are processed for meat.

[10] A combination of wireless sensors and GPRS network can be used for controlling and monitoring environmental parameters in a poultry farm. Various environmental parameters like temperature, humidity, ammonia gas have a big role in operations of Poultry. Operator can get updates regarding the internal environmental situation of poultry farm by accessing the data using a web page.

## PROPOSED METHOD

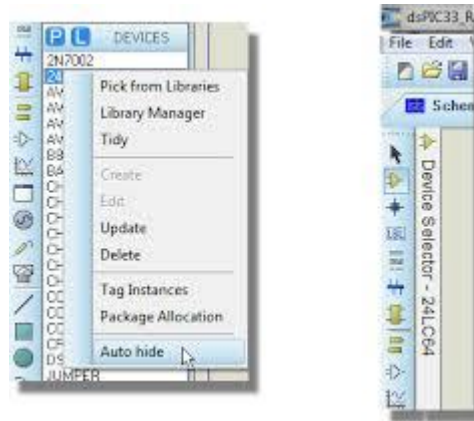
The proposed study focuses on developing a system configuration that includes farm monitoring and control utilizing cutting-edge technologies such as IoT, low-cost hardware, and free software. The device employs particular sensors to detect notable changes in its surroundings and tells the user via his mobile phone via an app. For each parameter, a threshold is specified, and when the detected data exceeds it, related devices may be remotely activated to bring the value below the threshold. As a result, we may save time while improving local hygiene. The created system makes use of Internet of Things (IoT) technologies. A temperature sensor is part of the system architecture (DHT 11). The temperature and moisture content are subsequently shown on the LCD viewer and supplied to the microcontroller for transmission to the cage manager's mobile phone. The Arduino UNO Mega is the device that processes the aforementioned components. After a review of the literature and observations on numerous similar systems, it was determined that the DHT-11 sensor is extremely useful for use in this research design since it can generate two data sets at once, namely temperature and humidity. The goal is figuring out how to design and develop a prototype utilizing IoT for monitoring and operating broiler chicken coops with many sensors. The goal of this research is to create an IoT device for laying hens utilizing a variety of IoT sensors. The objective is that this IoT gadget would aid lay hens in their daily duties. The use of Internet of Things (IoT) technology in chicken farm management is also being advocated in order to improve chicken health and meat quality. With the ATmega328p Microcontroller, the findings may be recorded. The code is processed by the microcontroller and shown on the LCD display, while the ESP8266 Wi-Fi module connects to Wi-Fi and sends data to the IoT device server. Lastly, IOT allows data to be monitored from anywhere in the world.

## SOFTWARE DESCRIPTION

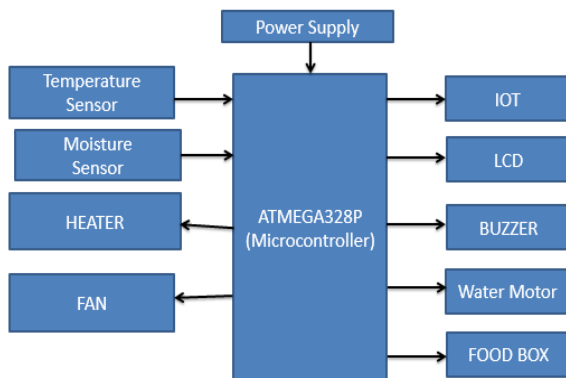
### ARDUINO IDE



The Arduino IDE (Integrated Development Environment) is a free and open-source software tool that is used to write and create code for Arduino boards. Arduino is an open-source electronics platform that allows users to construct interactive objects or environments using simple hardware and software. The Arduino IDE is a software application that allows you to write, modify, and upload code to Arduino boards. For debugging and testing the code, it contains a code editor, a compiler, and a serial monitor. The IDE is available for Windows, Mac, and Linux computers. The ability to write and upload code to Arduino boards via USB connection is a key feature of the Arduino IDE. The Arduino IDE uses the contested program to turn executable code into a text file in hexadecimal format, which is subsequently loaded into the Arduino board by a loader program in the firmware of the board. A basic hardware and software platform for electronics, Arduino is free and open-source. A motor can be operated, an LED can be turned on, and anything can be posted online using an Arduino board, which can read inputs like a light on a sensor, a finger on a button, or a tweet from Twitter.

**PROTEUS**

Proteus is a software program that is used to simulate and create electrical circuits. It is frequently used by electrical engineers, amateurs, and students to create and test electronic circuit designs prior to physically manufacturing them. Labcenter Electronics Ltd. created Proteus, which is accessible for Windows operating systems. Proteus is a comprehensive software suite comprised of two major components: the ISIS schematic capture tool and the ARES PCB layout tool. ARES is used for creating and laying out printed circuit boards, whereas ISIS is used for developing and modeling electrical circuits (PCBs). Proteus' sophisticated simulation capabilities are one of its most notable characteristics. The ISIS program allows users to simulate the behavior of the electrical circuits they design, allowing them to test and troubleshoot their circuits before physically manufacturing them. Proteus' simulation engine is extremely accurate, making it an invaluable tool for circuit design and analysis. Proteus also features a large library of pre-built electronic components, making it easier for users to quickly design complicated circuits. The program supports a wide range of microcontrollers and embedded systems, allowing users to virtualize and test their ideas.

**HARDWARE BLOCK DIAGRAM**

HARDWARE BLOCK DIAGRAM

**METHODS****MODULE LIST**

- Power supply
- ATmega328p Micro Controller
- LCD display
- IOT
- Temperature Sensor.
- Moisture Sensor

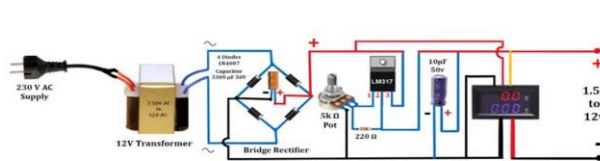
- Buzzer
- Heater
- Fan
- Water Motor.

## MODULE DESCRIPTION

### POWER SUPPLY

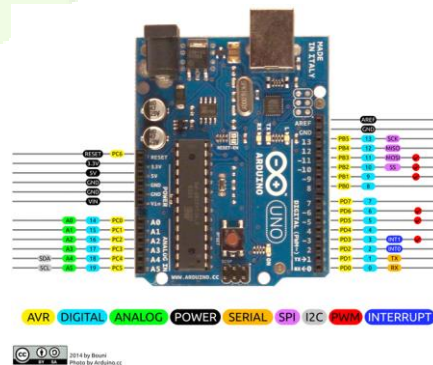
An electrical device known as a power supply delivers electricity to a load. Converting electric current from a source to the right voltage, current, and frequency to power the load is the main job of a power supply. Power supplies are hence also referred to as electric power converters. Others are built into the items they power. Other power supply are standalone machines.

12V - Variable DC Power Supply



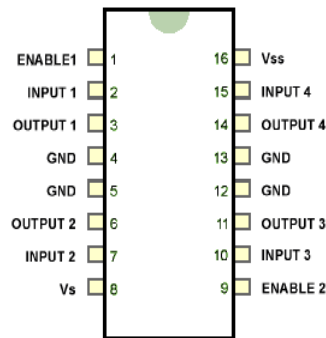
### ATMEGA 328P MICROCONTROLLER:

The Atmel 8-bit AVR RISC-based microcontroller includes 32 KB of ISP flash memory with read-while-write capabilities, 1 KB of EEPROM, 2 KB of SRAM, 23 general-purpose I/O lines, 32 general-purpose working registers, 3 flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D. The device's voltage range is 1.8 to 5.5 volts. The gadget has a throughput of around 1 MIPS/MHz. The ATmega328 is a single-chip microcontroller in the megaAVR family designed by Atmel (later Microchip Technology acquired Atmel in 2016). It has an 8-bit RISC processing core based on Harvard architecture.



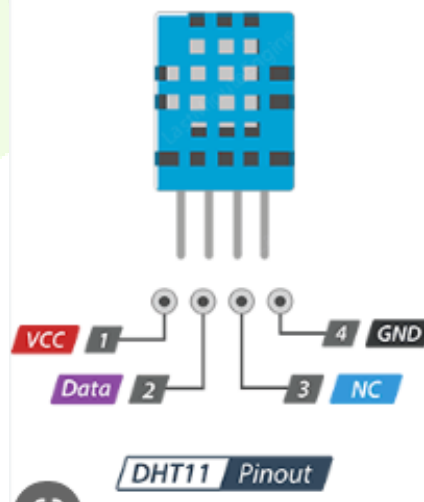
### LCD DISPLAY:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters



### TEMPERATURE SENSOR(DHT11)

The most commonly measured environmental quantity is temperature. This is understandable given that temperature affects the majority of physical, electrical, chemical, mechanical, and biological systems. Some chemical reactions, biological activities, and even electronic circuits function best in temperature ranges that are restricted. Temperature is one of the most often measured variables, thus it is not unexpected that there are several methods for measuring it. Temperature sensing can be accomplished either directly with the heating source or remotely, without direct contact with the source, by employing radiated radiation. Temperature sensors on the market today include thermocouples, resistance temperature detectors (RTDs), thermoistors, infrared sensors, and semiconductor sensors.



### FAN

A fan is a motorized mechanism that circulates air. A fan is a revolving arrangement of vanes or blades that operate on the air and are often constructed of wood, plastic, or metal. An impeller, rotor, or runner is a spinning assembly comprising blades and a hub. It is usually enclosed within some kind of housing or casing. This can be used to guide airflow or to promote safety by preventing things from colliding with the fan blades. Most fans are driven by electric motors, however alternative power sources such as hydraulic motors, hand cranks, and internal combustion engines may be employed.



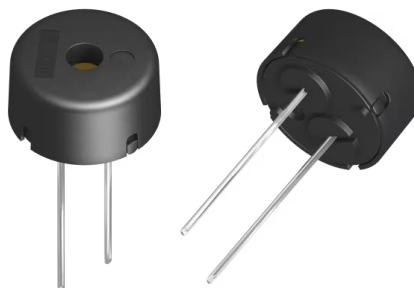
## WATER MOTOR

Small motors driven by a battery, dc power supply, or solar panel are known as DC water pumps. The basic function of these devices is to circulate, pressurize, and emulsify liquids. They are especially beneficial in places where water is scarce. Some applications for DC submersible pumps are listed below. This article will go through the most prevalent uses for DC water motors. It is critical to consider the maximum head of a small water motor before selecting one. The maximum head is the greatest amount of water that the motor can handle. This amount must be more than the label's maximum pumping height. There is frequently a five to ten percent difference between the maximum and usual flow rates.



## BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.



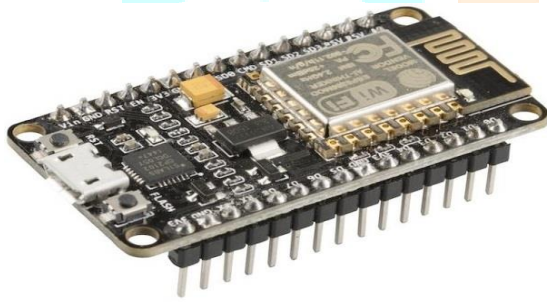


## HEATER



## NODEMCU

The Internet of Things (IoT) refers to physical objects (or groups of such objects) that are equipped with sensors, processing power, software, and other technologies that connect to and exchange data with other devices and systems over the Internet or other communication networks. The term "internet of things" has been deemed misleading because gadgets do not need to be linked to the public internet; instead, they must be connected to a network and be individually accessible.



## CONCLUSION

It has features that integrate all of the hardware components employed. Every module's presence has been carefully thought out and arranged, adding to the unit's optimal performance. Second, the project was effectively executed employing very advanced ICs and expanding technologies. As a result, the paper's concept has been effectively created and tested. The article "Wireless DC Motor Speed and Direction Control Using Bluetooth" was created to operate a DC motor using PWM and control through Bluetooth module, with the system capable of monitoring motor speed on an LCD display. The RPM of a DC motor is measured using an infrared sensor. We can control the DC motor with a PWM signal.

The suggested project approach would create a hardware model using the IOT Technology to operate a dc motor. As a result, the speed and temperature of a dc motor may be controlled and monitored via IOT. This paper discusses the real-time monitoring and control of a system designed to protect a dc motor. For real-time monitoring, the system is coupled with IOT. The suggested solution provides precision, reliability, and lowers the motor's failure rate. In this case, we utilized a microcontroller (ATMEGA328P) as a data gathering system. A potentiometer may be used to control the speed. The technology described in this work may be employed in a variety of industrial applications, and it is relatively inexpensive and contributes to the stability of the system.

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