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IoT Based Automated Poultry Farm

[1] Prakash P, [2] Rathish S, [3] Mohamedshah K, [4] Sabareeswaran V, [5] Mohan Raj S

[1]Assistant Professor, P. A. College of Engineering and Technology, Pollachi, India, prakashpacet@gmail.com

[2]Student, P. A. College of Engineering and Technology, Pollachi, India, rathishsrh03@gmail.com

[3] Student, P. A. College of Engineering and Technology, Pollachi, India, mohamedshah2003@gmail.com

[4]Student, P. A. College of Engineering and Technology, Pollachi, India, sabareeswaran.v9958@gmail.com

[5]Student, P. A. College of Engineering and Technology, Pollachi, India, mohanrajsr20203@gmail.com

Abstract: This project focuses on creating an IoT-based live weather monitoring system and automate the poultry farm using the ESP8266 Wi-Fi module and a set of weather sensors. The system continuously collects real-time environmental data such as temperature, humidity, and rain drop and displays it on an LCD screen. The ESP8266 microcontroller gathers data from sensors like the DHT11 for temperature and humidity and any other relevant sensors depending on specific weather variables to be monitored. The collected data is processed and displayed locally on a 16x2 LCD screen, making it easy for users to view the current weather conditions instantly. Additionally, the data is sent to an online platform via the Wi-Fi module, where users can access and track weather patterns over time through a web and also control the heaters and cooling motors from the web. This system provides a scalable and cost-effective solution for weather monitoring applications, from small-scale individual use to larger networked implementations. The data collected can be further analyzed for forecasting or even as a part of smart city initiatives. Through this IoT-based approach, the live weather monitoring system offers real-time insights into weather conditions and supports data-driven decision-making.

Keywords*:* Esp8266, IoT Platform, Heater, Cooling motor, Weather.

1. Introduction

The proposed system assists farmers in monitoring and controlling poultry farm operations efficiently. It integrates wireless sensors and a mobile-based system to simplify farm management. Environmental parameters such as temperature, light intensity, and ammonia gas levels are automatically monitored and regulated [1]. The system utilizes the Internet to enable seamless communication between devices and users. By implementing automation, operational costs, labor dependency, and time consumption are significantly reduced. A key feature of the system is the automated feeding mechanism, which replaces manual labor in dispensing feed into containers. This addresses labor shortages in the poultry industry while ensuring timely and precise feeding. The system also includes temperature regulation to maintain optimal conditions for poultry feed freshness [2]. By automating climate control and feed distribution, it enhances poultry health, prevents contamination, and improves farm efficiency. The poultry farm operates using computer network technology, incorporating a wireless sensor network for environmental monitoring and climate regulation. This network-based automation system assists farmers by reducing manual labor and improving productivity. The system contributes to the overall quality of meat production and promotes ecological balance [3]. The poultry management system integrates hardware and open-source software, incorporating sensors to monitor temperature, humidity, light intensity, and air quality. The focus is on providing an IoT-enabled, cost-effective, and efficient solution to address common challenges in poultry farming [4]. By automating these processes, the system optimizes time management, reduces labor dependency, and fosters a healthier farm environment, ultimately enhancing poultry production. This research highlights the use of a wireless sensor and GPRS network for real-time monitoring and control of poultry farm environments. The system enables users to regulate climate conditions, ensuring a healthier environment for poultry [5]. Key environmental parameters such as temperature, humidity, ammonia gas levels, and water supply are continuously monitored and adjusted to maintain ideal conditions. The implementation of this system leads to reduced labor costs, improved efficiency, and optimized resource usage. A fully automated poultry farm system based on wireless sensor networks and mobile communication is emphasized in this study. The system autonomously regulates temperature, humidity, and ammonia gas levels, ensuring consistent environmental control [6]. As a result, poultry meat quality is improved, and overall

farm growth is enhanced. By focusing on climate management, the system helps ensure healthier poultry and higher production efficiency. The primary objective of this system is to develop an automated, environment-controlled poultry management solution. It continuously monitors and regulates key physical parameters such as temperature, humidity, moisture levels, and air quality. Beyond monitoring, the system actively adjusts these parameters as needed, allowing farmers to manage operations remotely via handheld devices [7]. This automation reduces labor requirements, saves time, and ensures optimal farming conditions. Maintaining ideal climate conditions in poultry farms is crucial for performance optimization. Proper ventilation systems, which control air temperature and humidity, play a key role in ensuring poultry health [8]. By reducing uncertainties in farm operations, the system operates in a hierarchical manner to enhance efficiency. The project not only reduces production costs but also improves poultry well-being. The integration of wireless sensors and GPRS networks for environmental monitoring and control is a core focus of this study. Key parameters such as temperature, humidity, and ammonia gas levels are monitored and automatically adjusted to maintain optimal conditions. Additionally, food and water levels are regulated through an automated system [9]. This smart farming solution provides remote monitoring and control capabilities, helping farmers reduce manual labor while ensuring timely feeding and water distribution. By utilizing wireless sensors, environmental data is continuously collected and analyzed. The system ensures real-time access to climate conditions, enabling efficient monitoring and management of poultry farms [10]. Farmers can wirelessly receive updates and control farm conditions remotely, making poultry farming more efficient and less labor-intensive. Moroccan poultry farming, which contributes significantly to national food security, faces challenges related to extreme climate conditions, including summer heatwaves and winter cold spells. High temperatures lead to increased poultry mortality, while cold weather affects feed efficiency. This study explores the use of an earth-air heat exchanger to regulate poultry house temperatures, thereby improving farm productivity, product quality, and economic viability [11]. By implementing wireless sensor networks, poultry growth can be optimized, making it a comprehensive solution for modern poultry farming. Temperature regulation plays a vital role in poultry farming, impacting both production quality and animal health. Wireless sensor networks help maintain stable temperatures and improve poultry farm operations [12].

2. Proposed Method

The proposed methodology for temperature control and feed monitoring in poultry using IoT and NodeMCU involves deploying temperature, humidity, and feed sensors integrated with NodeMCU microcontrollers to continuously monitor the environmental conditions and feed levels. The NodeMCU is connected to a cloud platform or a local server, where data is sent in real-time for analysis and monitoring. Based on the sensor data, the system automatically adjusts temperature by controlling ventilation, heating, or cooling devices, while the feed dispensing mechanism is managed to ensure optimal feed intake for the poultry. Alerts and notifications are generated for any irregularities, such as temperature fluctuations or low feed levels. This setup enables farmers to remotely monitor and control the conditions, optimizing bird health, feed efficiency, and energy usage, all while reducing manual intervention and improving overall farm management.

2.1 Operational and Element Description

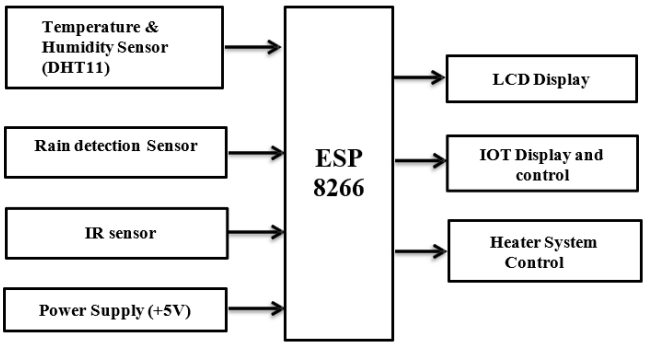

Fig.1 *Block diagram of the prototype system*

The DHT11 sensor measures the temperature and humidity levels in the poultry environment. It provides data on the current temperature and humidity, which is essential for regulating the poultry house's climate. This rain sensor detects rainfall and can trigger actions like closing windows or adjusting the ventilation to avoid water entering the poultry area. It helps in maintaining the ideal environment within the farm even during adverse weather conditions. The IR sensor is used to monitor the feed level in the poultry feeding containers. It detects the presence or absence of feed, allowing the system to ensure that birds are properly fed. If the feed level is low, the system can trigger an alert or even activate an automatic feeding mechanism to refill the container. The system is powered by an external power supply to support the operation of all sensors, the controller output devices such as the LCD display, motors, and IoT platform connectivity. The ESP8266 is the main controller of the system. It processes the

sensor data and makes decisions based on predefined conditions. It also handles communication with external systems like the LCD display and IoT platform. The ESP8266 sends temperature, humidity, and feed data to the IoT platform for real-time monitoring and stores or displays the data on the LCD. The LCD display provides real-time feedback to the farm operators. It shows the current temperature, humidity, feed levels. The IoT platform receives real-time data from the ESP8266 and displays it in an easily accessible format via a web interface. Based on the temperature data received from the DHT11 sensor, the ESP8266 will control the heater or cooling motor. If the temperature falls below a threshold, the ESP8266 will activate the heater to warm the environment. If the temperature exceeds a threshold, the ESP8266 will activate the cooling motor to maintain the ideal temperature range for the poultry.

2.2 Circuit Diagram

Fig.2 represents the circuit diagram for the proposed poultry farm system consists of several key components. The DHT11 sensor measures the temperature and humidity levels inside the poultry house, providing input to the ESP8266 controller. The rain detection sensor monitors rain. The IR sensor is used for feed level monitoring, detecting the presence or absence of feed and sending data to the controller. The ESP8266 processes this data and controls the system outputs: it displays real-time data on the LCD display, sends data to the IoT platform for remote monitoring, and operates the heater and cooling motor circuits to maintain the desired temperature by turning on or off the respective devices based on the input conditions. The power supply ensures that all components, including sensors, the ESP8266, and output devices, receive the necessary power for seamless operation. This integrated system automates climate control, feed management, and remote monitoring, improving overall poultry farm efficiency and productivity.

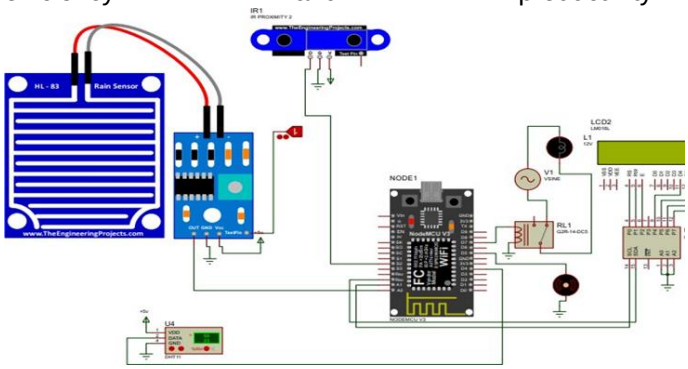

Fig.2 Circuit diagram of the prototype system

3. Performance and Analysis

3.1 Results of BLYNK Platform

The Blynk-based IoT med box system, integrated with an ESP32 microcontroller, enables efficient remote monitoring and control of the pill dispensing mechanism. The system consists of various components, including an IR sensor for object detection, push buttons for user input, an LCD display for real-time status updates, servo motors for pill dispensing, and a WT588D audio module with a PAM8403 amplifier for voice alerts. Through the Blynk platform, users can monitor the system remotely and receive real-time notifications about its status.

In conclusion, Fig.3 represents the Blynk-integrated med box system performs efficiently, providing a reliable solution for remote medication dispensing. With proper power management and Wi-Fi optimization, its overall effectiveness can be significantly enhanced.

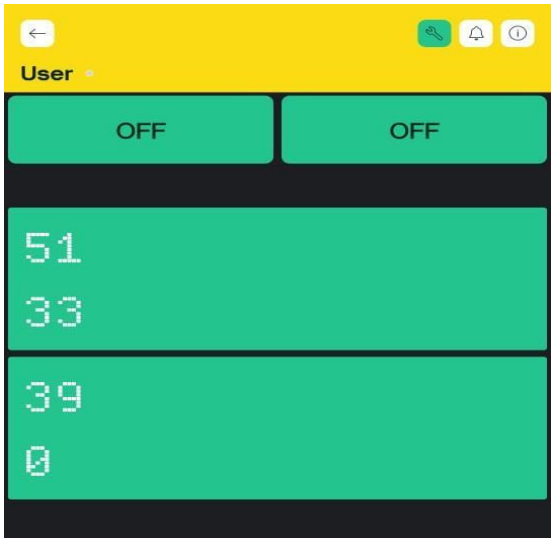

Fig.3 Dashboard of the BLYNK software

3.2 Hardware picture of the prototype

. The DHT11 sensor monitors temperature and humidity levels, ensuring optimal environmental conditions for poultry health, while the raindrop indication sensor detects weather changes to adapt the farm's conditions accordingly. Additionally, the IR sensor is used to track feed levels, providing real-time alerts for refilling when necessary. This integrated system allows farmers to remotely monitor farm parameters via the internet.

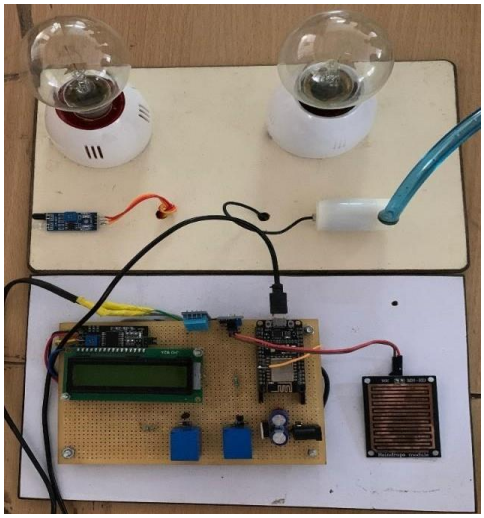

Fig.4 Hardware output

3.3 Heater automation

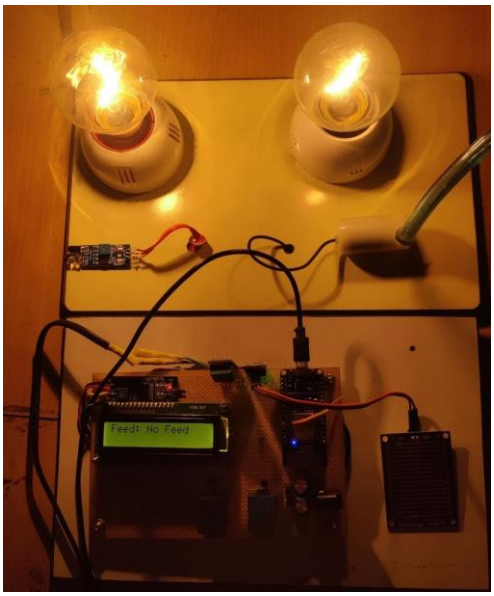

Fig.5 Heater On

By the use of rain detection and DHT11 sensor, the weather will be determined and heater is been turned on automatically and also displayed on the LCD display and IoT platform.

3.4 Cooling Motor automation

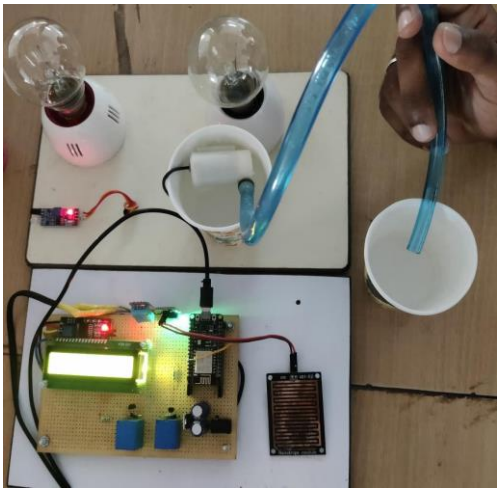

Fig.6 Cooling motor On

If the temperature raised above the threshold value, the cooling motor turned on automatically and displayed the temperature values on display and IoT platform.

3.5 Feeder level indication

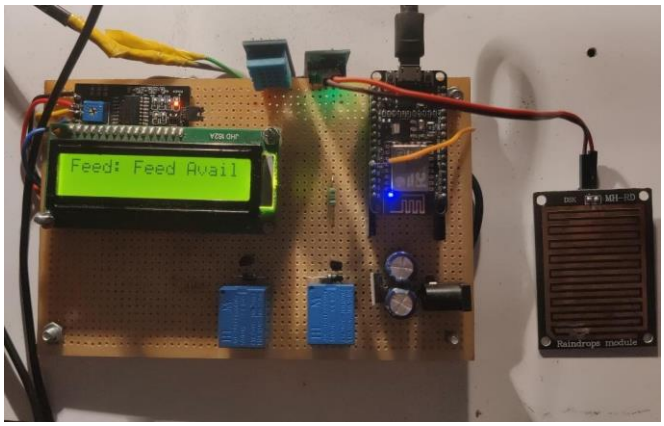

Fig.7 Feeder available / not available

The feed level available on the feed tank will be shown on the IoT platform and LCD display.

4. Results and Discussion

The system in the poultry farm uses a DHT11 sensor to monitor temperature and humidity, a rain detection sensor to detect rain, and an IR sensor to track feed levels. These sensors send data to the ESP8266 controller, which processes the information and controls the system outputs. The data is displayed on an LCD

display for local monitoring and sent to an IoT platform for remote access. The ESP8266 also controls the heater and cooling motors to maintain optimal temperature conditions in the poultry house, ensuring a comfortable and productive environment for the birds.

5. Conclusion

In conclusion, the integration of the DHT11 sensor for temperature and humidity monitoring, rain detection sensor for weather-related adjustments, and the IR sensor for real-time feed level tracking, all controlled by the ESP8266, provides an efficient and automated solution for managing a poultry farm. The system ensures optimal environmental conditions by controlling the heater and cooling motors, while the LCD display and IoT platform offer real-time and remote monitoring capabilities. This approach enhances farm productivity, minimizes human intervention, and helps maintain a comfortable environment for the poultry, ultimately improving farm management and operational efficiency.

6. References

[1] Archana M P1, Uma S K2, “Monitoring and controlling of poultry farm using IOT”, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 4, April 2018.

[2] Zainal H. C. Soh1, Mohd H. Ismail1, “Developement of automatic chicken feeder using Arduino Uno”,IEEE, Dec 2017.

[3] Danar Wicaksono, Ratna Mayasari, “Design and Analysis Automatic Temperature control in the Broiler poultry farm based on wireless sensor network”, 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), Nov 2017.

[4] Raghudathesh G P1, Deepak D J2“IOT based intelligent poultry management system using Linux embedded system”, IEEE, Aug 2017.

[5] Geetanjali A. Choukidar, Prof. N.A. Dawande, “Smart poultry farm automation and monitoring system”, IEEE, June 2017.

[6] Ayyappan.V, Deepika.T, “Smart poultry farm automation and monitoring system”, IOT Based Smart Poultry Farm, South Asian Journal of Engineering and Technology Vol.3, No.2 (2017) 77–84,07/03/2017.

[7] Lata S. Handigolkar, M.L. Kavya, “IOT based smart poultry farming using commodity hardware and software”, Bonfring International Journal of Software Engineering and Soft Computing, Vol. 6, Special Issue, October 2016.

[8] Teerapon Upachaban, Thana Radpukdee, “Climate control system of a poultry house using sliding mode control”,International Symposium on Flexible Automation Cleveland, Ohio, U.S.A., 1 - 3 August, 2016.

[9] Rupali B. Mahale, Dr. S. S. Sonavane, “Smart Poultry Farm: An Integrated solution using WSN and GPRS based network”, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5, Issue 6, June 2016.

[10] Abdul Muiz Fathi Md. Abas, “Chicken farm monitoring system farm”, International Conference on Computer & Communication Engineering, may 2016.

[11] Azzeddine Laknizi1,2∗, Anas ElMaakoul2, “Evaluation of Earth-air heat exchanger for cooling and heating a poultry house: Case study in Morocco”, may 2016.

[12] Muhanmmad Ammad-uddin,“Wireless sensor network: A Complete solution for poultry family”, IEEE 2nd International Symposium on Telecommunication Technologies (ISTT), Langkawi, Malaysia (24-26 Nov 2014).