



Automated Poultry Farm Management System Using ThingSpeak Cloud System

¹Sabarinathan S, ²Sanjeev K, ³Sankar P,

⁴Prabhu C, M.E.

¹ Student, ² Student, ³ Student,

⁴ Assistant Professor.

Electronics and Communication
Engineering Department, Nandha
Engineering College,
Tamil Nadu, India.

ABSTRACT- This project introduces an automated poultry farm management system leveraging the ThingSpeak cloud platform for enhanced efficiency and control. The system monitors critical environmental parameters, including temperature, humidity, and lighting, within the poultry farm. Real-time data acquisition is facilitated by IoT sensors, and the data is transmitted to ThingSpeak for storage and analysis. ThingSpeak's open data platform enables data visualization, analysis, and integration with other IoT devices and services. By automating key processes and providing valuable insights through ThingSpeak's platform, this system aims to optimize resource utilization, minimize manual intervention, and improve overall farm management.

Index Terms- Sensors, Disease Detection, IoT in Agriculture, Automated Feeding System.

I INTRODUCTION

The agricultural sector has undergone significant transformation over the past few decades, driven by the rapid advancement of technology. Traditional farming practices, once reliant on manual labor and rudimentary tools, are being replaced by innovative, technology-driven solutions that enhance productivity, efficiency, and sustainability. Among these advancements, the integration of Internet of Things (IoT) devices and cloud-based platforms has emerged as a game-changer, particularly in the realm of livestock and poultry farming. This project, titled “Automated Poultry Farm Management System Using Thingspeak Cloud System,” seeks to harness the power of modern technology to address the challenges faced by poultry farmers and revolutionize farm management practices. Poultry farming is a critical component of the global food supply chain, providing a significant source of protein through meat and eggs. However, managing a poultry farm efficiently requires constant monitoring of various environmental and operational parameters, such as temperature, humidity, feed levels, and water supply. Traditional methods of monitoring these factors are often labor-intensive, timeconsuming, and prone to human error, leading to suboptimal conditions for poultry and reduced farm productivity. Inefficient management can also result in increased operational costs, resource wastage, and potential losses due to disease outbreaks or unfavorable environmental conditions. To address these challenges, this project proposes an intelligent, automated poultry farm management system that leverages the capabilities of the Thingspeak Cloud System. Thingspeak, a powerful IoT analytics platform, serves as the backbone of this system, enabling seamless integration of IoT-based sensors, real-time data monitoring, and centralized data management. By utilizing Thingspeak's cloud infrastructure, the system provides a scalable, secure, and cost-effective solution for modern poultry farms, ensuring optimal conditions for poultry health and growth while minimizing manual intervention.

II. LITERATURE SURVEY

Karun K.C, Karan Subedi, Siddharth Sharma, and Pradip Paneru [1] introduced a system leveraging Raspberry Pi for automating household devices. The focus was on affordability, flexibility, and security through a mobile application interface. Abhijit Shejal [2] emphasized the design of a smart switch that simplifies the control of appliances using IoT principles. Their system showcased user-friendly operation via mobile or web interfaces. Sudha Kousalya [3] combined IoT with smart security systems, offering a dual purpose solution for automation and safety. K. Eswari [4] implemented real-time automation for lights and fans using Arduino, ensuring energy efficiency and ease of use. Bouzid Mohamed Amine [5] developed a comprehensive framework integrating sensors and IoT technology for adaptable home environments.

III. PROPOSED SYSTEM

The proposed method involves using a variety of sensors, such as gas, DHT11, and IR sensors, to monitor the environmental conditions in a poultry farm. These sensors are connected to a Node MCU microcontroller, which processes the data and sends it to a cloud platform like Firebase for real-time analysis. Based on the sensor data, an Arduino microcontroller controls various devices, including feeders, water pumps and cleaners, exhaust fans, and heaters, to maintain optimal conditions. Automation is implemented to regulate temperature and humidity, while automatic lighting systems ensure proper light exposure. A reliable power supply unit supports all components, and a mobile or web application allows farmers to monitor and control the system remotely.

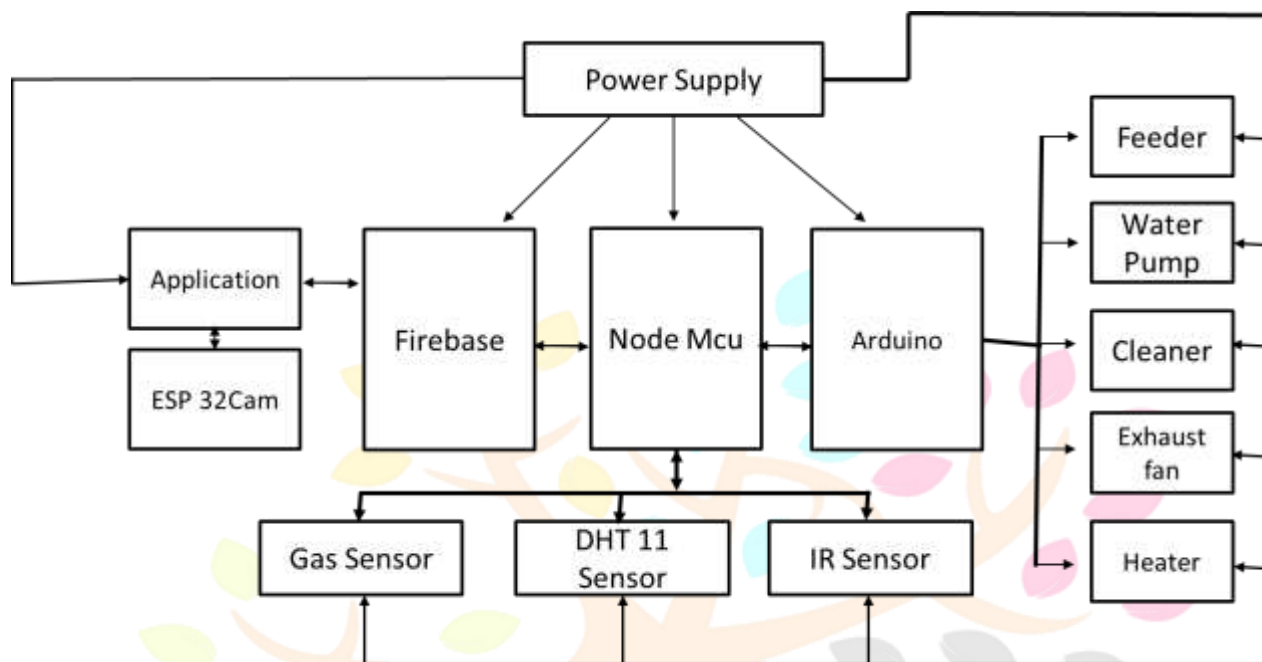


Figure 1 : System Architecture

Real-time alerts and notifications are provided for abnormal changes, and data analysis over time helps identify patterns for better decision-making. The system includes safety monitoring for harmful gas levels, minimizes feed and water wastage, optimizes energy usage, and allows remote adjustments by farmers. It is designed to be cost-effective, ensure stable conditions, enhance productivity, and promote poultry health. The user-friendly interface, continuous real-time monitoring, and scalability ensure efficient farm management and resource optimization. Emergency alerts and pattern recognition further enhance the system's effectiveness.

Hardware Interface components:

Node MCU ESP8266 - On-chip integration with sensors and other applications.

Arduino Mega - To control the overall output controls.

Gas sensor - Gas identification for Arduino mega.

DHT 11 Sensor - Temperature sensor for the temperature identification.

ESP 32 CAM - Live view for application.

MOTOR - To use to control the feeder and cleaner.

12V WATER PUMP - To use for the water supply.

Software Interface components:

Arduino IDE - To use the upload the code.

MIT App Inventor - To use to create the application.

IV. RESULT

The project successfully developed an automated poultry farm management system integrated with a ThingSpeak Cloud platform. The system enables real-time monitoring and control of essential parameters, including temperature, humidity, air quality, and poultry feeding and cleaning processes. Through the user-friendly mobile application interface, farm operators can efficiently manage operations, toggle feeders, water dispensers, and cleaners, and monitor specific categories like child hens and adult hens. The system's cloud connectivity ensures seamless data synchronization and live updates, improving farm management efficiency and productivity.

V. CONCLUSION

The Automated Poultry Farm Management System leveraging ThingSpeak Cloud is a transformative solution for modern poultry farming. It enables precise control, real-time monitoring, and efficient resource utilization, ensuring healthier poultry and higher productivity. Remote access and real-time alerts provide farmers with unmatched flexibility and ease of management. Its scalability and adaptability make it suitable for farms of all sizes. By integrating IoT and cloud technologies, this system promotes sustainable and efficient farming practices. Ultimately, it bridges technology and agriculture, enhancing both productivity and animal welfare.

REFERENCES

- [1] Karun K. C., Karan Subedi, Siddharth Sharma, and Pradip Paneru. "IoT Based Smart Poultry Management System." *Journal of IoT in Social, Mobile, Analytics, and Cloud*, (2024), pp. 39-53.
- [2] Suresh Neethirajan. "Automated Tracking Systems for the Assessment of Farmed Poultry." *Journal of Animals*, 2022, pp. 232.
- [3] N. Z. Malika, M. G. Md Johar, M. H. Alkawaz, A. Iqbal Hajamydeen and L. Raya, "Temperature & Humidity Monitoring for Poultry Farms using IOT," 2022 IEEE 12th Symposium on Computer Applications & Industrial Electronics (ISCAIE), Penang, Malaysia, 2022, pp. 76-81.
- [4] Wu, Dihua, Di Cui, Mingchuan Zhou, and Yibin Ying. "Information Perception in Modern Poultry Farming: A Review." *Computers and Electronics in Agriculture* 199 (2022).
- [5] Idowu, Peter Olalekan, Oluwale Abiodun Adegbola, Ifeoluwa David Solomon, Monsuru Abolade Adeagbo, and John Adedapo Ojo. "Design and Implementation of Smart-Controlled Poultry Farm Management System." *International Journal of Enhanced Research in Science, Technology & Engineering*, (2021), pp. 9.
- [6] Naphade, S. T., and S. G. Badhe. "Study of Smart Management System in Poultry Farming." *Journal of Scientific Research, Institute of Science, Banaras Hindu University, Varanasi, India*, vol. 65, no. 6, (2021), pp. 1-6.
- [7] Zheng, Haikun, Tiemin Zhang, Cheng Fang, Jiayuan Zeng, and Xiuli Yang. "Design and Implementation of Poultry Farming Information Management System Based on Cloud Database." *Animals*, vol. 11, no. 3, 2021, p. 900.
- [8] Aguirre-Munizaga, M., Romero-Sánchez, J., Quinde-Gonzabay, J., and Samaniego Cobo, T. "Automation of Poultry Production Monitoring Through Web Services." *Journal of IoT in Social, Mobile, Analytics, and Cloud*, (2024), pp. 39-53.
- [9] Naphade, S. T., and S. G. Badhe. "Study of Smart Management System in Poultry Farming." *Journal of Scientific Research, Institute of Science, Banaras Hindu University, Varanasi, India*, vol. 65, no. 6, (2021), pp. 1-6.
- [9] Naphade, S. T., and S. G. Badhe. "Study of Smart Management System in Poultry Farming." *Journal of Scientific Research, Institute of Science, Banaras Hindu University, Varanasi, India*, vol. 65, no. 6, (2021), pp. 1-6.
- [10] Moses Oluwafemi Onibonjo. "IoT-Based Synergistic Approach for Poultry Management System." *Proceedings of the IEEE International IoT, Electronics and Mechatronics Conference (IEMTRONICS)*, IEEE, 21–24 April 2021.

