



# International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

*(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)*



**Impact Factor: 8.699**

**Volume 15, Issue 3, March 2026**

# Smart Poultry Feed Optimization

**Mr. S.K.Sarwade, Purav Jagdish Patel, Ksharyan Rohidas Mavale, Manish Anil Garud,  
Aarambh Sarju Shinde**

Department of Information Technology Engineering, Pimpri Chinchwad Education Trust's Pimpri Chinchwad  
Polytechnic, Pradhikaran, Nigdi, Pune, India.

**ABSTRACT:** Poultry farming is a vital component of the agricultural sector, contributing significantly to food production and economic growth. One of the major challenges in poultry farming is efficient feed management, as feed constitutes a large portion of the total production cost. Traditional feeding methods rely on manual observation and distribution, which often lead to feed wastage, inconsistent feeding schedules, and increased labor effort.

This research presents a Smart Poultry Feed Optimization System using Internet of Things (IoT) technology to automate and enhance feed management processes. The proposed system utilizes sensors such as ultrasonic sensors to monitor feed levels, load cells to measure feed consumption, and environmental sensors to track temperature and humidity conditions. A microcontroller-based unit processes the collected data and controls an automated feeding mechanism to ensure optimal feed distribution.

The system is integrated with a cloud-based platform for real-time data storage and analysis. A web or mobile application provides farmers with remote access to monitor feed usage, schedule feeding operations, and receive alerts for low feed levels or abnormal conditions. This enables better decision-making and efficient farm management.

The implementation results indicate that the system significantly reduces feed wastage, improves feeding accuracy, and enhances poultry health and productivity. By combining IoT, automation, and data analytics, the proposed system offers a reliable and scalable solution for modern poultry farming.

**KEYWORDS:** Internet of Things (IoT), Smart Poultry Farming, Feed Optimization, Automated Feeding System, Sensor Networks, Precision Agriculture, Poultry Monitoring, Cloud Computing, Real-Time Monitoring, Smart Agriculture

## I. INTRODUCTION

Poultry farming is one of the most important sectors in agriculture, providing a major source of protein in the form of eggs and meat. It plays a significant role in supporting rural livelihoods and contributing to the economy. With the increasing demand for poultry products, farmers are required to adopt efficient and modern techniques to improve productivity and reduce operational costs.

One of the key factors affecting poultry production is feed management. Feed accounts for nearly 60–70% of the total cost in poultry farming, making it essential to utilize it efficiently. In traditional poultry farms, feeding is done manually at fixed intervals without considering the actual requirements of the birds. This often leads to problems such as overfeeding, underfeeding, feed wastage, and uneven distribution. Additionally, manual monitoring of feed levels and poultry behavior is time-consuming and prone to human error.

Environmental conditions such as temperature and humidity also play a crucial role in poultry health and feed consumption. Improper environmental conditions can lead to stress, reduced growth rate, and increased mortality. However, traditional systems lack the capability to continuously monitor and control these parameters effectively.

With the advancement of Internet of Things (IoT) technology, smart farming solutions have emerged to address these challenges. IoT enables real-time monitoring, data collection, and automation by connecting sensors, devices, and systems through the internet. These technologies allow farmers to make data-driven decisions and manage farms more efficiently.

The Smart Poultry Feed Optimization System using IoT is designed to automate feeding operations and monitor feed usage in real time. The system uses sensors to track feed levels, poultry activity, and environmental conditions. A microcontroller processes this data and controls an automated feeding mechanism to ensure proper feed distribution. The collected data is stored in a cloud database and can be accessed through a web or mobile application.

The main objectives of the proposed system are to reduce feed wastage, improve feeding efficiency, minimize manual labor, and enhance poultry health and productivity. By integrating IoT technology with poultry farming, the system provides a smart, reliable, and scalable solution for modern agricultural practices.

## II. LITERATURE SURVEY

Recent advancements in smart agriculture and precision livestock farming have led to the development of IoT-based systems for efficient poultry management. Researchers have focused on automating feeding processes, monitoring environmental conditions, and improving poultry health using modern technologies.

Several studies have highlighted the importance of automation in poultry feeding systems. Traditional feeding methods require manual labor and are time-consuming, especially for large farms. IoT-based automatic feeding systems have been developed using microcontrollers, sensors, and motor-driven mechanisms to distribute feed efficiently. These systems reduce human effort and ensure timely feeding of poultry, improving overall farm productivity .

In addition to feeding automation, environmental monitoring plays a crucial role in poultry farming. Research shows that parameters such as temperature, humidity, and air quality directly affect poultry growth and feed consumption. IoT-based systems use sensors like DHT22 and gas sensors to continuously monitor these conditions and maintain a stable environment using automated controls such as fans and ventilation systems . Maintaining optimal environmental conditions helps reduce mortality rates and improves feed conversion efficiency.

Many researchers have also explored the use of multi-sensor IoT platforms for poultry farm management. These systems collect real-time data on various parameters and provide actionable insights for farmers. Studies indicate that IoT-enabled farms can significantly improve efficiency by reducing feed conversion ratios and minimizing resource wastage, while also enhancing poultry welfare .

Behavior monitoring is another important area in poultry research. Advanced IoT systems integrate sensors and machine learning algorithms to analyze poultry behavior such as feeding, movement, and resting patterns. These systems help in early detection of diseases and abnormalities, enabling farmers to take preventive measures and optimize feeding strategies .

Cloud computing and data analytics are widely used in modern poultry farming systems. IoT devices transmit data to cloud platforms where it is stored, processed, and analyzed. Farmers can access this data through web or mobile applications to monitor farm conditions remotely and make informed decisions. Such systems improve farm management efficiency and reduce dependency on manual observation .

Furthermore, automated poultry farming systems integrate feeding, cleaning, and monitoring functions into a single platform. These systems reduce labor costs and improve operational efficiency by automating routine tasks . Real-time monitoring and alert systems also help farmers respond quickly to abnormal conditions, ensuring better poultry health and productivity.

Despite these advancements, challenges such as high initial cost, network connectivity issues, and system complexity still exist. Many existing systems focus only on specific aspects like environmental monitoring or feeding automation, rather than providing a fully integrated solution.

Therefore, there is a need for a cost-effective, scalable, and integrated IoT-based poultry feed optimization system that combines feed monitoring, automation, and data analytics to improve overall farm efficiency.

### III. METHODOLOGY

The proposed **Smart Poultry Feed Optimization System using IoT** is designed to automate feed management and monitor poultry conditions in real time. The system integrates sensors, a microcontroller unit, an automated feeding mechanism, cloud storage, and a user interface. The overall architecture ensures efficient feed utilization, reduced wastage, and improved poultry health.

The methodology consists of the following major components:

#### 1. Sensor-Based Data Collection

Sensors are used to continuously monitor feed levels, poultry activity, and environmental conditions inside the poultry farm.

- **Ultrasonic Sensor:**

Measures the level of feed available in the storage container. When the feed level drops below a threshold, the system triggers an alert or refilling process.

- **Load Cell (Weight Sensor):**

Measures the amount of feed consumed by poultry. This helps in analyzing feeding patterns and optimizing feed distribution.

- **Temperature and Humidity Sensor (DHT11/DHT22):**

Monitors environmental conditions that directly affect poultry health and feeding behavior.

- **Motion Sensor (PIR Sensor):**

Detects poultry movement and activity, helping to determine feeding demand.

These sensors ensure accurate and real-time data collection for decision-making.

#### 2. Microcontroller Processing Unit

A microcontroller such as **Arduino, ESP8266, or ESP32** acts as the central control unit of the system.

- It receives data from all sensors
- Processes the data based on predefined conditions
- Controls the feeding mechanism
- Sends data to the cloud server via Wi-Fi

The microcontroller ensures that feeding is done only when required, preventing overfeeding and underfeeding.

#### 3. Automated Feeding Mechanism

The system uses a **motor-driven feeder** to distribute feed automatically.

- A servo motor or DC motor controls the opening and closing of the feed outlet
- Feeding can be triggered based on:
  - Time schedule (fixed intervals)
  - Sensor data (low feed level or high poultry activity)

This automation ensures consistent and efficient feeding without human intervention.

#### 4. IoT Communication and Cloud Integration

The system uses IoT technology to transmit data to a cloud platform.

- Data collected from sensors is sent via Wi-Fi module (ESP8266/ESP32)
- The cloud database stores real-time and historical data
- Data can be analyzed for trends and optimization

Cloud integration enables remote monitoring and improves scalability of the system.

#### 5. Web/Mobile Application Interface

A user-friendly interface is developed for farmers to monitor and control the system.

Features include:

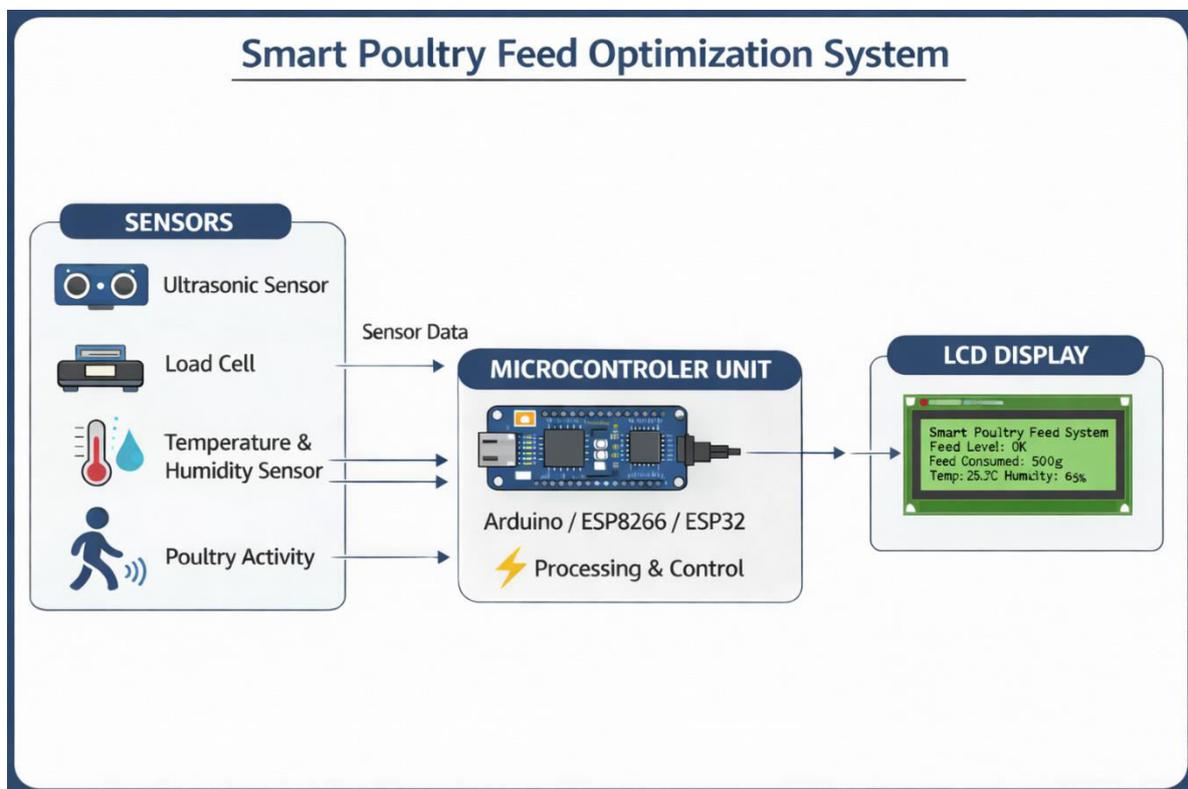
- Real-time feed level monitoring
- Feed consumption reports
- Environmental condition display

- Manual control of feeder
  - Alerts and notifications (low feed, abnormal conditions)
- This interface allows farmers to manage poultry farms efficiently from anywhere.

### 6. Working Principle of the System

1. Sensors continuously collect data from the poultry farm
2. Microcontroller processes the data
3. If feed level is low or feeding time is reached:
  - The feeder is activated automatically
4. Data is transmitted to the cloud
5. Farmers monitor and control the system via application

## IV. EXPERIMENTAL RESULTS



The workflow of the Smart Poultry Feed Optimization System begins with data collection using various sensors installed in the poultry farm. Sensors such as the ultrasonic sensor measure feed levels, the load cell monitors the weight of feed, and temperature and humidity sensors track environmental conditions. Additionally, poultry activity sensors observe the movement and behavior of birds to understand feeding patterns.

- ✓ All the collected data is transmitted to the microcontroller unit (Arduino/ESP8266/ESP32), where it is processed and analyzed in real time. The microcontroller evaluates the sensor inputs to determine the current status of feed availability and environmental conditions.
- ✓ Based on this analysis, the system makes intelligent decisions regarding feed management. It identifies whether the feed level is sufficient, detects abnormal conditions, and ensures that feeding requirements are met efficiently.
- ✓ The processed information is then displayed on the LCD screen, allowing farmers to monitor parameters such as feed level, temperature, humidity, and system status directly. This provides a simple and effective way to observe the system without requiring internet connectivity.

✓ Finally, the system continuously repeats this cycle, ensuring real-time monitoring and efficient feed management. This workflow helps reduce feed wastage, improves poultry health, and enhances overall farm productivity.

## V. CONCLUSION

This research presented a Smart Poultry Feed Optimization System using IoT technology aimed at improving efficiency in poultry farming through automation and real-time monitoring. The proposed system integrates sensors, a microcontroller, an automated feeding mechanism, and cloud-based storage to optimize feed distribution and reduce wastage.

The implementation of the system ensures accurate monitoring of feed levels, poultry activity, and environmental conditions, enabling efficient and timely feeding. By automating the feeding process, the system minimizes manual labor and eliminates common issues such as overfeeding and underfeeding. The integration of a cloud platform and user interface allows farmers to remotely monitor farm conditions, analyze data, and make informed decisions.

The results demonstrate that the system enhances feed utilization, improves poultry health, and increases overall farm productivity. It also provides a scalable and cost-effective solution for modern poultry farming.

Future enhancements may include the integration of artificial intelligence for predictive feeding, advanced data analytics, mobile application improvements, and renewable energy sources such as solar power. These improvements can further increase the efficiency and sustainability of IoT-based poultry management systems.

## REFERENCES

- 1.L. Atzori, A. Iera, and G. Morabito, "The Internet of Things: A Survey," *IEEE Communications Magazine*, vol. 54, no. 15, pp. 2787–2805.
2. S. Wolfert, L. Ge, C. Verdouw, and M. Bogaardt, "Big Data in Smart Farming – A Review," *Agricultural Systems*, vol. 153, pp. 69–80, 2017.
3. A. Kamilaris and F. Prenafeta-Boldú, "Deep Learning in Agriculture: A Survey," *Computers and Electronics in Agriculture*, vol. 147, pp. 70–90, 2018.
4. J. Gubbi, R. Buyya, S. Marusic, and M. Palaniswami, "Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions," *Future Generation Computer Systems*, vol. 29, no. 7, pp. 1645–1660, 2013.
5. P. Sundmaecker, P. Guillemin, P. Friess, and S. Woelfflé, "Vision and Challenges for Realising the Internet of Things," European Commission, 2010.
- 6.A. Rghioui, A. Lloret, J. Parra, and P. Sendra, "A Smart Architecture for Livestock Monitoring Using IoT Technologies," *International Journal of Distributed Sensor Networks*, 2018.
- 7.M. Hasan, M. S. Hossain, and A. Rahman, "IoT-Based Smart Poultry Farm Monitoring System," *International Journal of Scientific and Technology Research*, 2020.



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details