

Poultry Farm Temperature Monitoring System

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Abstract: *In this project, we use a temperature sensor like the DHT11 to measure the internal temperature of the farm. The data goes to an Arduino microcontroller, which checks the readings against set temperature limits. If the temperature gets too high or too low, the Arduino turns the fan or heater on or off automatically to keep conditions ideal. This system reduces the need for manual adjustments, saves time, and creates a healthy environment for the birds. It is straightforward, affordable, and easy to use, making it suitable for small to medium-sized poultry farms. Additionally, the project promotes smart farming by combining basic electronics with automation.*

Keywords: Poultry Farm, Temperature Monitoring, Arduino UNO, DHT11 Sensor, Relay Module, Heating System, Cooling System, Fan Control

I. INTRODUCTION

Poultry farming is a key part of agriculture that provides a steady supply of eggs and meat to meet the growing food demand. Keeping chickens healthy and productive relies on maintaining the right environmental conditions inside the poultry shed. Temperature is the most important factor. If it becomes too hot or too cold, it directly affects the growth, health, and egg production of chickens. Extreme temperatures can also stress or even kill young chicks. In most traditional poultry farms, farmers check and control the temperature by turning heaters and fans on or off as needed. This manual process takes a lot of time and can often be inaccurate. During busy times or at night, farmers might miss sudden temperature changes, which can negatively impact the birds. To make this process more efficient and reliable, we developed the “Poultry Farm Temperature Monitoring System.” The main goal of this project is to keep the temperature inside the poultry shed within a comfortable range automatically. The system uses a DHT11 sensor to measure the ambient temperature in real time. The sensor sends the data to an Arduino microcontroller, which acts as the system's control unit. Based on the temperature readings, the microcontroller decides whether to turn on the fan or the light. If the temperature falls below 25°C, the system automatically turns on the light bulb to warm the chickens. The bulb stays on until the temperature rises above this lower limit. When the temperature goes above 35°C, the system turns on the exhaust fan to cool the poultry shed. Once the temperature returns to normal, the fan or light switches off automatically. This automated system helps maintain a stable temperature in the poultry shed without needing manual intervention. It also saves energy by running the fan and lights only when needed. Moreover, it protects chickens from sudden temperature changes, leading to better growth and productivity. Upgraded versions can include IoT connectivity, allowing farmers to check the temperature and system status remotely with their mobile phones. The benefits of this project include its low cost, simplicity, and efficiency. It is easy to set up using basic parts like an Arduino, sensors, a fan, and a bulb. The system can be installed in small to medium-sized poultry farms to automatically manage the environment, reducing the need for constant supervision. It also shows how automation can enhance traditional farming. Furthermore, this idea can be applied beyond poultry farms. With some minor changes, it can be used in greenhouses, dairy farms, or warehouses, where controlling temperature is also essential. This shows that such a system has many practical uses in agriculture and environmental monitoring.



II. LITERATURE SURVEY

Enriko et al. (2021) created an automatic temperature control system for poultry farms using a PID-based microcontroller setup. The system effectively kept the broiler comfort temperature range and demonstrated precise control of heating and cooling devices. The main challenge was adjusting the PID parameters, which requires technical skill.

Susanto et al. (2023) developed a microcontroller-based temperature and humidity monitoring system that uses a DHT11 sensor and relays to control fans and heaters. The system was cost-effective and easy to implement, providing reliable automatic control without needing constant human oversight. However, it had limitations in scalability and historical data logging.

Olaniyan et al. proposed a similar system using Arduino to monitor temperature and humidity in a prototype poultry house. The system was simple, reliable, and low-cost, but it only controlled temperature and required manual checks for other environmental factors.

Santosa and Nugraha (2025) designed a system that connects DHT11 sensors to an Arduino, which automatically switches fans or heaters based on temperature readings. The system made farm management easier but was restricted by the number of sensors and areas it could monitor.

Pratama et al. (2024) presented a PID-controlled system for broiler houses. Their study showed the system's high performance and accurate temperature control; however, programming complexity and PID tuning were limitations for less experienced users.

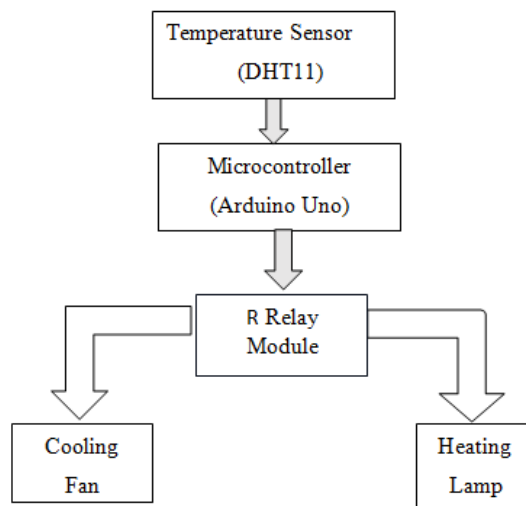
Soelistianto et al. (2022/23) built a simple microcontroller system for automatically controlling fans and heaters in a broiler farm. This system was easy to install and effectively maintained a safe temperature range, but it lacked data logging and the ability to monitor multiple areas.

Kale et al. (2024) suggested a system that uses multiple sensors to enable more thorough environmental monitoring. This brought better performance by checking many points simultaneously, but it required more complex wiring and slightly higher costs. Fauzi Ishak et al. focused on improving laying hen productivity with a temperature-controlled cage system. Their offline system kept a stable environment but had limited automation and only monitored a single area.

Gamare et al. (2023) developed a temperature monitoring and control system based on Arduino. It was low-cost, easy to use, and reliable for small farms but lacked data display and logging.

Paputungan et al. (2020) implemented a similar offline system that showed moderate performance in controlling temperature, but it restricted itself to monitoring one environmental factor.

III. PROPOSED METHODOLOGY



The proposed system seeks to create a reliable method for automatically monitoring and controlling temperature and humidity in a poultry farm using IoT technology. The main goal is to reduce manual work and keep a comfortable environment for the birds at all times. The system centers around a microcontroller like the Arduino Uno. This device continuously reads data from environmental sensors such as the DHT11. These sensors track both temperature and humidity levels inside the poultry house. The microcontroller processes the collected data. If the temperature or humidity goes beyond set limits, the system activates the control devices automatically. For instance:

- When the temperature gets too high, the exhaust fan or cooling system turns on.
- When it gets too cold, the heater or bulb turns on to raise the temperature.
- This allows farmers to check the farm's conditions anytime and from anywhere. The proposed system follows these main steps:

1. The DHT11 sensor continuously measures temperature and humidity.
2. The Arduino processes the sensor data and compares it to predefined threshold values.
3. The fan or heater automatically turns on or off based on temperature levels.

This approach ensures real-time monitoring of the poultry environment, reduces human error, and maintains optimal conditions to support better growth and productivity of the birds.

IV. RESULT AND DISCUSSION

After completing and testing the Poultry Farm Temperature Monitoring System, the results were very encouraging. The setup functioned as expected; it was able to sense, display, and control the temperature and humidity levels inside the poultry area in real time. When the temperature inside the cage became too high, the fan automatically turned on to cool the environment. Similarly, when the temperature dropped below the set limit, the heater switched on to keep the chickens warm. This automatic response helped maintain the temperature within the ideal range for healthy poultry growth. The readings from the DHT11 sensor were compared with those from a standard digital thermometer, and the difference was minimal, usually within 1 °C.. This made it easy to monitor the farm remotely without needing to be physically present all the time. From observation, the birds stayed more active and comfortable when the system kept the optimal temperature. This also reduced the need for constant manual monitoring, saving time and effort for the farmer. The system operated reliably, used less power, and responded quickly to temperature changes. It can easily be expanded to include more sensors or additional features, such as air quality monitoring or automatic feeding, in the future.

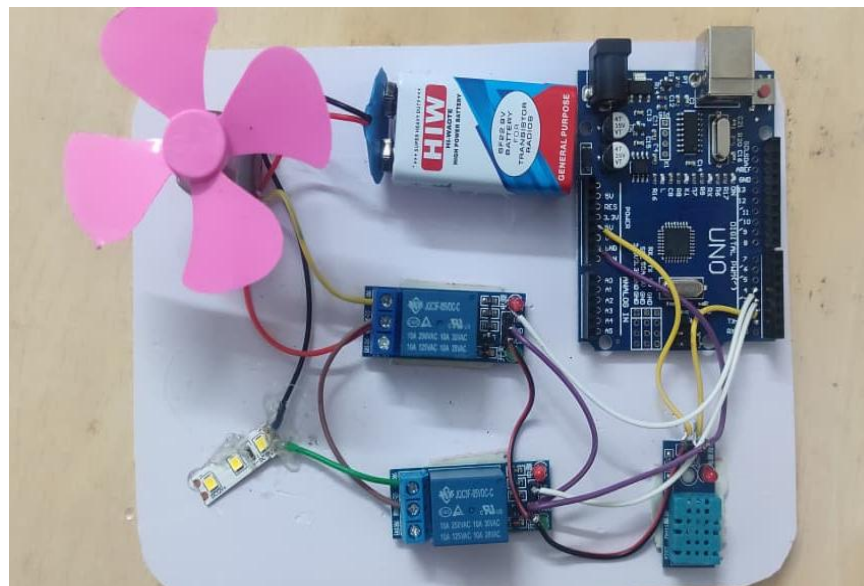


FIG1: OUTPUT RESULTS



V. CONCLUSION

The Poultry Farm Temperature Monitoring System provides an efficient and reliable way to keep the environment in poultry houses at the right conditions. It continuously measures temperature and humidity with sensors like the DHT11 and uses microcontrollers such as Arduino. This design helps maintain a comfortable zone for poultry without needing constant manual checks. This system boosts bird health and growth performance while also lowering mortality rates and energy use. It allows for smart control of fans, heaters, and ventilation systems. With wireless, cloud-based data monitoring, farmers can access real-time information from anywhere, which helps them make better decisions and work more efficiently.

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