COST-EFFICIENT THERMAL REGULATION SYSTEM TO ENHANCE PRODUCTIVITY IN POULTRY FARMS

DOMAIN : INTERNET OF THINGS

Sri Venkateswara College of Engineering

SVCE IQAC Consciousness for Quality

Department of Information Technology

ABSTRACT

•**Advanced Farm Management Integration**:
Implements IoT an machine learning for optimized poultry farming operations.

•**Innovative Technology Stack**: Includes ESP32 microcontroller, DHT22 sensor, and 4-channel relay module for comprehensive environmental monitoring and device control.

•**Enhanced Efficiency and Productivity**: Predicts temperature trends using a Random Forest regression model for proactive adjustments, ensuring optimal conditions and reducing manual labor.

INTRODUCTION

- IoT-based poultry farm monitoring automates environmental observation, regulation, and analysis using interconnected sensors, microcontrollers, actuators, and cloud platforms.
- These systems monitor conditions like temperature, humidity, and air quality in real time, triggering actions like activating fans or heaters based on preset thresholds.
- They enable remote monitoring and control via mobile and web-based dashboards, improving efficiency, reducing manual intervention, and enhancing overall farm productivity and animal welfare.

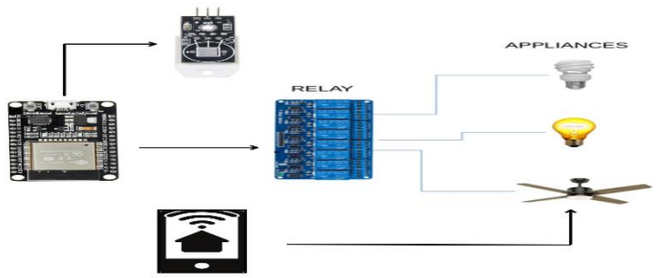
EXISTING WORK

- Manual Monitoring and Control
- Lack of Automation and Integration
- Limited Predictive Capabilities
- Scalability

PROPOSED WORK

- **Automated Monitoring and Control:** Utilizes IoT, cloud platforms, and machine learning (Random Forest algorithms) to automate and streamline the monitoring of environmental parameters crucial for poultry health and productivity.
- **Real-time Data Transmission and Analysis:** Continuous data collection from sensors (ESP32 and DHT22) transmitted to cloud platforms (e.g., ThingSpeak), enabling real-time monitoring and remote access via smartphones or web interfaces. Automated equipment control.
- **Predictive Analytics for Enhanced Efficiency:** Incorporates machine learning for predictive analytics, specifically using Random Forest algorithms to forecast future temperature trends. This capability supports proactive environmental adjustments, optimizing energy consumption and improving overall farm efficiency

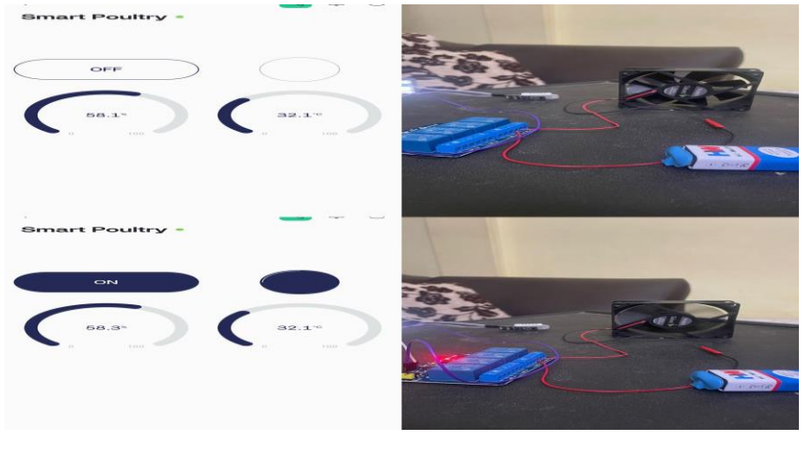
ARCHITECTURE DIAGRAM



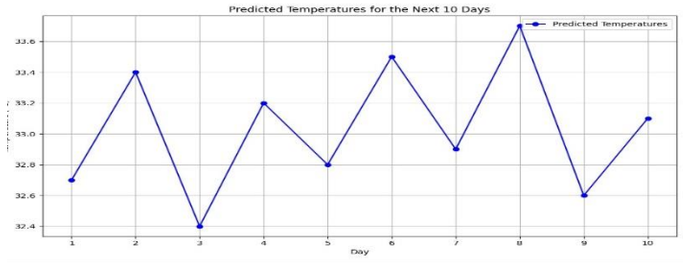
MODULE DESCRIPTION

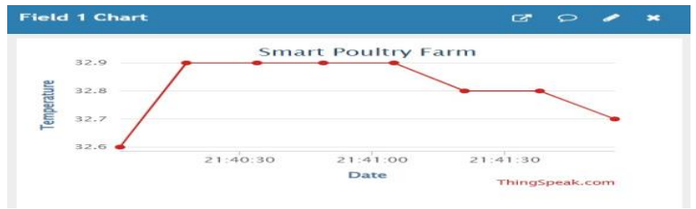
- ESP32 Microcontroller Module
- DHT22 Temperature and Humidity Sensor Module
- Cloud Platforms (e.g., ThingSpeak)
- Relay Module for Equipment Control
- Machine Learning (Random Forest Algorithms)
- Mobile Application Interface
- Web Interface for Monitoring
- Alarm Systems Integration
- Data Logging and Analytics Platform
- Power Management Module
- Security System Integration
- User Authentication Module
- Remote Firmware Update Module
- Error Handling and Logging Module

RESULTS



PERFORMANCE EVALUATION





CONCLUSION AND FUTURE WORK

- The system integrates IoT, cloud platforms, and machine learning for automated poultry farm monitoring and control, enhancing efficiency and animal welfare.
- Future plans include expanding sensor capabilities, enhancing system security, and refining predictive models for optimized farm management and productivity.
- Explore the integration of advanced data analytics techniques to further analyze and optimize poultry farm operations, potentially including AI-driven decision support systems for real-time insights.

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