Proposal

The Internet of Things

Instructor: DR. TRAN NGOC HOANG

Case study

IoT-Based Chicken Egg Incubator

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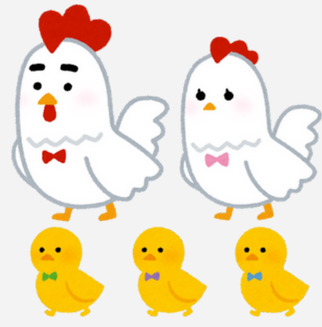

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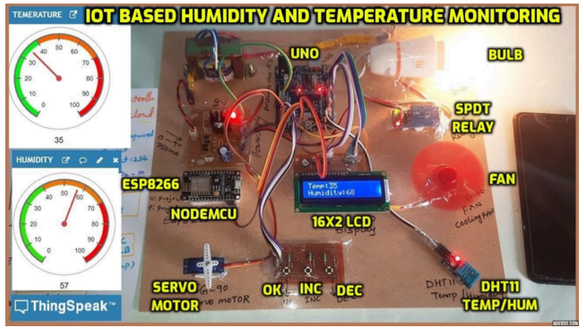

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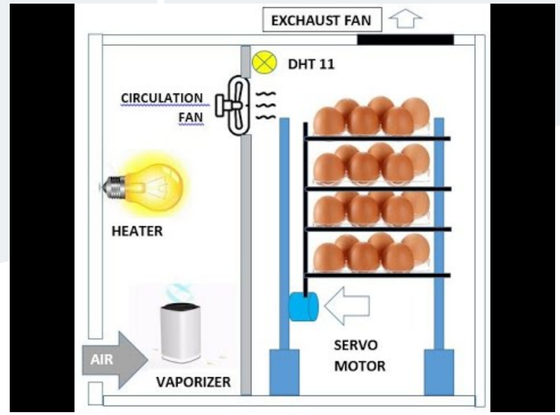
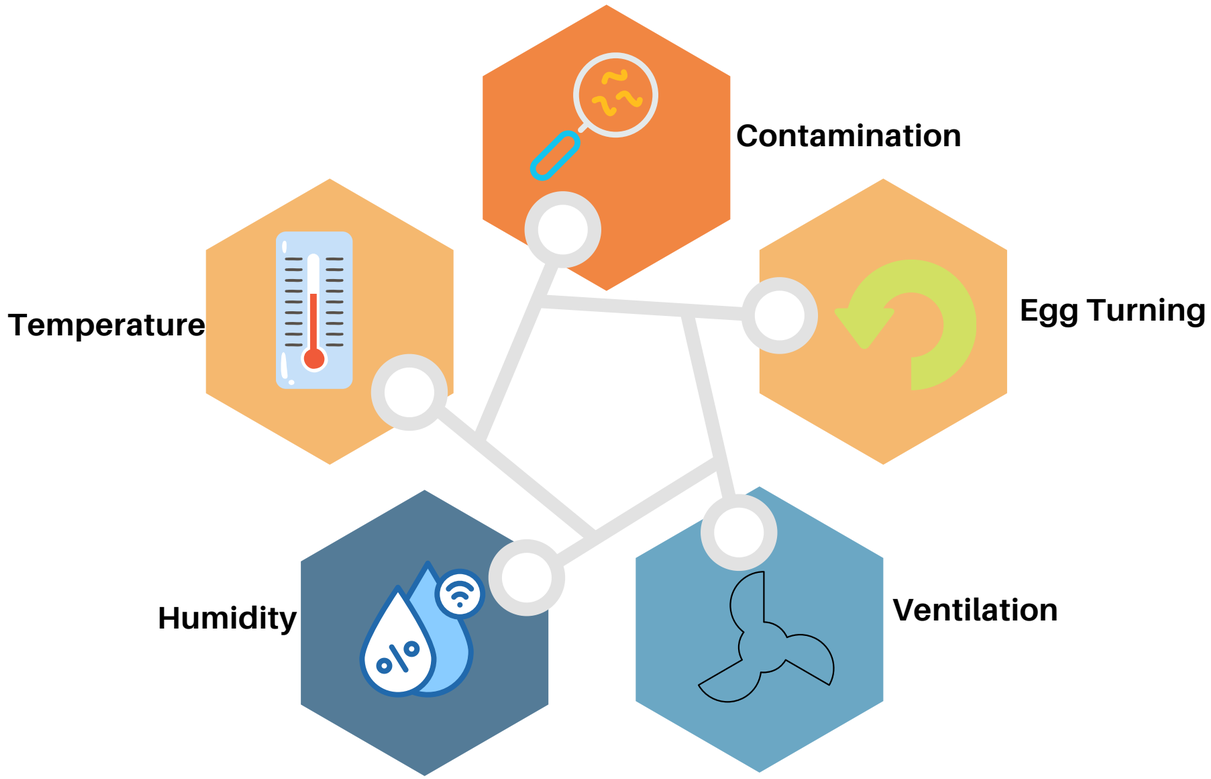


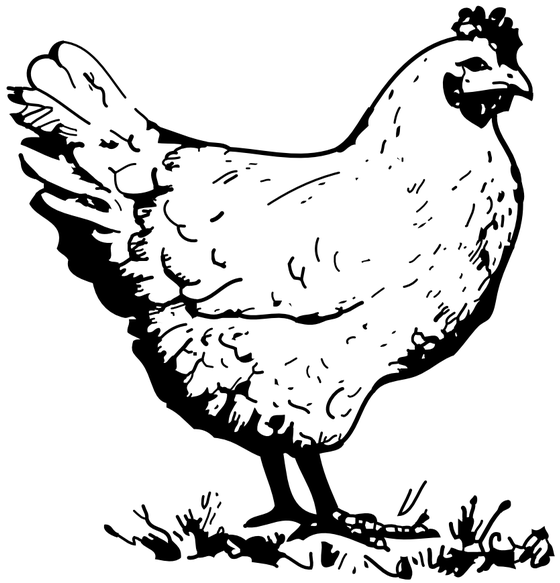
All brief step of a proposal

Step 1: Introduction

Project Background:

The incubation of chicken eggs is a delicate process that requires precise control over temperature, humidity, and periodic movement of the eggs to ensure successful hatching. Traditional incubators often require manual monitoring and adjustments, which can be labor-intensive and error-prone.





Step 1: Introduction

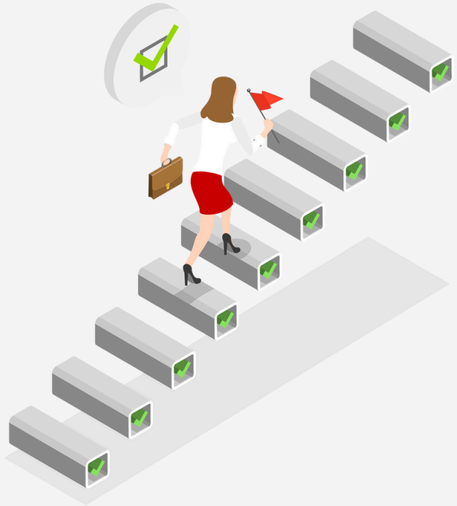
Objective:

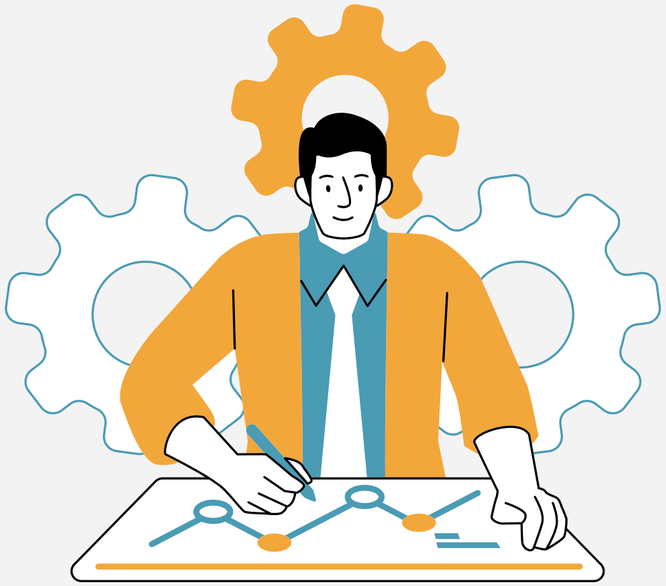
This project aims to develop a smart, automated chicken egg incubator using IoT technology. The system will monitor and control temperature and humidity, manage egg rotation, and store data in a MySQL database for analysis.

Step 2: Problem Statement

Challenges in Manual Incubation: Manual control of egg incubators requires constant monitoring and adjustments, leading to inefficiencies and a higher risk of failure.

Need for Automation: An automated system can ensure consistent environmental conditions, reduce human error, and increase the likelihood of successful hatching.





Step 3: Project Objectives

• Temperature and Humidity Monitoring: Use a DHT11 sensor to continuously monitor the temperature and humidity inside the incubator.

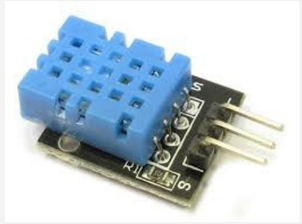
• Data Logging: Store the temperature and humidity data in a MySQL database for real-time monitoring and future analysis.

• Temperature Control: Implement a relay-controlled heating element (e.g., light bulb) to maintain a stable temperature.

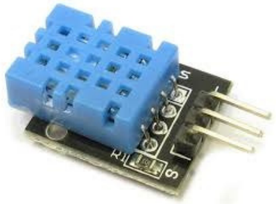
• Cooling System: Use a fan to reduce the temperature if it exceeds a predefined threshold.

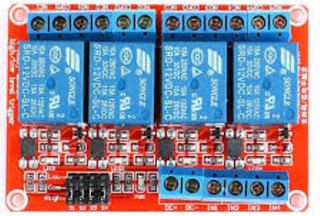
• Egg Tray Rotation: Design a mechanism to periodically rotate the egg tray to ensure even heating and development.

• User Interface: Develop a web-based interface for monitoring and controlling the incubator remotely.



Step 4: System Architecture





- Hardware Components:
  - DHT11 Sensor: For measuring temperature and humidity.
  - Relay Module: To control the heating element (light bulb).
  - Fan: For cooling the incubator when necessary.
  - Motor/Servo: To rotate the egg tray.
  - Raspberry Pi: As the central controller for processing sensor data and controlling actuators.

- Software Components:
  - Flask Web Server: For creating the web-based interface.
  - MySQL Database: For storing sensor data and system logs.

Python Scripts: For sensor data acquisition, control algorithms, and database interaction.

MySQL

python

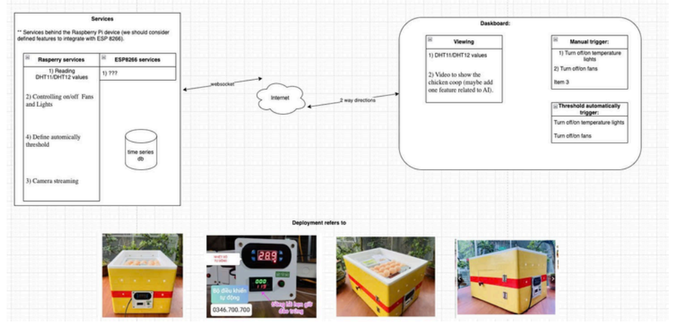
Flask
web development,
one drop at a time

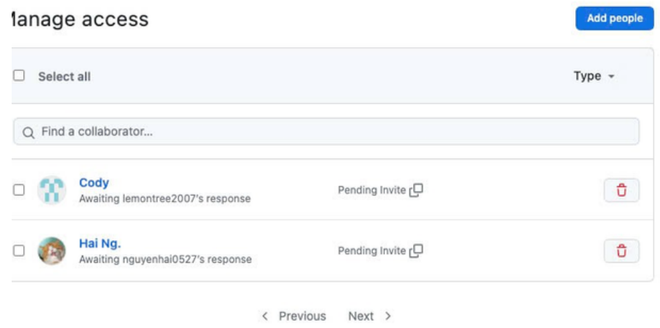
Step 5: Methodology

ID	Task	Member
	System Design and Research (Day 1-2)	
	Task 1: Literature Review - Research existing solutions, best practices, and relevant IoT technologies	All member
	Task 2: Component Identification - Identify and select suitable hardware components (sensors, relays, motors, etc.)	Thinh
	Task 3: Software Tools Selection - Decide on programming languages, frameworks, and databases (e.g., Python, Flask, MySQL)	All member
	Hardware Setup and Sensor Integration (Day 3-5)	
	Task 4: Circuit Design and Layout - Design the circuit layout and ensure all components are correctly placed	Thinh
	Task 5: Sensor Calibration and Testing - Integrate the DHT11 sensor with the Raspberry Pi and test for accuracy	Hải
	Task 6: Relay and Actuator Integration - Connect the relay module to the heating element, fan, and motor, and test functionality	Lộc

Step 5: Methodology

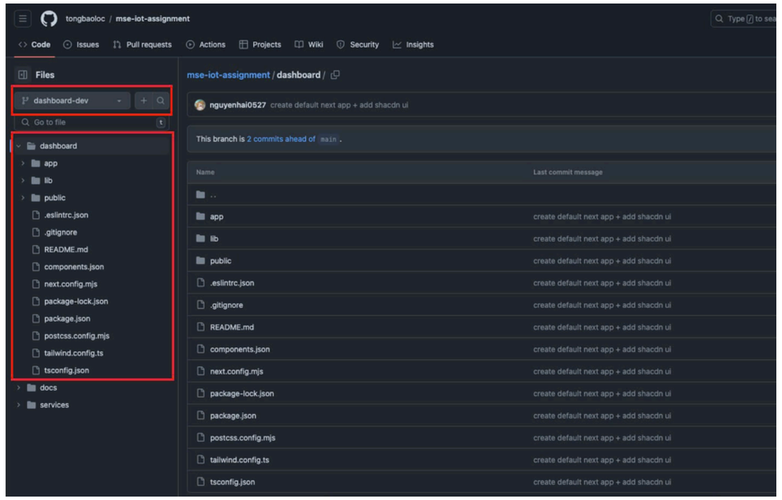
Development of Control Algorithms and Database Schema (Day 6-8)	
Task 7: Algorithm Development - Develop algorithms to maintain temperature and humidity, and to control egg tray rotation	Võ
Task 8: Database Schema Design - Design the MySQL database schema for logging temperature, humidity, and system states	Võ
Task 9: Python Script Development - Write Python scripts for data acquisition, control logic, and database interaction	Lộc
Web Interface Development and System Integration (Day 9-11)	
Task 10: Front-end Development - Develop a user-friendly web interface using HTML, CSS, and JavaScript	Hải
Task 11: Backend Development - Develop Flask-based APIs to interact with the hardware and database	Trí
Task 12: System Integration - Integrate the hardware, control algorithms, and web interface into a cohesive system	All member

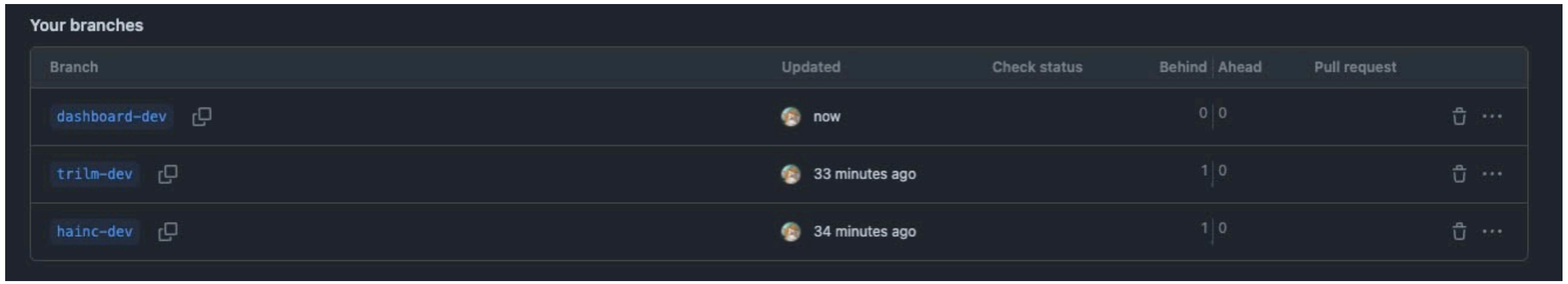




Step 5: Methodology

Testing and Validation (Day 12)	
Task 13: System Testing - Conduct end-to-end testing of the system in a controlled environment, identifying and fixing any issues	All member
Task 14: Performance Tuning - Refine the control algorithms and database operations for optimal performance	All member
Final Deployment and Report Writing (Day 13)	
Task 15: Deployment - Deploy the system and ensure it runs reliably in the target environment	Thinh
Task 16: Documentation - Prepare detailed documentation, including user guides, system architecture, and maintenance procedures	All member
Task 17: Final Report Writing - Compile the final project report, summarizing the objectives, methods, results, and conclusions	All member



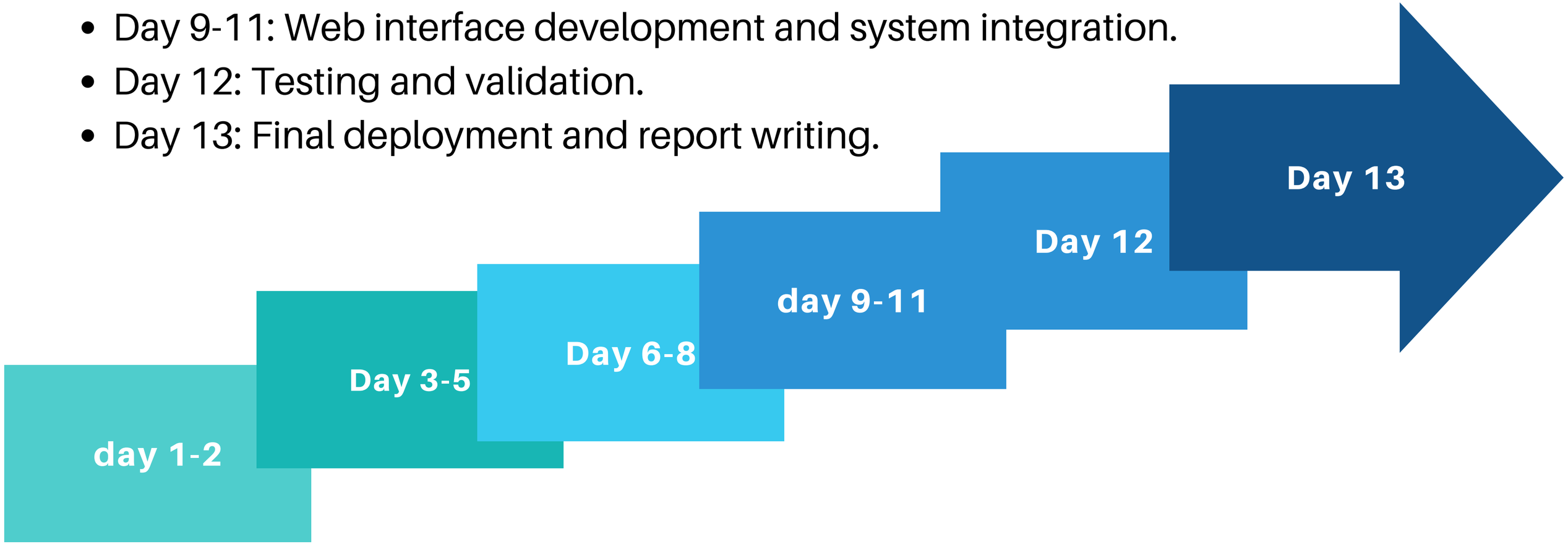


Step 6: Expected Outcomes

- Automated Control: A fully automated egg incubator that maintains optimal conditions for hatching.
- Data Analysis: Historical data available for analysis to improve the incubation process.
- Remote Monitoring: Ability to monitor and control the incubator remotely through a web interface.

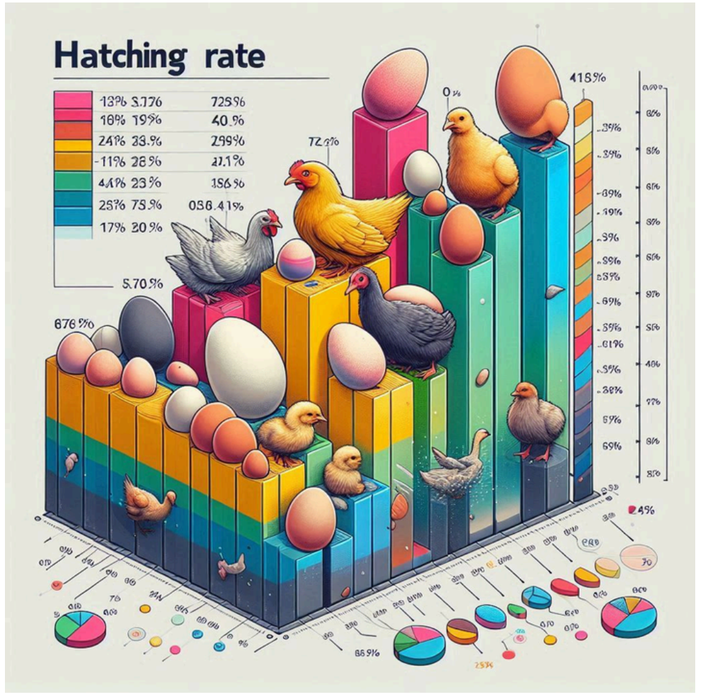
Step 7: Timeline

- Day 1-2: Research and component selection.
- Day 3-5: Hardware setup and sensor integration.
- Day 6-8: Development of control algorithms and database schema.
- Day 9-11: Web interface development and system integration.
- Day 12: Testing and validation.
- Day 13: Final deployment and report writing.



Step 8: Conclusion

This project will demonstrate the practical application of IoT in automating an egg incubation process, ensuring better hatching rates, reducing manual intervention, and providing valuable data for further optimization.



Step 9: References

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Thank you!

IoT-Based Chicken Egg Incubator will be comming soon!