



TelurTrack: An Android Based Mobile Application for Monitoring Egg Production

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Abstract. *The development of information and communication technology has brought significant changes to various sectors, including livestock. This research aims to design and develop TelurTrack, an Android-based mobile application for monitoring egg production in layer poultry farming. The application was developed using Android Studio with the Java programming language and utilizes Firebase for secure database management. The system features daily data recording, feed stock monitoring, chicken health tracking, and environmental monitoring integrated with the OpenWeather API. Furthermore, an Artificial Intelligence (AI) assistant utilizing the Groq API (Llama-3.1-8b-instant model) is implemented to provide automated analysis and recommendations based on production metrics and weather conditions. The application was tested on two different smartphones to evaluate its performance, demonstrating stable results with no crashes. The implementation of TelurTrack effectively digitalizes the manual recording process, making the management of layer poultry farming more efficient, structured, and secure.*

Keywords: Android Application; Egg Production; Feed Conversion Ratio; Firebase; Poultry Farming

1. Introduction

Current advancements in information and communication technology have significantly impacted the agricultural and livestock sectors (Sahid & Beeh, 2022). Layer poultry farming is a crucial business for fulfilling the community's need for animal protein. In daily operations, farmers must perform activities such as recording egg production, monitoring cage conditions, controlling chicken health, and managing feed and water stocks. However, many farmers still rely on manual data recording methods using logbooks, which leads to inefficiencies in analyzing production outcomes and data loss risks (Wijaya & Kusuma, 2020).

To address these issues, "TelurTrack" was developed as an Android-based egg production monitoring application. The application is designed to assist farmers in digitally recording production data, monitoring cage conditions, tracking chicken health, and viewing historical production logs through mobile and IoT concepts (Archana & Uma, 2018; Pratama & Wibowo, 2022). The system also provides simple analytics and notifications to aid farmers in making informed decisions. The primary goal of this research is to design an application that reduces reliance on manual recording, thereby increasing the effectiveness and efficiency of poultry farm management (Karun & Sharma, 2020).

2. Methods

The application is designed for a single-user environment, specifically the farm owner, ensuring that all data is managed centrally without the need for a separate administrator system.

2.1. System Requirements and Tools

The software development utilized several key tools:

- Android Studio was used as the Integrated Development Environment (IDE) to build the application and write the Java programming code.
- Figma was used to design the User Interface (UI) before implementation.
- Google's Firebase was employed as the Backend as a Service (BaaS).
- Firebase Authentication was utilized for user login processes.
- Firebase Realtime Database was used to store user profiles, production data, cage conditions, and notifications securely in the cloud, as demonstrated in similar poultry farm monitoring studies (Mulyadi & Rahman, 2020).

2.2. Development Stages

The system development followed a structured approach including needs analysis, UI design, layout creation, and database integration. The overall system design is represented through a flowchart and use case diagram as follows:

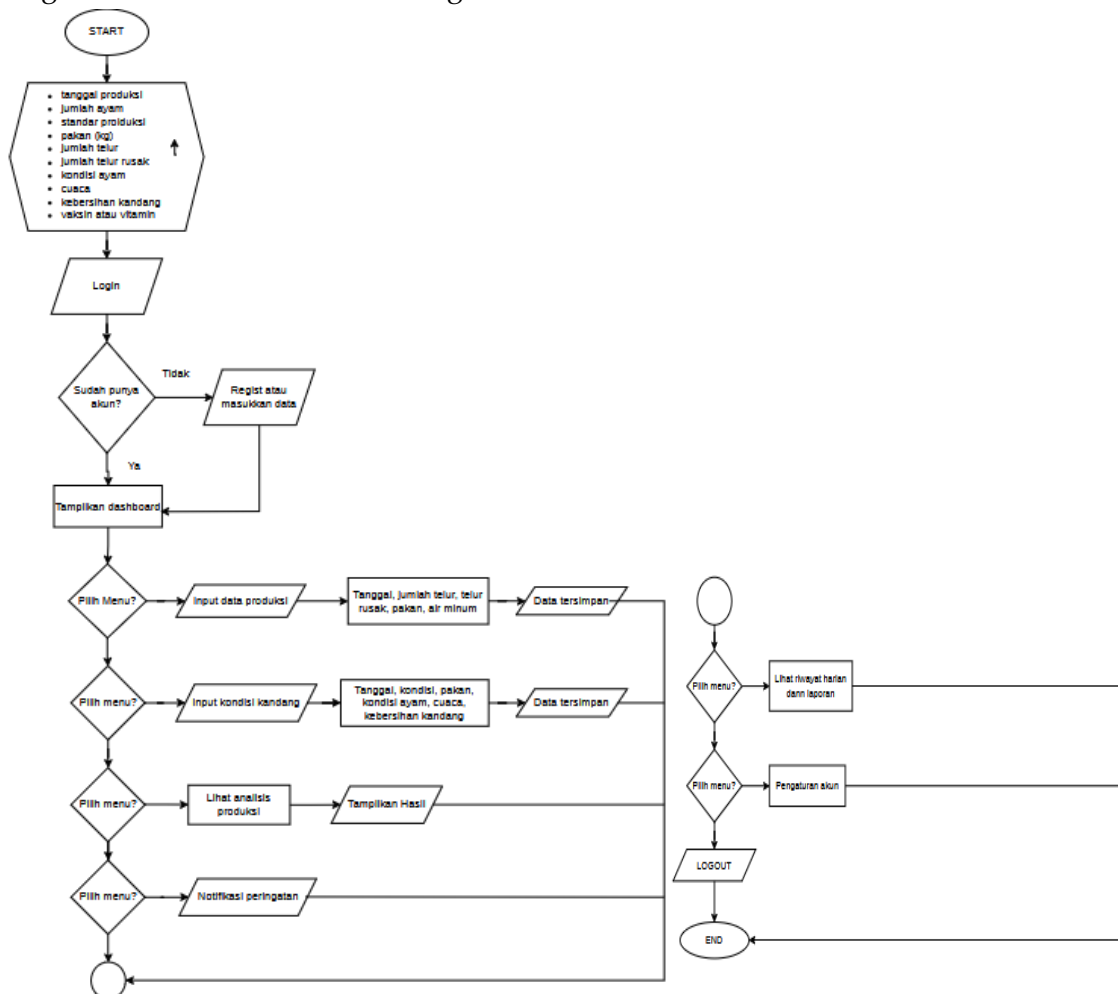


Figure 1. System Flowchart of TelurTrack, illustrating the logical flow of user interactions.

USE CASE DIAGRAM – APLIKASI TELURTRACK (PETERNAK)

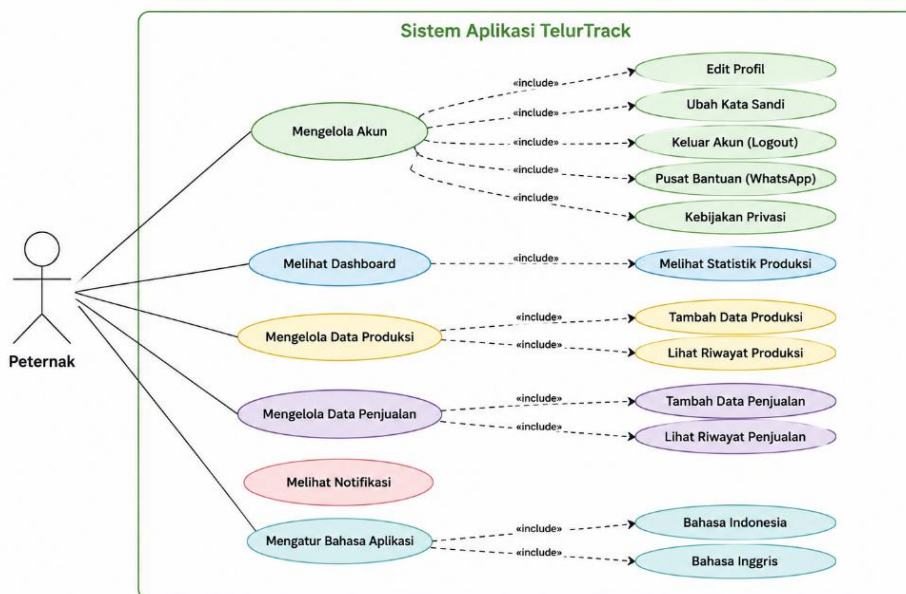


Figure 2. Use Case Diagram demonstrating the farm owner's interaction with the system.

3. Results and Discussion

3.1. Application Implementation

The TelurTrack application features several key interfaces designed to facilitate farm management. Automated lighting, heating, and environmental monitoring concepts similar to Goswami et al. (2021) and Mahale & Sonavane (2016) were taken into consideration for dashboard metrics:

- **Dashboard:** Serves as the main page displaying critical information such as total good eggs, damaged eggs, feed stock, and the number of sick chickens. It visualizes the Feed Conversion Ratio (FCR) trend over the last seven days and integrates the OpenWeather API for thermal stress warnings (Amaral et al., 2024; Siregar & Setiawan, 2021).
- **Production and Cage Condition Input:** Allows users to record daily yields and cage cleanliness, chicken health, weather conditions, and notes.
- **AI Assistant Integration:** The application integrates the Groq API using the Llama-3.1-8b-instant model to provide an AI Assistant feature for automated evaluations.
- **Notifications and History:** Generates notifications for critical events, such as low feed stock or detected sick chickens, providing a log filtering option.

3.2. Performance Testing

The application was tested on two different smartphone devices to evaluate performance and responsiveness:

Table 1. Application Performance Test Results

Test Aspect	Hp 1 (High Spec)	Hp 2 (Low Spec)
Application Launch Time	2.1 seconds	3.8 seconds
Login Process	1.3 seconds	2.4 seconds
Stability & Responsiveness	Stable, no crashes, very fast response	Stable, no crashes, slight delay

Conclusions

The TelurTrack application has been successfully designed and implemented as an Android-based egg production monitoring system for single-user farm management. By utilizing Android Studio, Java, and Firebase, the application provides a reliable platform for digital data recording, real-time weather monitoring, and AI-driven analytics. TelurTrack effectively resolves the issues associated with manual data recording, making poultry farm management more structured, secure, and efficient.

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Conflicts of Interest

The authors declare no conflict of interest.

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