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Development of a Digital Farm Management Portal for Implementing Biosecurity in Pig and Poultry Farms

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Abstract: *This project aims to develop a digital farm management portal for implementing biosecurity in pig and poultry farms. The main objective is to manage biosecurity and control the farm system effectively through a mobile and web application. By conducting a survey, it was found that many farmers face problems in farm management. Most farmers use paper records to store data of pigs and poultry, which is difficult to manage. Also, farmers do not have proper knowledge of biosecurity, due to which pig and poultry farms are at high risk of disease outbreaks. To solve these problems, a user-friendly digital farm management system is developed. This system can be accessed from anywhere and helps farmers to handle farm activities easily. It also helps in implementing effective biosecurity practices for disease prevention.*

The system integrates IoT-based real-time monitoring and risk assessment to provide instant alerts. It also helps in data-driven decision making to improve farm productivity and animal health. The results show that farmers can use this application to store all records digitally. Farm owners can also use an inventory management system to track used and remaining stock. The reports section provides useful insights such as profit and loss. In conclusion, this digital system is helpful for farmers and improves the implementation of biosecurity in pig and poultry farms.

Keywords: *digital farm management*.

I. INTRODUCTION

Agriculture plays an important role in the economy and daily life. Pig and poultry farming are important parts of agriculture. Many farmers depend on these as a side business. These farms are mainly used for meat and egg production, and many people consume these products, so they are very important. It is necessary to maintain farms in a clean and hygienic condition and to follow proper biosecurity rules. If biosecurity is not maintained, animals can get infected, and humans who consume these animals may fall ill. Diseases and viruses can spread easily, for example, swine flu. Therefore, maintaining biosecurity in pig and poultry farms is very important.

Based on research, the current situation shows that many farmers maintain paper records. These records can be lost or damaged and are difficult to manage. Farmers also face problems in tracking farm activities such as entry and exit of people. In addition, many farmers do not have proper knowledge of biosecurity practices. Due to this, diseases spread very quickly. If one animal gets infected, it can spread to all animals in a short time. To solve these problems, this project proposes the development of a user-friendly digital farm management system. This system is designed as a mobile and web application that helps farmers to manage farm activities easily. It helps in reducing disease spread and improves overall farm management. This system is needed to maintain digital records, store biosecurity checklists, and

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manage farm data anytime and anywhere. The system includes different features such as alerts, compliance, reports, home, and livestock management. The home screen shows all alerts, the compliance tab provides biosecurity rules and instructions for farmers, and the reports tab shows data in graphical representation.

II. LITERATURE SURVEY

Many researchers and companies have worked on improving livestock farming using modern technologies. One such well-known company is Big Dutchman, which focuses on providing innovative and sustainable solutions for pig and poultry farming. Big Dutchman was founded in 1938 in the USA and started with the invention of an automatic poultry feeding system. Over the years, the company expanded globally and developed advanced equipment and infrastructure for large-scale livestock farming. In Asia, the company started its operations in 1992 and has grown significantly by providing modern farming technologies. The company mainly focuses on automation, efficient farm management, and improving productivity in livestock farming. Their systems help farmers in feeding, housing, and managing animals more effectively. They also provide solutions that support large-scale commercial farming with better efficiency and performance. Therefore, there is a need to develop a simple and user-friendly digital farm management portal that focuses on biosecurity, real-time monitoring, and easy data management. This project aims to provide a practical solution that can be easily used by farmers to improve farm management and disease prevention.

According to Vougat Ngom et al. (2025), biosecurity plays a key role in controlling disease spread in poultry farms. Modern poultry systems have a large number of birds, which increases the risk of disease outbreaks. The study shows that biosecurity implementation is moderate and varies across farms, with many farms following only basic practices like cleaning and disinfection. The research also highlights that most studies focus on large-scale farms, while small and medium farms are often neglected. In addition, biosecurity is commonly used as a reactive approach rather than a preventive system. Therefore, there is a need for a digital system that supports real-time monitoring, proper data management, and effective implementation of biosecurity practices. This project aims to develop a user-friendly digital farm management portal to improve disease prevention and farm efficiency.

Another study by Kuppireddy Divya et al. (2025) highlights the importance of biosecurity measures in pig farming. The study explains that biosecurity plays a major role in preventing diseases such as African swine fever and respiratory infections, which can cause heavy economic losses to farmers. The research shows that proper biosecurity practices like visitor control, transportation hygiene, quarantine of new animals, and cleaning and disinfection are essential to reduce disease spread. It also explains the difference between external biosecurity (preventing disease entry) and internal biosecurity (controlling disease spread within the farm). The study also highlights that poor biosecurity can lead to major financial losses, reduced productivity, and increased mortality in pigs. In many cases, disease outbreaks have caused serious damage to pig farming businesses. In addition, modern technologies such as sensors, smart feeding systems, and RFID tags are being used for real-time monitoring and better farm management. These technologies help in early disease detection and improve overall efficiency. However, implementing proper biosecurity in all farms is still a challenge, especially in small and medium farms. There is a need for a simple and user-friendly digital system that can help farmers in maintaining biosecurity and monitoring farm activities effectively. Therefore, this project focuses on developing a digital farm management system that supports biosecurity practices, real-time monitoring, and easy data handling for farmers.

III. METHODOLOGY

The methodology of this project is based on developing a digital farm management system using a user-friendly approach. The requirements were collected by understanding the problems faced by farmers in managing pig and poultry farms. The system starts with user registration and login. After login, the user is directed to the main dashboard (home screen), which contains five tabs: Home, Alerts, Livestock, Compliance, and Reports.

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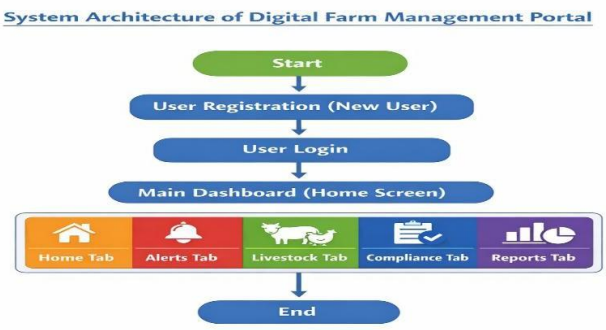
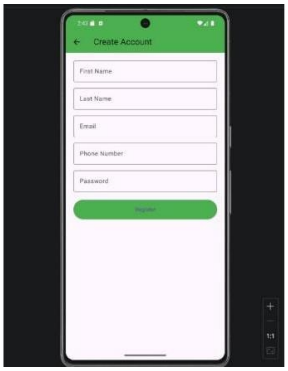


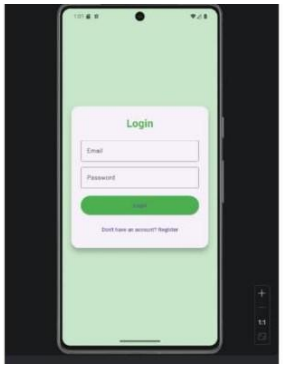
Above figure shows the system work i.e work How actually system works. In the development of a digital farm management portal implementing biosecurity in pig and poultry farms . user start this application will get a first page i.e Home page. In that user

1. Register:



The first step is user registration, where new users create an account by entering basic details.

2. Login:



After that, the user completed the basic information, then started using this application, they started the login, stored information, and then opened the main window home page.

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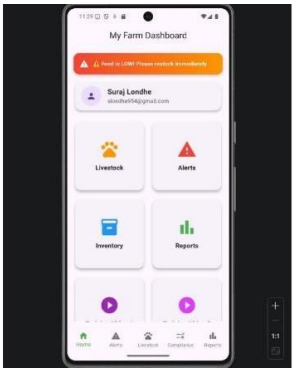
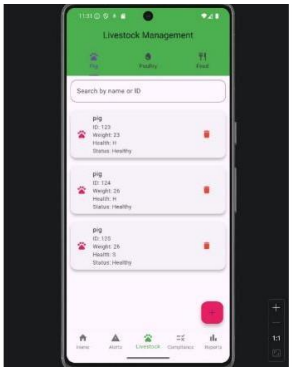
3. Home page



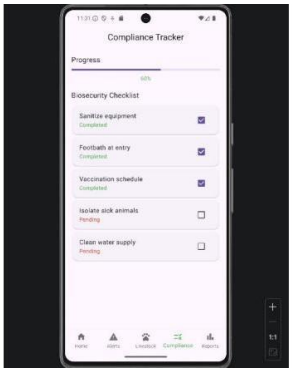
The open displays the homepage and bottom tabs. The home page shows the alerts training session and about that biosecurity rules

4. Livestock



The livestock tab is responsible for keeping track of pigs, poultry, and feed information. The purpose of this is to update, delete, and add new animals. If the feed is low, then a notification will show on the home page tab.

5. Compliance



The compliance tab shows what to do each day, adding new activities each day. Show this activity in a graphic representation; this helps the user remember the task.

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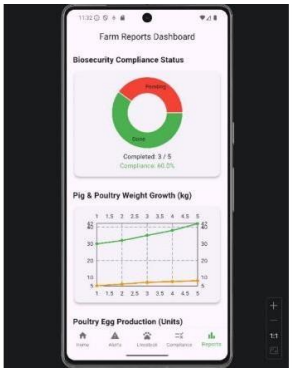
6. Reports



A quick overview of farm performance and management is provided by the Reports tab. The distribution of overall farm expenses, profit and loss, and pending biosecurity tasks are shown. To improve monitoring and decision-making, it tracks the weight and health status of pigs.

IV. DISCUSSION

The developed system provides a practical solution for managing pig and poultry farms using digital technology. It helps farmers maintain records, follow biosecurity practices, and monitor farm activities more efficiently compared to traditional paper-based methods.

The use of features like alerts, reports, and livestock management improves decision-making and reduces the risk of disease outbreaks. However, the system may face challenges such as limited technical knowledge of farmers and internet connectivity issues in rural areas. Overall, the system shows that digital tools can significantly improve farm management and biosecurity implementation, but further improvements and adoption are needed for better results

V. TECHNOLOGY STACK

- Programming Languages :- Dart
- Framework :- Flutter
- Backend :- Firebase
- Database :- Cloud Firestore
- Cloud Services :- AWS, Firebase
- Tools :- Vs code, GitHub

VI. FUTURE SCOPE

Future improvements include:

- Integration of AI for disease prediction and smart analytics.
- Expansion to other livestock farms such as dairy and sheep.
- Advanced dashboard with graphical reports and insights.
- Ofline mode and scalability for large-scale farm usage.

VII. CONCLUSION

This project presents a digital farm management system for pig and poultry farms to improve biosecurity and farm management. The system helps farmers to store data digitally, monitor farm activities, and follow biosecurity practices effectively.

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By using this system, farmers can reduce disease risks, improve productivity, and make better decisions through reports and alerts. Overall, this digital solution provides an easy and efficient way to manage farms and supports better animal health and farm performance.

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