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Agri Lease Hub

Amtul Shanaz[1],E Divyasri[2], K Mamatha[3],Ch Navya[4]

[1]Assistant Professor; Department Of Computer Science And Engineering, Bhoj Reddy Engineering College For Women, Hyderabad, India.

[2,3,4]B.Tech Students; Department Of Computer Science And Engineering, Bhoj Reddy Engineering College For Women, Hyderabad, India.

Mail Id; amtulshanaz@gmail.com[1],erladivyasri7@gmail.com[2],kunurumamatha70@gmail.com[3], chithalurinavya16@gmail.com[4]

Abstract

Agri Lease Hub is a smart mobile-based application designed to help farmers rent and lease agricultural equipment in an easy, affordable, and efficient manner. The system bridges the gap between equipment owners and farmers by providing a centralized digital platform for listing, searching, and booking farm machinery.The application enables users to view nearby equipment using location-based services, access multilingual support, and interact with an AI-powered chatbot for guidance. It allows equipment owners to upload details and media, while farmers can browse, book, and review equipment based on their needs.By adopting a structured development model and modern technologies, Agri Lease Hub ensures scalability, reliability, and user-friendly interaction. The platform promotes cost-effective farming, improves equipment utilization, and supports digital transformation in the agricultural sector.

Keywords

Agricultural Equipment Rental, Smart Farming, Mobile Application, GPS-Based Search, AI Chatbot, Equipment Leasing, Farmer Connectivity, Digital Agriculture, Resource Sharing, Multilingual Support

INTRODUCTION

Agri Lease Hub is a mobile-based application designed to provide a digital platform for farmers to rent and lease agricultural equipment in an easy, affordable, and efficient manner. In the existing system, farmers rely on local rental agencies, dealers, or informal lending, which often leads to high costs, limited accessibility, lack of transparency, and underutilization of machinery. Small and medium farmers especially face financial burdens due to expensive equipment purchases and the absence of proper guidance in using modern tools. To overcome these challenges, the proposed system introduces a user-friendly mobile application that connects equipment owners and farmers through a centralized platform. It offers features such as GPS-based location services to find nearby equipment, multi-language support for wider accessibility, and an AI-powered virtual assistant to assist users in navigation and queries. Additionally, the system includes product demonstration videos and a review-rating mechanism to ensure better understanding, trust, and transparency among users. The application is developed using technologies like Expo React Native for the frontend, Supabase for the backend, and Postgres, SQL for database management. This project not only reduces costs and saves time but also promotes efficient resource utilization and digital inclusion in agriculture. The scope of Agri Lease Hub extends to improving farming productivity, enabling sustainable practices, and supporting future enhancements like online payments and smart farming integration. Furthermore, the system enhances collaboration among farmers by creating a shared economy model where resources are efficiently utilized. It also helps in bridging the gap between rural users and modern technology through an intuitive and simple interface. The platform can be expanded to include advanced features such as real-time tracking, secure payment gateways, and government scheme integration. By ensuring reliability, scalability, and security, the system can support a large number of users without performance issues. Overall, Agri Lease Hub acts as a transformative solution that modernizes agriculture and empowers farmers economically and technologically.

LITERATURE SURVEY

[1] R. Wendt (2025) titled “Bridging the Gap in Agricultural Sharing Economy

A Systematic Review for Evaluating Information Systems for Machinery Efficiency” explores the role of digital platforms in enhancing machinery utilization and operational efficiency through sharing-economy models in agriculture. The paper emphasizes how information systems can minimize equipment underuse and reduce costs by enabling collaborative access among farmers. This aligns directly with the Agri Lease Hub project’s objective of creating a digital platform for renting and leasing agricultural equipment, thereby improving accessibility, transparency, and affordability for small and medium-scale farmers.

[2] Krishi Jagran (2024), “10 Rental Apps Bring Farm Equipment and Services to Farmers’

Doorsteps” This paper provides an overview of existing mobile applications in India that allow farmers to rent machinery and agricultural services on demand. It highlights the increasing adoption of

technology in rural areas and how such applications bridge the gap between equipment owners and farmers who cannot afford to purchase costly machinery. This article supports the practicality and real-world need for the Agri Lease Hub application, which similarly aims to simplify equipment rental through an intuitive, multilingual, and location-based system.

[3] **S. Kumar et al. (2024), titled** *"Development of a Mobile-Based Agricultural Equipment Hiring System"*

This paper explores the design of a mobile application that connects farmers with equipment owners for hiring farm machinery. The study highlights how digital platforms can reduce dependency on traditional rental methods and improve efficiency through online booking and availability tracking. It also emphasizes the importance of user-friendly interfaces for rural users. This aligns with the Agri Lease Hub project by supporting the idea of a **mobile-based, easy-to-use platform** that simplifies equipment access and enhances convenience for farmers.

PROPOSED METHODOLOGY

The **Agri Lease Hub system** is designed using a client-server architecture, where the mobile application acts as the client and communicates with the backend server for processing user requests, managing equipment listings, and handling bookings efficiently.

A. Front-End Technologies

The front-end is developed using React Native with Expo for cross-platform mobile application development. It provides a responsive and user-friendly interface for farmers and equipment owners. The application also supports multiple languages to improve accessibility.

B. Back-End Technologies

The backend is built using Supabase, which manages the server-side operations of the application. It handles user authentication, booking logic, and data processing efficiently. It ensures secure communication between the frontend and the database.

C. API Integration

The system uses Google Maps API for location-based services and nearby equipment search. It also integrates OpenAI API for AI chatbot and multilingual support. These APIs improve user experience with smart assistance and real-time tracking.

D. Database

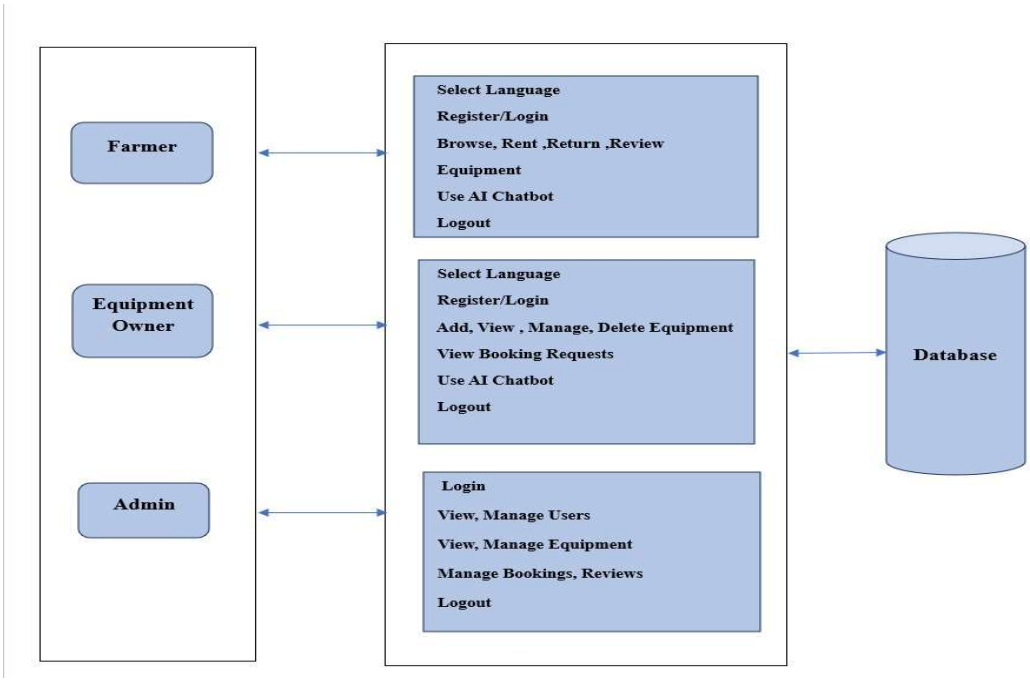
PostgreSQL (Supabase) is used as the database management system. It stores user information, equipment details, bookings, and reviews securely. It ensures data consistency, reliability, and scalability

E. Development Environment

The development is carried out using tools like Visual Studio Code and Android Studio. The application is built using modern technologies like React Native, Supabase, and TypeScript. The system runs on Windows 11 with standard hardware requirements for development and testing.

Architecture

System Architecture



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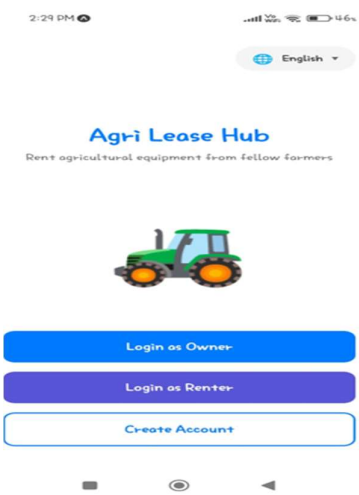
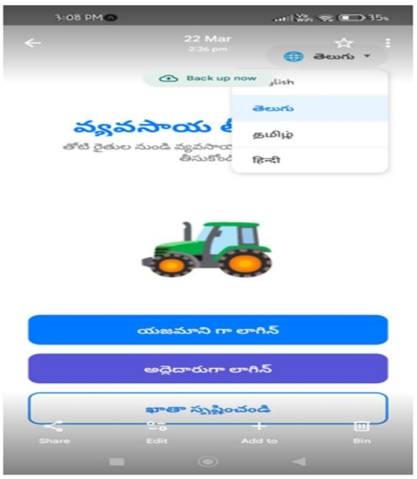
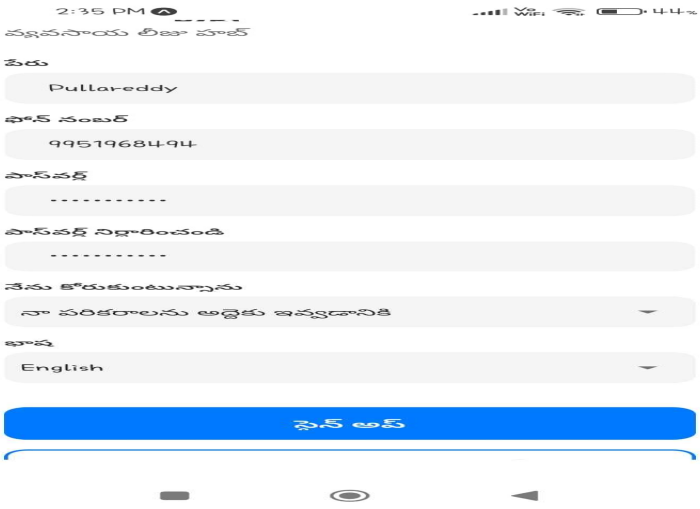
Screenshots
Home Page

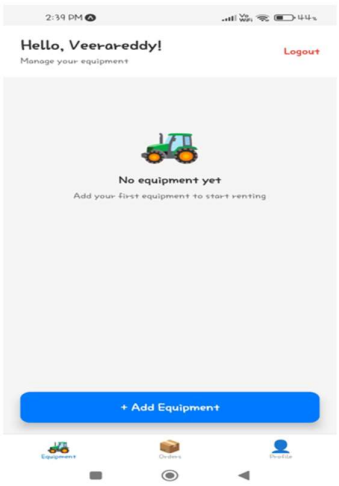


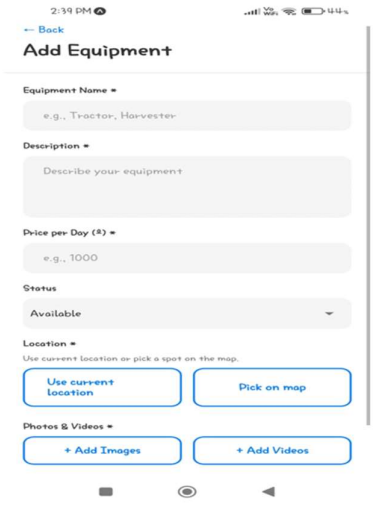


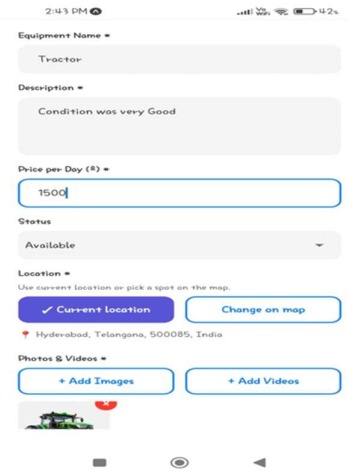
Registration Page



Equipment owner
Add Equipment







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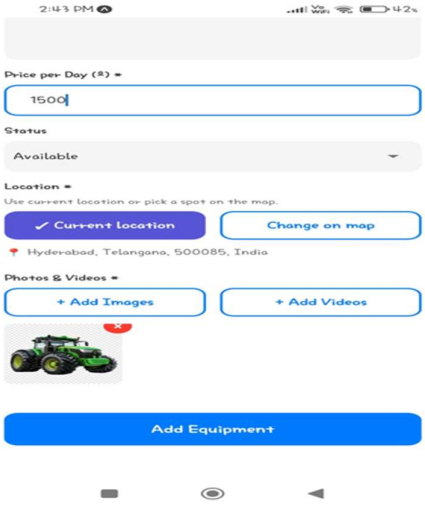
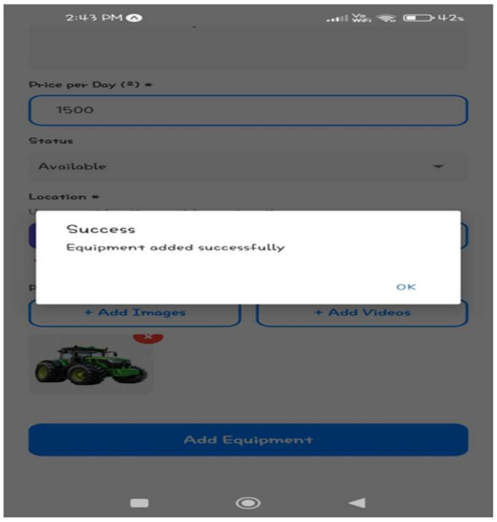
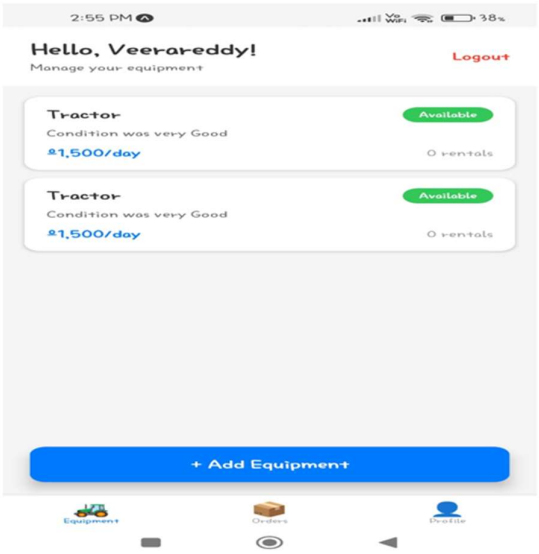
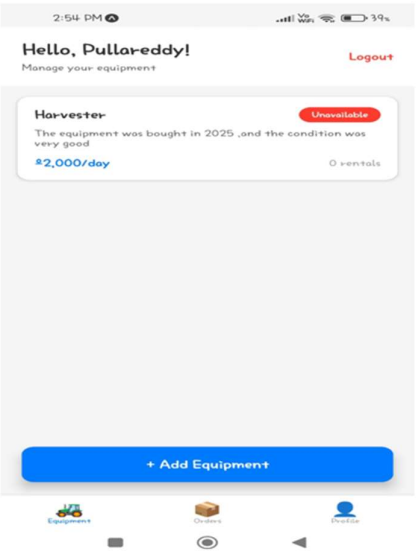


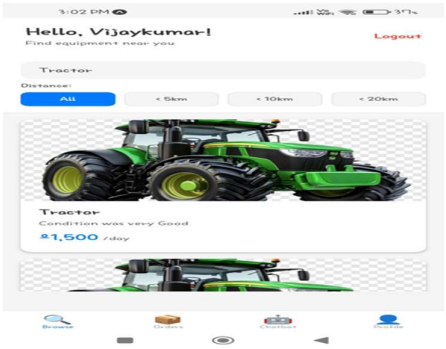


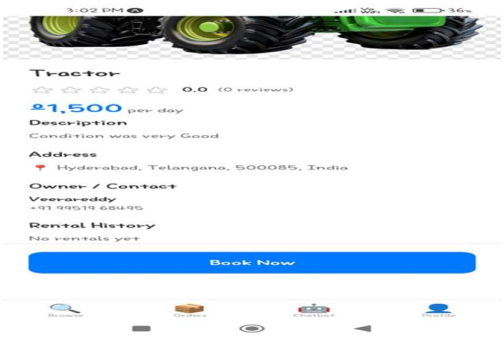
View & Manage Equipment





Farmer
Search Equipment





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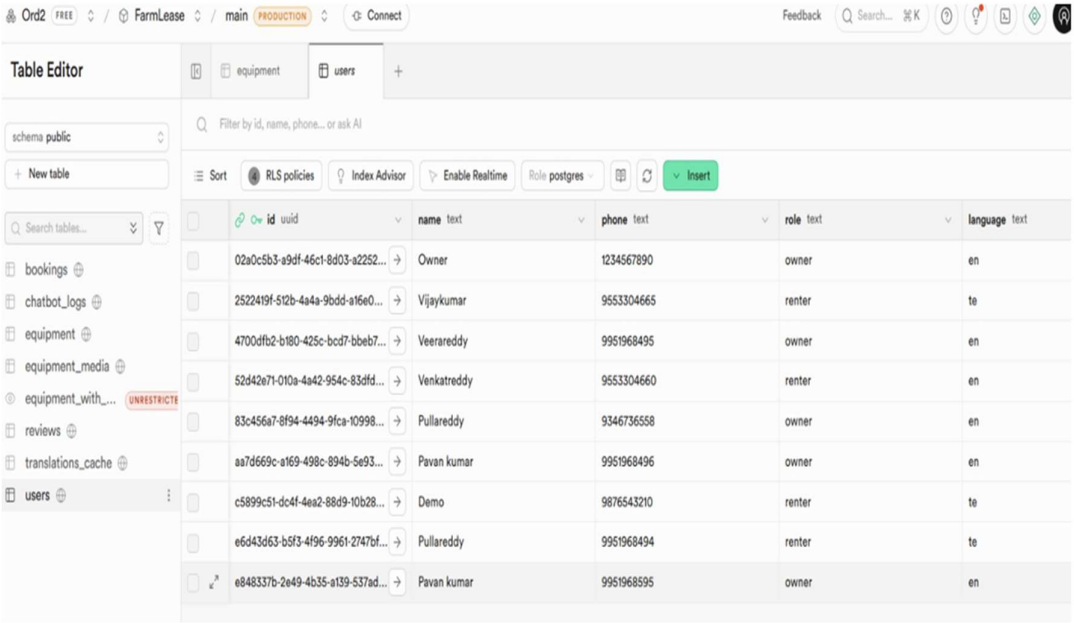
AI chatbot

Admin
View & Manage Users



RESULT

The **Agri Lease Hub system** was tested under different user scenarios to evaluate its performance, usability, and efficiency. The application successfully enabled farmers and equipment owners to register, list machinery, and rent equipment using a simple and user-friendly interface.

The system showed reliable performance in storing and retrieving data such as user details, equipment listings, and booking records using the PostgreSQL database. The integration of Google Maps API provided accurate location-based search, allowing users to find nearby equipment easily and quickly.

The booking system worked effectively by preventing date conflicts and ensuring smooth transaction flow between users. The AI chatbot provided real-time assistance and multilingual support, helping users navigate the application and resolve queries efficiently.

Overall, the system improved accessibility to agricultural equipment by providing a transparent and cost-effective platform. The application demonstrated good performance, ease of use, and scalability, making it suitable for real-world agricultural equipment sharing.

CONCLUSION

Agri Lease Hub provides an efficient digital solution for renting and leasing agricultural equipment. The system enables farmers and equipment owners to connect easily, allowing users to list, search, and book machinery with location-based services.

The project follows the Waterfall Model, ensuring a structured and systematic development process. The

use of modern technologies such as React Native, Node.js, and AI-based chatbot ensures reliability, scalability, and ease of use.

Overall, Agri Lease Hub improves accessibility to farming equipment, reduces costs, and promotes resource sharing among farmers. Future enhancements like online payments and advanced AI features can further improve system efficiency and user experience.

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