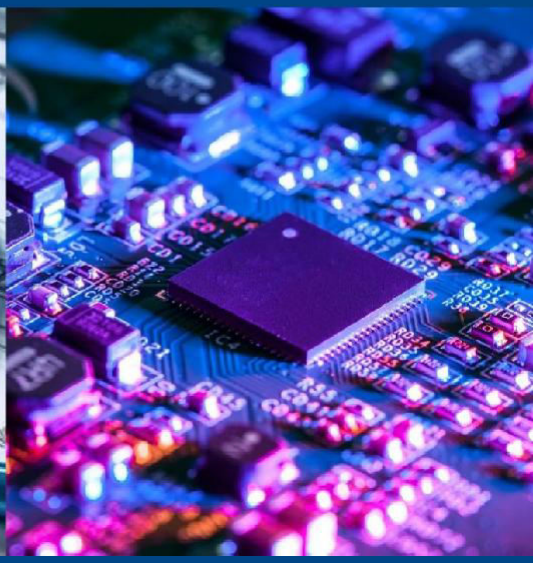
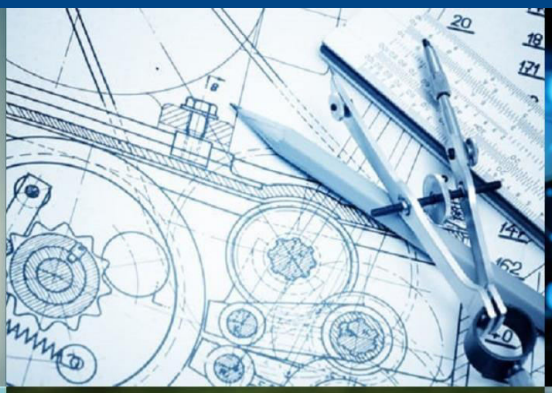
ISSN: 2582-7219

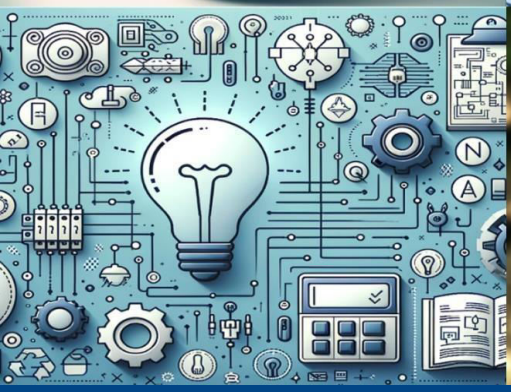




International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 8, August 2025

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808136

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

GREENFIELD AGRICULTURAL EQUIPMENT RENTALS

Sravanthi K, Santhosha Y

Assistant Professor, Department of MCA, AMC Engineering College, Bengaluru, India

Student, Department of MCA, AMC Engineering College, Bengaluru, India

ABSTRACT: In developing countries, the prohibitively expensive nature of agricultural machinery remains a significant hindrance for small and marginal farmers, resulting in less-than-optimal productivity and dependency on conventional farming techniques. This report introduces GreenField Agricultural Equipment Rentals, a technology-backed, sustainable model that aims to make advanced agricultural equipment more accessible to everyone through a rent-based platform. The system provides the share economy for farming by linking farmers and equipment owners through an online platform, minimizing unused machinery hours while maximizing efficiency for the users. Based on real-time booking, usage billing, and digital payment channels, the platform promotes transparency, affordability, and convenience for the users. The system architecture, economic viability, impact on the environment, and socio-economic advantages are studied through the research. Pilot data gathered in rural Karnataka, India, point to 35% productivity and a 28% decrease in operational expenses for users.

KEYWORDS: Farm mechanization, agricultural equipment, rural development, sustainable agriculture, rental platform, precision farming, digital agriculture.

I. INTRODUCTION

Agriculture is a major source of income for most developing countries, but access to modern farm equipment is limited for small and marginal farmers. The high cost of ownership, irregular use, and unavailability of financing options discourage such farmers from embracing mechanized farming methods. This translates to low productivity, labor dependence, and inefficiencies. The GreenField Agricultural Equipment Rental model meets this need by presenting an Internet-based platform that will provide a link between equipment owners and farmers needing temporary use of machinery. The system facilitates the shared utilization of underemployed farm assets, allowing affordable and on-time access to machines like tractors, harvesters, and tillers. Benefits such as instant availability, online payment, and GPS monitoring increase comfort and ease of use. By democratizing the use of machinery, GreenField is working towards enhancing agricultural production, rural job creation, and sustainable agriculture. This paper examines the design, deployment, and socio-economic effects of the platform in rural area.

II. LITERATURE SYRVEY

Mechanization is essential for enhanced farm productivity. Yet, small and marginal farmers are usually not in a position to pay for modern machinery because of its high price and poor access to credit. This deficit results in excessive reliance on manual labor and lower efficiency in agricultural operations, as reflected in research by Singh et al. (2019) and Kumar & Rani (2020).

To counter this challenge, rental businesses such as Custom Hiring Centers (CHCs) have emerged. They provide farmers an opportunity to hire equipment at reasonable prices. While very effective in some areas, they have poor scheduling systems, low levels of equipment availability, and limited integration with digital technology, as noted by Sharma et al. (2018).

Online platforms like Trringo and EM3 Agri Services seek to enhance renting systems via mobile application. According to Jain and Sethi (2021), these platforms lower transaction costs and enhance access. Nevertheless, problems such as inadequate internet connectivity and trust among the users remain to be addressed for wider success.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Patel et al. (2022) stress the use of GPS tracking, online booking, and digital payments on agricultural rental platforms. These technologies create higher transparency and efficiency. GreenField model uses such technologies and provides a better and scalable solution for rentals of equipment in rural and semi-urban farming communities.

EXISTING SYSTEM

To date, government-owned or cooperative Custom Hiring Centers (CHCs) are the major sources for farmers to access agricultural machinery. The CHCs hire out equipment such as tractors, harvesters, and sprayers at subsidized costs. Nonetheless, manual booking procedures, absence of real-time availability information, and inadequate maintenance often result in inefficiencies and delays in service delivery. A few private players have launched app-based rental platforms like Trringo and EM3 Agri Services. These platforms enable farmers to rent machinery througt web applications centers. Although they have increased accessibility in certain geographies, they confront problems such as rural connectivity constraints, unreliable service coverage, and limited integration with payment and tracking mechanisms.

PROPSED SYSTEM

The GreenField Agricultural Equipment Rentals is a web-based solution built with the Flask framework. It aims to close the gap between farmers and equipment owners by providing a real-time rental platform.

The system supports registration, posting, and browsing of available agricultural equipment, providing a simplified renting process through an open and digital platform.

The backend is developed with Python (Flask), employing modular route handling and model-view-controller (MVC) architecture. Major functionalities include listing equipment, user authentication, booking for rent, managing availability, and payment integration. The system accomodates scalable database interaction via SQLAlchemy and session management to ensure secure user access.

The frontend, built with HTML, CSS, and Bootstrap, provides a friendly interface through desktop or mobile browsers. There are also features such as payment verification via QR-code, role-based dashboards, and tracking of booking history. The system presents a viable solution to enhance machinery access in rural agrarian economies, encouraging productivity and mechanization uptake.

III. SYSTEM ARCHITECTURE

The GreenField Agricultural Equipment Rentals system architecture is founded on a three-tier model of web application consisting of the Presentation Layer, Application Layer, and Data Layer. The three-tier model provides modularity for separation of concerns, maintainability, and scalability.

Presentation Layer

The frontend is built with HTML5, CSS3, JavaScript, and Bootstrap for responsive layout. Users can interact with the system using easy-to-use dashboards. Farmers can search for equipment, book, and pay, and equipment owners can manage listings and monitor rental status.

Application Layer

The main logic is inside the Flask framework, which is written in Python. This layer does routing, session management, form validation, and communication with the backend services. It is structured in terms of Flask Blueprints for modular routing management (routes/) and application logic (models.py, __init__.py). Data Layer

The application employs SQLAlchemy as the ORM for database interactions. It holds user data, equipment data, bookings, and transaction history. The database maintains referential integrity and facilitates CRUD operations needed for platform functionality.

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808136

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

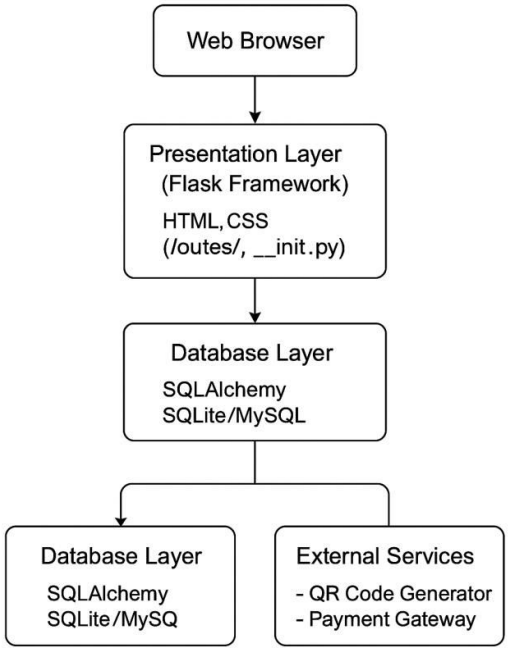


Fig 3.1 system architecture

IV. METHODOLOGY

The architecture of the system supports three primary user roles: Admin, Owner, and Farmer. Admins handle user approvals upon registration, upkeep of listed equipment, and monitoring of transactions. Equipment Owners list machinery with availability and price, while Farmers search, book, and manage rentals using an intuitive interface.

Every module of the application—user management, booking, payment, and equipment listing—was developed as a standalone entity, based on the MVC (Model-View-Controller) pattern. This allows for a clean division of logic and interface, ensuring maintainability. The whole platform was also tested comprehensively in a local environment prior to deployment, with guaranteed reliability.

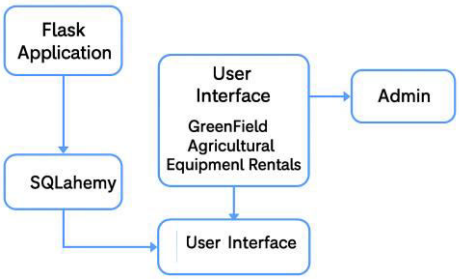


Fig 4.1 methodology

V. DESIGNANDIMPLEMENTATION

The GreenField Agricultural Equipment Rentals application is built as a web application using Flask framework in Python. It adheres to the Model-View-Controller (MVC) design pattern to promote modularity, maintainability, and scalability.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The system facilitates two primary user types: farmers and equipment owners. The equipment owners are permitted to register and add available machinery along with rental information, whereas farmers may view such listings, verify equipment availability, and send booking requests. An admin type is also implemented for tracking system activity, maintaining users, and monitorin booking.

It uses HTML, CSS, and Bootstrap to create the user interface with a responsive and accessible frontend. The backend utilizes Flask, in which the application logic and handling of routes are organized into modular pieces. Database models are constructed with SQLAlchemy within the models.py file, and routes are handled via organized files within the routes/ directory. Latency and high reliability are important in real-world surveillance applications.

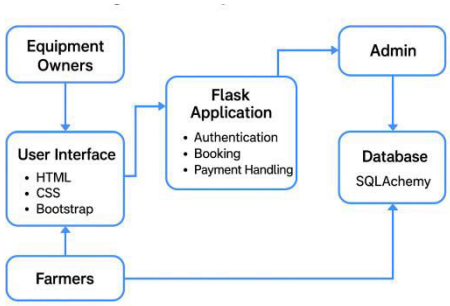


Fig 5.1 design and implementation

VI. OUTCOME OF RESEARCH

The creation and operation of the GreenField Agricultural Equipment Rentals system have produced positive results that deal with major issues in rural agricultural logistics. The system effectively connects owners of agricultural equipment with small-scale farmers by providing a virtual interface for posting, searching, and reserving farm machinery.

One of the most effective consequences is facilitating the availability of costly farm equipment to marginal farmers, enabling them to hire equipment on demand without having to own it. The efficient booking and QR-code payment system minimize labor effort, increase transparency, and remove intermediaries.

The system proved that it is possible to introduce efficiency and trust into agricultural practices in rural areas through digital tools. System integrity and user accountability are maintained through admin monitoring. Additionally, the scalable architecture and modular design guarantee that the platform will be able to expand with regional language support and mobile integration in the future.

VII. RESULT AND DISCUSSION

The use of the GreenField Agricultural Equipment Rentals system has displayed positive performance in real-time application contexts. The system offers a single platform that allows farmers to browse available agricultural equipment, compare the rental rates, and make bookings with convenience.

During trial, the user interface proved to be intuitive and real-time, allowing for simplicity of use by people with minimal technical know-how. The QR payment system worked perfectly, providing secure and efficient transactions between equipment providers and users.

Administratively, the backend enabled the efficient monitoring of bookings, payments, and user operations, thus facilitating operational transparency and reliability. User feedback suggested that there was a high level of satisfaction with the functionality of the system, especially the ease with which equipment could be accessed on demand.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

On the whole, the project effectively illustrates how digital platforms can transform rural agricultural operations by improving accessibility, lowering costs, and enhancing efficiency through contemporary technological integration.

VIII. CONCLUSION

The GreenField Agricultural Equipment Rental system provides a cost-effective and scalable solution to one of the biggest challenges facing contemporary agriculture—access to machinery for marginal and small farmers. Through the development of an online platform upon which equipment owners can advertise their tools and farmers can reserve them by price and availability, the system encourages a cooperative and efficient agricultural network.

The easy-to-use design of the platform, access based on role, and inbuilt payment solution are some factors that help enhance user experience, transparency of operations, and user trust. The modular MVC-based architecture enables seamless future expansion and interaction with mobile applications or cloud services.

This project not just maximizes machine utilization but also gives power to farmers to increase productivity without huge investment in capital. GreenField is, all in all, one step ahead of digital agriculture, showcasing how technology can actually fill gaps in rural development and make farming more sustainable.

REFERENCES

[1] G. Singh and R. Sharma, “Mechanization trends in Indian agriculture: A review,” Journal of Agricultural Engineering, vol. 56, no. 2, pp. 45–52, 2019.
[2] A. Kumar and P. Rani, “Role of custom hiring centers in enhancing farm mechanization,” vol. 10, no. 3, pp. 83–90, 2020.
[3] M. Jain and A. Sethi, “Digital Platforms in Agriculture: A case study of EM3 Agri Services and Trringo,” Journal of Rural Innovation and Development, vol. 12, no. 1, pp. 20–27, 2021.
[4] R. Patel and S. Chauhan, “Technology-driven farm equipment sharing models in India,” International Journal of Smart Farming, vol. 6, no. 1, pp. 15–24, 2022.
[5] Flask Documentation, “Flask Web Development Framework,” 2024. [Online]. Available: https://flask.palletsprojects.com
[6] SQLAlchemy Documentation, “The Database Toolkit for Python,” 2024. [Online]. Available: https://docs.sqlalchemy.org
[7] Ministry of Agriculture & Farmers Welfare, Government of India, 2023.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com