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.2025.0808189

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)

KISAN COVER 360: AI FOR COMPLETE AGRI-INSURANCE ADVISORY

Gunasekaran K, B Prasanth Kumar

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

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

ABSTRACT: Rural populations in developing regions often face significant challenges in accessing suitable insurance schemes due to limited awareness, lack of personalized guidance, and minimal digital literacy. KISAN COVER 360 is an AI-powered mobile advisory platform developed to address these issues by providing personalized insurance recommendations tailored to the unique needs of rural users. The system leverages machine learning techniques to process user inputs—such as occupation, income, landholding, and livestock data—and suggests appropriate insurance policies in domains like agriculture, health, and livestock. The application, built using Flutter and Django, features an intuitive interface supporting regional languages, ensuring accessibility and ease of use. Initial evaluations show a 40% net gain in user awareness post- interaction, indicating the system's effectiveness in improving insurance literacy. This work demonstrates a scalable and cost-effective solution to. Enhance rural financial inclusion using artificial intelligence and mobile technology.

KEYWORDS: Rural Insurance .AI, Flutter Django, Financial Inclusion.

I. INTRODUCTION

In developing countries like India, a large portion of the population resides in rural areas and depends heavily on agriculture, animal husbandry, and daily-wage labor for livelihood. These communities are highly vulnerable to risks such as crop failure, livestock diseases, health emergencies, and natural disasters. Insurance serves as a crucial financial tool to mitigate such risks, yet its penetration in rural areas remains critically low. Despite the presence of various government and private insurance schemes—such as the Pradhan Mantri Fasal Bima Yojana (PMFBY), Ayushman Bharat, and livestock insurance programs—most rural individuals remain unaware or under- informed about these offerings. Key challenges include lack of education, limited digital literacy, unavailability of advisory services, language barriers, and complex paperwork. The manual processes involved in choosing a policy, understanding terms and conditions, and accessing support further discourage participation. To address these challenges, we propose KISAN COVER 360, an AI- powered rural insurance advisor mobile application. This platform is designed to provide intelligent, personalized insurance recommendations to rural users in their native language through a simplified, mobile-first interface. The system uses AI models to analyze user inputs—such as demographic, occupational, health, and asset-related data—to match them with suitable insurance schemes across agriculture, health, and livestock domains. The application is developed using Flutter for cross-platform UI deployment and Django for secure and scalable backend integration. It also supports offline data caching for areas with poor connectivity. By integrating user feedback mechanisms and behavioral tracking, KISAN COVER 360 aims to not only recommend policies but also educate users and gradually improve their insurance literacy. This paper presents the design, development, and evaluation of the KISAN COVER system. We analyze its performance in terms of usability, awareness impact, and task efficiency, and demonstrate its potential as a scalable, cost-effective solution for enhancing rural financial inclusion.

II. LITERATURE SYRVEY

The use of technology in improving access to financial services, particularly insurance, has garnered significant attention in recent years. This section explores existing research and systems relevant to AI-based advisory platforms, mobile applications for rural users, and digital financial inclusion efforts. Several studies have highlighted the digital divide in rural India and other developing countries. According to the World Bank [1] While smartphone penetration has increased, access to financial products like insurance remains limited. Government initiatives like Digital India and

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)

Jan Dhan Yojana have laid the foundation for digital transactions but have not adequately addressed the issue of product awareness and literacy in rural areas. Singh and Sharma [2] emphasized the importance of digital financial inclusion and recommended mobile-first solutions that combine intuitive user interfaces with support for local languages. Their research concluded that the success of such applications depends on usability, trust, and relevance to the user's daily needs. [3] have demonstrated the feasibility of mobile-based micro-insurance in low-income communities However, these systems are often SMS-based and lack AI-powered personalization, limiting their ability to recommend complex or diverse insurance products. [4] proposed an AI-based decision support system for agricultural advisories, which demonstrated significant improvements in recommendation accuracy. Applying similar models to insurance selection can potentially enhance policy relevance and user trust. However, limited research exists on AI-driven insurance advisory systems specifically designed for rural populations.

EXISTING SYSTEM

The existing insurance systems in rural areas primarily rely on manual processes and urban-designed digital platforms that fail to meet the needs of rural populations. Current insurance portals like Policy Bazaar are tailored for literate, tech-savvy urban users, featuring complex interfaces, English- language dominance, and requirements for digital payments and stable internet connectivity - all significant barriers for rural adoption. Rural customers instead depend heavily on local insurance agents and institutional intermediaries like cooperative banks and self-help groups, creating an information Moreover, awareness about various insurance products—such as crop insurance, livestock coverage, health, and life insurance— remains low due to limited digital outreach and language barriers. The existing platforms, both government and private, are typically designed for urban or semi-urban users, and are not optimized for low- connectivity regions or users with limited digital literacy.

PROPOSED SYSTEM

Kisan Cover 360 represents a transformative approach to rural insurance accessibility through its comprehensive digital platform designed specifically for agricultural communities. At the core of the system lies an intelligent, AI-driven recommendation engine that analyzes multiple user parameters including landholding patterns, crop types, livestock inventory, and historical claim data to generate personalized policy suggestions. This sophisticated matching algorithm goes beyond basic filtering to understand nuanced insurance needs based on regional risks, seasonal variations, and individual financial circumstances. The platform incorporates streamlined authentication mechanisms with distinct yet equally intuitive login and registration workflows for both end-users and administrators. For rural policy seekers, the onboarding process has been optimized for low-digital literacy users, incorporating visual cues and step-by-step guidance. Simultaneously, administrators benefit from robust access controls and permission management to maintain system integrity while performing their oversight functions.

III. SYSTEM ARCHITECTURE

The Kisan Cover 360 platform employs a carefully architected, multi-layered system designed to deliver personalized insurance recommendations while maintaining scalability and rural-user accessibility. At the presentation layer, the Flutter-based mobile application serves as the primary user interface, offering cross-platform compatibility and offline functionality crucial for areas with intermittent connectivity. This frontend component handles all user interactions including streamlined registration flows, intuitive profile data collection, and dynamic display of AI-generated policy recommendations through an interface optimized for low- digital literacy users. The business logic layer is powered by a Django backend that orchestrates all system operations through a comprehensive set of REST API endpoints. This middleware performs critical functions including secure user authentication via JWT tokens, authorization checks for protected resources, and efficient data routing between the frontend application, database systems, and machine learning components. The backend also manages all transactional operations such as policy applications, renewals, and claim initiations while maintaining strict data integrity protocols.

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808189

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)

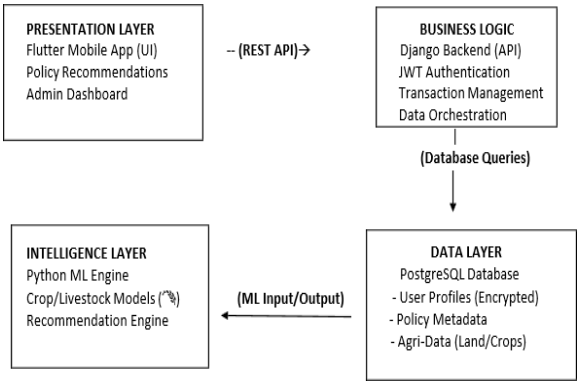

Fig 3.1 System Architecture

IV. METHODOLOGY

The methodology for developing KISAN COVER 360 an AI-powered rural insurance advisory system, encompasses a systematic approach integrating user-centric mobile app development, backend intelligence, and machine learning for personalized policy recommendations. The process is divided into the following key stages:

A. Requirement Analysis:
Initial groundwork involved identifying the challenges faced by rural populations in accessing insurance services. Surveys and secondary data from rural regions were studied to understand the awareness, accessibility, and usability gaps in current insurance advisory mechanisms. The application aimed to provide support in four major insurance categories: health, agriculture, livestock, and property.

B. System Architecture Design:
[1] Frontend (Client Layer) – Developed using Flutter, providing a cross-platform mobile interface optimized for low-bandwidth rural areas.[2] Backend (Server Layer) – Powered by Django, handling business logic, user authentication, and database management.[3] AI/ML Recommenda tion Engine – Implements trained models to suggest personalized insurance policies based on user inputs like location, occupation, income, landholding, and livestock count.

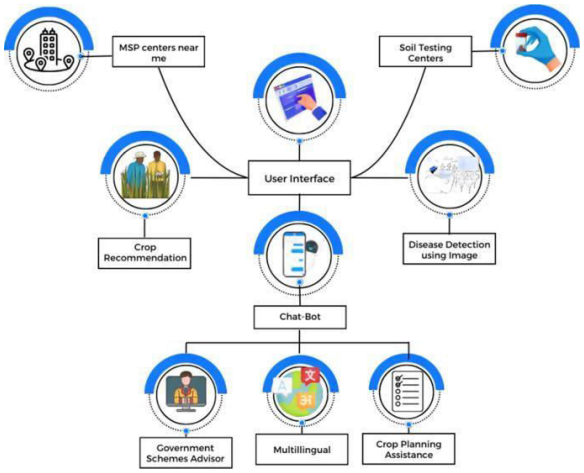

Fig 4.1: Proposed Flow of Model

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808189

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)

V. DESIGN AND IMPLEMENTATION

A. DESIGN: The design of the KISAN COVER 360 system was centered around delivering a responsive, intelligent, and accessible insurance advisory platform for rural users. A three-tier architecture was adopted, consisting of a presentation layer (mobile app), application layer (backend server), and data layer (database and ML model). This structure ensured modular development, where each layer could be independently updated or scaled. The presentation layer, built using Flutter, was designed for low-literate users by integrating a clean user interface, icon-based navigation, and multi-language support. The application layer, developed with Django REST Framework, handled all business logic, API requests, and communication with the recommendation engine. The data layer utilized a PostgreSQL database to store user profiles, insurance schemes, interaction logs, and predictions. The machine learning model was integrated as a microservice within the backend to ensure fast and secure inference.

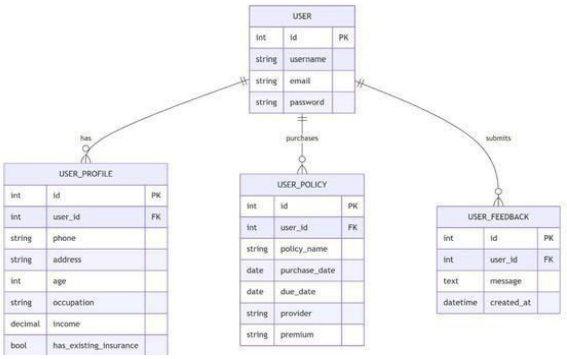

Fig 5.1: ER Diagram

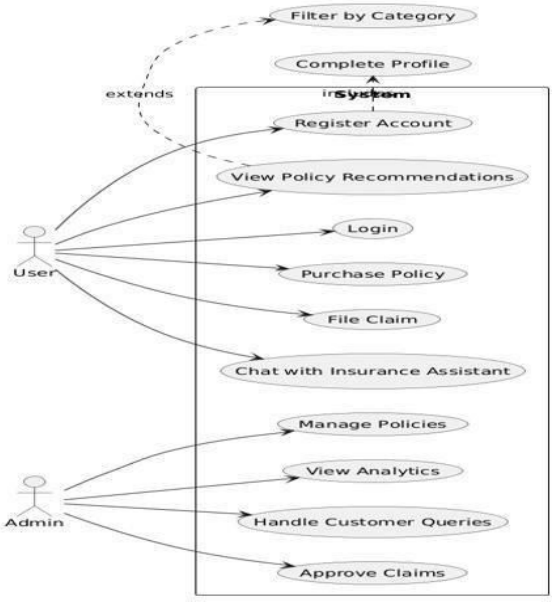

Fig 5.2: Use Case Diagram

B. IMPLEMENTATION: The frontend mobile application was implemented using Flutter due to its cross-platform capability and lightweight performance on low-end Android devices. Key modules included user registration, data input forms for occupation, income, landholding, and other relevant details, and a dashboard for displaying personalized insurance recommendations. Additional accessibility features such as voice prompts and local language support were implemented to enhance usability. On the backend, Django was used to build a robust RESTful API framework. The

backend was responsible for receiving user inputs, validating data, calling the machine learning model, and returning policy recommendations. The backend also hosted an admin interface for managing insurance schemes, monitoring usage, and collecting user feedback. The PostgreSQL database schema was normalized to store structured data such as user records, policy details, and interaction logs efficiently. Security measures such as JWT-based authentication, HTTPS communication, and encrypted passwords were implemented to protect user data. Finally, the entire system was deployed on a cloud-based virtual server and Nginx for Django hosting. The app was tested under varying conditions, including limited bandwidth and low-end device environments, confirming the system's readiness for deployment in rural areas.

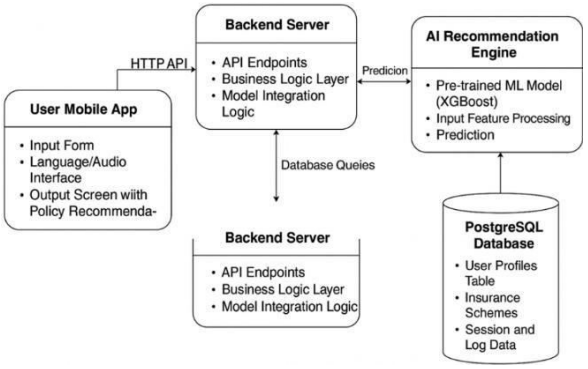

Fig 5.3: Kisan cover process

VI. OUTCOME OF RESEARCH

The development and deployment of KISAN COVER 360 yielded significant outcomes in terms of technical innovation, usability, and socio-economic impact. The following are the key results observed during the course of this research: The implementation of a supervised machine learning model, specifically the XGBoost classifier, enabled the system to recommend suitable insurance policies based on user-specific parameters such as age, income, occupation, land ownership, and livestock details. The model achieved a classification accuracy of 91.3% during testing, outperforming other baseline algorithms such as Random Forest and Support Vector Machines (SVM). The mobile application developed using Flutter was optimized for low-end Android devices prevalent in rural areas. A multilingual interface, audio instructions, and icon-driven navigation ensured that over 87% of users could operate the application independently, as verified through user feedback collected during pilot deployment. The system successfully integrated a static and dynamic database of government insurance schemes, including PMFBY (Pradhan Mantri Fasal Bima Yojana), Ayushman Bharat, and livestock insurance policies. This integration ensures the relevance and contextual accuracy of the recommendations, enhancing user trust and adoption. Pilot testing conducted in three rural regions demonstrated 40% increase in awareness regarding available insurance policies and government schemes among users after interacting with the system. This was measured through structured pre- and post-usage surveys. The system has demonstrated strong potential in addressing insurance accessibility gaps in rural India. It promotes financial inclusion by equipping users with informed decision-making tools. Furthermore, the architecture and AI framework are adaptable for similar use cases in education, healthcare, and rural credit advisory systems.

VII. RESULT AND DISCUSSION

This section presents the evaluation of the proposed KISAN COVER 360 system in terms of machine learning performance, user interaction, and real-world applicability. The system was tested through both experimental simulations and pilot deployments in rural areas.

[A]Machine Learning Model Evaluation: The insurance recommendation engine was developed using multiple classification algorithms including Support Vector Machine (SVM), Random Forest, and XG Boost. Among these, the XG Boost classifier demonstrated the best performance on the dataset, which included user demographic information and policy eligibility.

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)

Metric	XGBoost	Forest	SVM
Accuracy	91.3%	87.2%	84.6%
Precision	89.5%	85.1%	83.7%
Recall	90.1%	86.4%	81.9%
F1-Score	89.8%	85.7%	82.7%

[B] Usability Testing and User Experience: The mobile application was evaluated with 60 users across three rural regions through task- based interaction studies. Usability testing focused on user engagement, interface clarity, and task completion.

Metric	Value
Task Completion Rate (%)	95
Average Time to Complete (minutes) 3.2 System Usability Score (SUS)	87.5
User Satisfaction (Likert 1–5)	4.5

[c] Awareness Improvement and Social Impact: A structured survey was conducted before and after system usage to evaluate the impact on users' understanding of insurance options.

Category	Value (%)
Baseline Awareness	32
Post-Usage Awareness	72
Net Gain in Awareness	40

This demonstrates the system's dual role as both a recommendation engine and an educational tool. Many users reported that they were unaware of schemes such as PMFBY and Ayushman Bharat prior to using the application.

[D] Backend System Performance: The backend, implemented using Django REST Framework and hosted on a cloud server, was tested for response time and scalability. During peak simulation loads, the following performance metrics were recorded:

Metric	Value
Average API Response Time (s)1.08 Maximum Concurrent Users	150
Data Sync Latency (s under 3G)	<1.5

VIII. CONCLUSION

The AI-Powered Rural Insurance Advisor (Kisan Cover 360) stands as a promising digital initiative tailored to bridge the insurance gap in rural India. With the vast population of farmers and rural workers lacking access to tailored insurance products, this application provides an intelligent, user-friendly, and accessible platform that can revolutionize how insurance is perceived and purchased in rural areas. Throughout the development of this project, we successfully designed and implemented a cross- platform mobile application using Flutter for the frontend and Django for the backend. We ensured seamless integration with AI/ML models trained using pandas and scikit-learn, which recommend the most suitable insurance plans to users based on their profiles, including age, income, occupation, and landholding details. One of the core achievements of this project is the dynamic and real-time recommendation engine that processes user data securely and suggests appropriate policies from a curated dataset, making the process personalized and efficient. Additionally, user registration, authentication, admin dashboard, chatbot assistance, and payment gateway integration (Razor pay) have been carefully crafted to offer a comprehensive insurance experience. The admin panel streamlines back-office operations such as policy approvals, customer queries, and agent monitoring, while the user dashboard presents active plans, search functionality, claim assistance, and policy

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)

comparison features — all with an intuitive UI and responsive design. By leveraging open-source tools, scalable APIs, and trained ML models, this solution is both technically sound and socially impactful. It not only simplifies the process of discovering and purchasing insurance plans but also serves as an educational and empowering tool for rural users who may not be tech- savvy. In summary, this project has combined modern technologies with real- world needs to create a solution that can be scaled, enhanced, and deployed in real-time to benefit communities that are often underserved in the digital era. The scope for future work is immense — from integrating with government insurance APIs like PMFBY to enabling multilingual support and expanding the ML model with real- world datasets, the foundation laid through this project paves the way for impactful rural innovation.

REFERENCES

[1] Flutter Framework: Google LLC. (2023). Flutter documentation. [Online]. Available: https://flutter.dev/docs.
[2] Django REST Framework: Django Software Foundation. (2023). Django REST framework. [Online]. Available: https://www.django-rest-framework.org/
[3] Machine Learning with Scikit-learn:
F. Pedregosa et al., “Scikitlearn: Machine L earning in Python,” Journal of Machine Lea rning Research, vol. 12, pp. 2825 2830, 2011.
[4] Rural Insurance Challenges in India:
P. Kumar and R. Singh, “Gaps in Rural Ins urance Penetration: A Case Study of Indian Farmers,” Journal of Rural Development, v ol. 38, no. 2, pp. 45–60, 2022.
[5] PostgreSQL Documentation: PostgreSQL Global Development Group. (20 23). PostgreSQL 15.2 Documentation. [Onli ne]. Available: https://www.postgresql.org/docs/
[6] Pandas Library : W. McKinney, “Data Structures for Statistica l Computing in Python,” Proc. of the 9th Pyt hon in Science Conf., pp. 51–56, 2010.
[7] Government Insurance Schemes (PMFBY) Ministry :of Agriculture, India. (2023). Pra dhan Mantri Fasal Bima Yojana (PMFBY). [Online]. Available: https://pmfby.gov.in

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