KRISHIMITRA

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Keywords:

Machine Learning, Naive Bayes, Random Forest, CNN, Multilingual NLP

Introduction:

Agriculture plays a vital role in India's economy, yet farmers face challenges such as improper crop selection, inefficient fertilizer usage, and delayed disease detection. These issues arise due to limited access to expert guidance and reliance on traditional farming practices.Existing digital agricultural tools often lack integration, real-time intelligence, and accessibility for rural users, especially due to language barriers.To address these challenges, this project proposes Krishimitra, an AI-powered smart agricultural assistant system. The platform leverages Machine Learning and Deep Learning techniques to provide farmers with data-driven recommendations for crop selection, fertilizer usage, and plant disease detection.The system is designed as a web-based platform with multilingual support, ensuring accessibility, scalability, and ease of use for farmers across diverse regions.

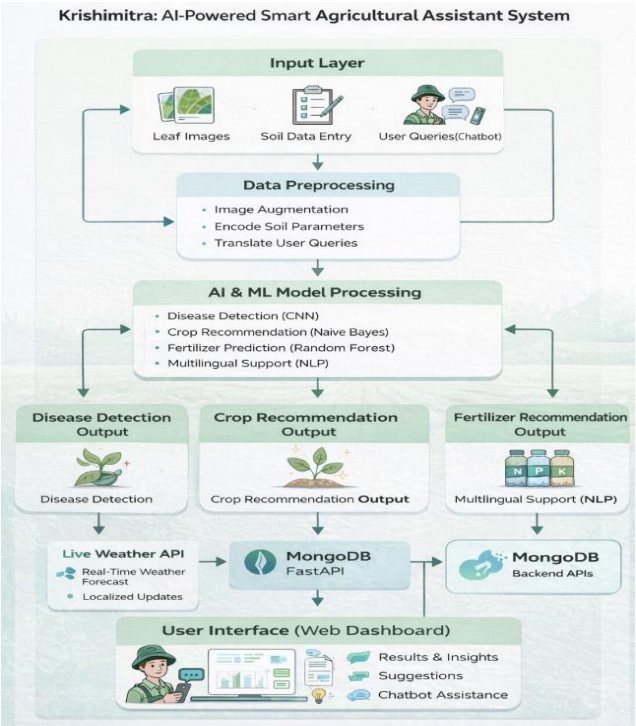

Figure 1: AI-powered agricultural assistant flowchart

Objectives:

1. Provide real-time, location-specific agricultural insights through weather forecasting and risk alerts.
2. Detect plant diseases and deficiencies using AI-powered image analysis and recommend appropriate remedies.
3. Recommend crops and fertilizers based on soil type, climate, and seasonal data using machine learning.
4. Ensure farmer accessibility with multilingual, multi-channel alerts and offline functionality.
5. Build a community-driven ecosystem with expert-backed Q&A and AI-chatbot support.

Methodology:

1. KrishiMitra will use weather APIs to provide localized forecasts and help farmers plan irrigation more effectively.
2. Farmers can upload crop images, which will be analyzed by CNN models (e.g., MobileNet) to detect diseases or nutrient deficiencies and provide actionable remedies.
3. Soil health analysis will be supported through manual data entry or by processing scanned soil test reports using OCR technology.
4. Fertilizer and crop recommendations will be generated using ML models trained on soil parameters, weather data, and seasonal patterns.
5. A pest and disease forecasting system will evaluate historical climate patterns and crop types to provide early risk alerts.
6. Farmers will receive timely updates through SMS, WhatsApp, and push notifications in their preferred language.
7. Offline data caching will ensure the application functions smoothly in regions with poor or unstable internet connectivity.
8. A RAG-based AI chatbot will assist farmers by answering queries using a curated agricultural knowledge base.
9. A built-in community forum will support peer-to-peer learning and expert-guided discussions to enhance farmer engagement.

Result and Conclusion:

1. CNN model effectively detects plant diseases from leaf images
2. System provides real-time, actionable recommendations
3. Multilingual support improves accessibility for rural users
4. Achieves high accuracy in crop and fertilizer prediction

KrishiMitra is expected to deliver a reliable, AI-driven agricultural decision-support platform that significantly improves farming efficiency, crop productivity, and resource management for farmers. The project aims to provide farmers with accurate crop and fertilizer recommendations based on real-time weather, soil parameters, and seasonal data, enabling scientifically informed choices. The integrated CNN-based disease detection system will

allow early identification of crop infections or deficiencies, reducing yield losses through timely interventions. The platform will generate pest and disease risk forecasts, empowering farmers to take preventive measures rather than reactive ones. By offering multilingual alerts and personalized advisory through SMS, WhatsApp, push notifications, and an AI-powered chatbot, the system will enhance accessibility and digital awareness among farmers, even in remote areas. The community forum will strengthen farmer-to-farmer and farmer-to-expert collaboration, promoting knowledge sharing and sustainable practices. Overall, KrishiMitra is expected to contribute to higher crop yields, reduced input costs, improved soil health management, and greater adoption of data-driven agriculture, ultimately supporting the broader goals of smart farming and rural development.

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Future Scope:

Krishimitra can be extended by developing a mobile application to improve accessibility for farmers in remote areas. Integration with IoT-based soil sensors can enable real-time data collection for more accurate recommendations. The system can be expanded to support a wider range of crops and plant diseases across different regions. Voice-based assistance can be incorporated to help farmers with low digital literacy interact easily with the system. Additionally, predictive analytics can further enhance decision-making and farming efficiency.