

Krishi AI: Intelligent Chatbot For Agricultural Advisory And Market Access

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Abstract- Agriculture plays a vital role in India's economy, yet farmers face multiple challenges such as lack of real-time information, poor access to markets, and limited technological support. This paper presents Krishi AI, an intelligent AI-based chatbot designed to provide agricultural advisory services, real-time market insights, and multilingual interaction. The system integrates Artificial Intelligence, Natural Language Processing, and location-based services to enhance decision-making for farmers. It aims to bridge the gap between traditional farming practices and modern digital solutions by offering a user-friendly platform that supports both online and offline functionalities. The proposed system acts as an intelligent virtual assistant capable of responding to farmers' queries related to crop selection, soil health, weather forecasts, pest control, irrigation techniques, and market prices (APMC rates). The chatbot is designed with a user-friendly interface supporting regional languages to ensure accessibility for rural users with varying literacy levels. It also integrates location-based services to deliver personalized recommendations based on state, district, and local agricultural conditions. The system architecture combines machine learning-based intent classification with a knowledge base of agricultural data sourced from government portals and agricultural research institutions. Additionally, the chatbot can be deployed on mobile and web platforms, ensuring wide accessibility. The expected outcome of this system is to enhance decision-making efficiency for farmers, reduce dependency on intermediaries, and promote smart agriculture practices. By bridging the gap between modern agricultural knowledge and rural farmers, the AI-based chatbot aims to contribute toward sustainable farming and improved crop productivity. **Keywords** — Artificial Intelligence, Chatbot, Smart Agriculture, Natural Language Processing, Farmer Assistance, Machine Learning, APMC, Precision Farming.

Keywords: Artificial Intelligence, Chatbot, Agriculture, APMC Market, Flutter, Firebase, Smart Farming

I. INTRODUCTION

Agriculture is the backbone of the Indian economy, supporting a large percentage of the population. However,

farmers often face difficulties in accessing timely and reliable information regarding crop management, weather conditions, and market prices.

With advancements in Artificial Intelligence (AI), it is now possible to develop intelligent systems that assist farmers in decision-making. Krishi AI is designed as a smart chatbot system that provides real-time agricultural advisory, nearby APMC market details, and multilingual communication.

The system aims to enhance productivity, reduce losses, and improve accessibility to agricultural knowledge using modern technologies. One of the major limitations faced by farmers is the lack of timely and accurate information. Traditional agricultural advisory systems depend heavily on field visits by experts or government extension services, which may not always be available or accessible, especially in remote rural areas. Additionally, language barriers and low digital literacy further restrict farmers from accessing modern digital solutions. As a result, there is a strong need for an intelligent, accessible, and user-friendly system that can provide agricultural guidance in real time. With the rapid advancement of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP), new opportunities have emerged to transform traditional agriculture into smart agriculture. AI enables systems to learn from large datasets, identify patterns, and provide predictive insights that can assist in decision-making. NLP allows machines to understand and process human language, making it possible to build conversational systems such as chatbots that can interact with users in a natural and intuitive manner. An AI-based farmer chatbot is an intelligent conversational system designed to assist farmers by providing instant solutions to their agricultural queries. These chatbots can operate through mobile or web platforms and support multilingual communication, which is particularly important in a diverse country like India where farmers speak different regional languages. By integrating AI techniques, the chatbot can understand user queries related to crop selection, soil health, irrigation methods, fertilizer usage, pest and disease management, weather forecasting, and market price trends. Furthermore, integration with external data sources such as

meteorological departments, agricultural research databases, and Agricultural Produce Market Committee (APMC) price systems enhances the accuracy and relevance of the responses.

II. PROBLEM STATEMENT

Farmers encounter several issues such as lack of awareness about market prices, difficulty in locating nearby APMC mar-kets, language barriers, and limited access to expert guidance. Traditional systems do not provide integrated solutions combining advisory services, location-based market access, and multilingual support. Therefore, there is a need for an intelligent system that can provide real-time assistance and simplify decision-making for farmers. Therefore, there is a strong need for an intelligent, automated, and interactive system that can provide real-time, personalized, and multi-lingual agricultural assistance. The proposed AI-based farmer chatbot aims to address these challenges by enabling farmers to interact in natural language and receive accurate, location-based agricultural guidance in a simple and accessible manner.

III. LITERATURE SURVEY

Various AI-based agricultural systems have been developed for crop prediction, disease detection, and advisory services. However, most systems lack integration with real-time market data and multilingual capabilities.

Existing chatbots focus on limited functionalities and do not provide location-based APMC market recommendations. Krishi AI aims to overcome these limitations by integrating multiple services into a single platform. Additionally, systems like AgroLLM further highlight the use of advanced large lan-guage models combined with agricultural databases to enhance knowledge transfer. These models achieve high accuracy in answering agricultural queries and improve response relevance through continuous feedback mechanisms.

IV. OBJECTIVE

The main objectives of Krishi AI are:

The specific objectives of this project are as follows:

- To develop an AI-powered chatbot system that can under-stand and respond to farmer queries in natural language related to agriculture, crop management, and farming techniques.
- To provide real-time agricultural information, including weather updates, soil health guidance, irrigation methods, pest and disease control

measures, and market price information (APMC rates).

- To support multilingual communication, enabling farmers to interact with the system in regional languages for better accessibility and usability. Integration of machine learn-ing and NLP techniques for accurate intent recognition, query processing, and context-based response generation.
- To offer location-based personalized recommendations, such as suitable crops, fertilizers, and farming practices based on soil type, climate, and regional conditions.
- To reduce dependency on intermediaries and manual consultation, allowing farmers to directly access reliable agricultural knowledge anytime and anywhere.

V. METHODOLOGY

The system is developed using Flutter for frontend and Firebase for backend. The chatbot uses NLP techniques to process user queries.

The workflow includes:

1. User inputs query
2. Chatbot processes using AI
3. Location is detected
4. APMC market data is retrieved
5. Response is displayed

VI. SYSTEM REQUIREMENTS

1. *Software Requirements*
 - Programming Language: Dart
 - Frontend: Flutter
 - Backend Services: Firebase (Authentication Cloud Sup-port)
 - Database: Firebase Firestore
 - Machine Learning: TensorFlow Lite (TFLite)
 - APIs: Weather API, Market Price (APMC) API
 - IDE/Editor: Android Studio, Visual Studio Code
 - Version Control: Git, GitHub
 - Testing Tool: Postman
2. *Hardware Requirements*
 - Processor: Intel i3 or higher
 - RAM: Minimum 4 GB (8 GB recommended)

- Storage: At least 250 GB
- Device: Android smartphone
- Camera: For crop disease detection
- Microphone: For voice interaction
- GPS: For location-based services
- Network: Stable internet connection
- Display: Minimum 5-inch screen

3. System Architecture Diagram

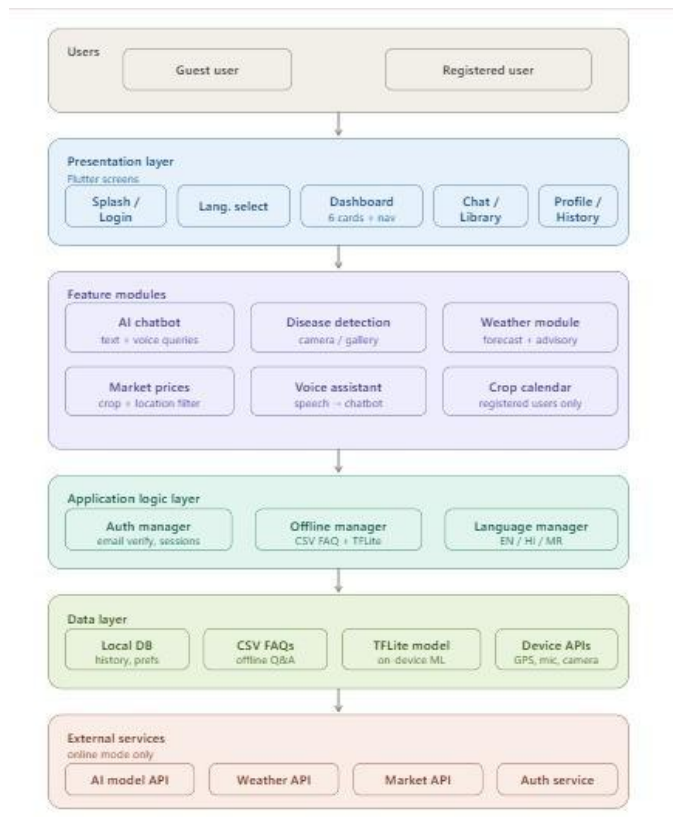


Fig. 1. Krishi AI System Architecture

VII. FUTURE SCOPE

- Improve AI models for accurate crop disease detection
- Integrate IoT sensors for real-time monitoring
- Add voice-based interaction
- Expand offline features
- Include drone-based analysis
- Implement irrigation alerts

VIII. CONCLUSION

Krishi AI provides a reliable and efficient platform for farm-ers by combining AI, location services, and cloud technolo-gies. It helps farmers make informed decisions and improves agricultural productivity.

The system ensures accessibility through multilingual sup-port and offers both online and offline functionalities. Future enhancements can further improve the system's effectiveness and contribute to smart farming.

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