Google Cloud

PRESENTS

Agentic AI Day

Build the next generation of intelligent agents

Powered by H2S

Team Details

a. **Team name: Epochs**
b. **Team leader name: Sibivarshan M**
c. **Problem statement:** Project ‘Kisan’ an AI powered assistant:Farmers face delays in diagnosing crop diseases, lack real-time market price insights, and struggle to access government schemes due to language, literacy, and tech barriers—impacting yield, income, and decision-making.

CORE IDEA:

1. Project Kisan is a voice-first, AI-powered assistant that supports farmers in diagnosing crop diseases, tracking market prices, understanding government schemes,***Purchasing farming products***, and making ***informed planting decisions*** — all in their native language.

2. Powered by Google's Gemini models(vision pro,2.5 flash),vertex AI and deployed using Firebase studio, the agent understands videos,images, speech, and text. It responds with actionable, localized advice and reaches out to human experts when needed.

3. The system is modular, multilingual, and optimized for low-literacy, mobile-first users ,aiming to bring expert-level agricultural support to every farmer, anywhere,anytime.

How is it different from existing solutions?

- Project Kisan addresses this gap by offering a voice-first interface, multilingual support, and the ability to process voice, image, and video inputs. Unlike static data-based tools, it delivers ***context-aware, real-time responses*** using grounded reasoning.
- Most agricultural applications rely heavily on text, offer limited language support, and are often not accessible to farmers. Also offers plantation support considering various factors.

How does it address the problem?

- Farmers can describe issues in native languages,share image/video for crop disease identification,request market trends.
- **The system responds with actionable insights across four key areas:** crop disease identification, market trend analysis, subsidy guidance, and crop planning. In cases where ***diagnosis confidence is low, queries are escalated to agricultural experts*** to ensure accuracy and trust.

Unique Value Proposition (USP):

- Multimodal input support: text,voice, image, and video.
- Regional/native language accessibility with voice interaction.
- Can be used at different regions, crops, and government schemes.
- Integrated expert review system for ambiguous crop disease cases.

List of features offered by the solution

1. Crop Disease Diagnosis

- Farmers can submit images, videos, or voice/text descriptions of crop issues.
- Gemini Vision analyzes the media and identifies likely diseases.
- If the system is uncertain, the case is escalated to agricultural experts or research institutions.

2. Market Price Intelligence

- Real-time crop prices are fetched from government and market APIs (e.g., Agmarknet).
- Gemini analyzes trends and provides actionable recommendations on whether to sell or hold.
- Advice is tailored based on crop type, region, and recent market behavior, viability of commodity.

3. Scheme and Subsidy Guidance

- Uses Vertex AI Search (RAG) to retrieve relevant government schemes from web scraping and policy documents from **https://agriwelfare.gov.in/**.
- Gemini summarizes eligibility criteria, benefits, and application steps in the farmer's native language.
- The document repository is updated regularly from cloud buckets or official portals.

4. Smart Crop Recommendation

- Suggests suitable crops to grow based on:
  - Current season and weather forecasts
  - Local market demand and past price trends
  - Estimated input costs (seeds, fertilizers, etc.) and expected return
- Recommendations are personalized using the farmer's location, soil type, planting history,market trends etc…

5. Voice-First Multilingual Interaction

- Farmers can **interact entirely using voice only**.
- Speech-to-Text and Text-to-Speech support multiple regional languages.
- Designed to be accessible for users with limited literacy or digital exposure.

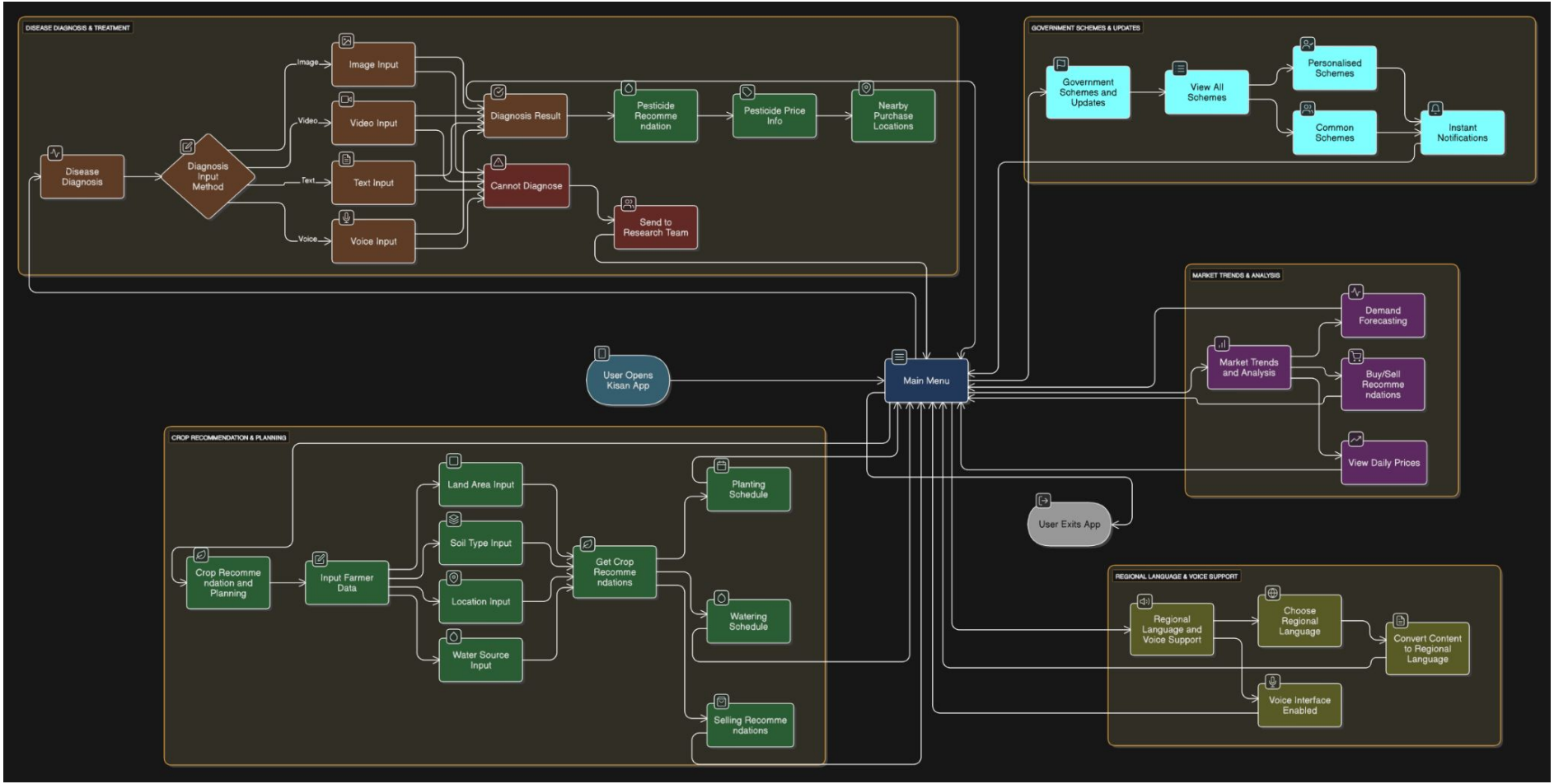
6. Expert Escalation System

- If **AI confidence is low** (e.g., uncertain disease diagnosis), the system logs the query and notifies a human expert.
- This ensures reliability and builds trust in AI-human collaboration.

7. Firebase Infrastructure

- **Firebase Storage**: Used to store images, videos, and documents.
- **Firestore**: Stores user interactions, query history, and expert responses.
- **Firebase Studio**: Used to build and deploy the web or mobile interface and expert dashboard.

Process flow diagram or use-case diagram



Technologies to be used in the solution

1. AI and Reasoning

- **Gemini Flash** – Natural language and market reasoning.
- **Gemini Vision Pro** – Image/video-based crop disease detection.
- **Vertex AI Agent Builder** – Core interaction orchestration.
- **Vertex AI Search (RAG)** – Government scheme document grounding.

2. Voice Interaction

- **Vertex AI STT & TTS** – Full voice-based input/output
- **Google Translate API** – Multilingual support

3. Data & Decision APIs

- **Agmarknet / Market APIs** – Real-time crop pricing
- **OpenWeatherMap API** – Weather for crop planning
- **Gov Docs / PDFs** – Scheme data for RAG

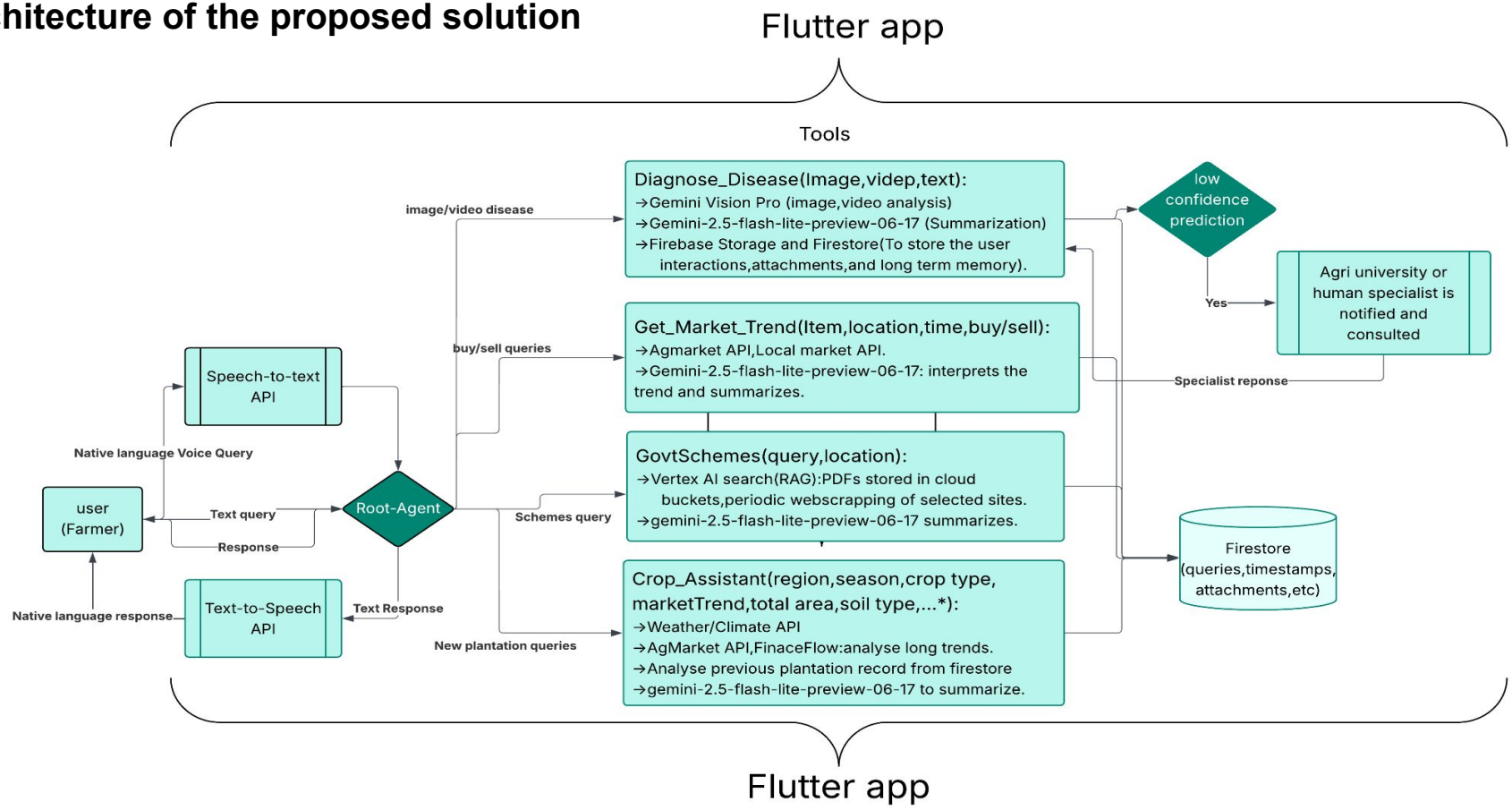
4. Backend Infrastructure

- **Firestore** – Data storage (queries, replies)
- **Firebase Storage** – Image and video uploads

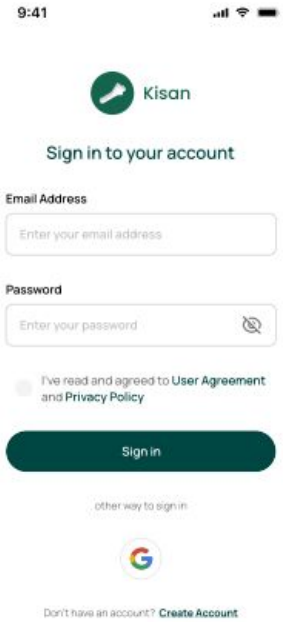
5. Frontend & Hosting

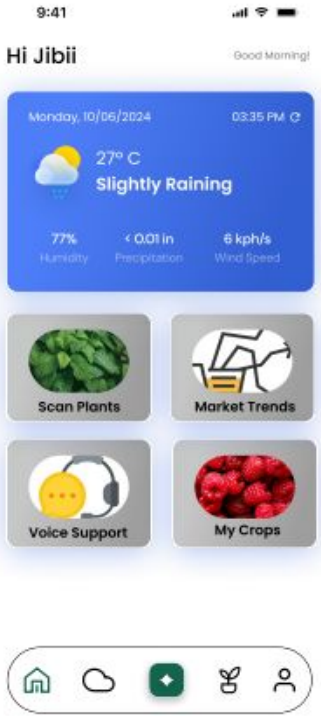
- **Flutter** – Mobile app
- **Firebase Studio** – App deployment

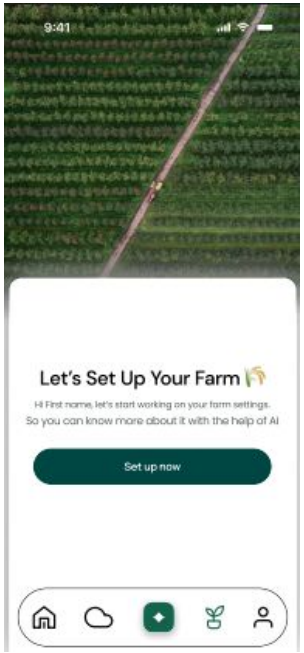
Architecture of the proposed solution

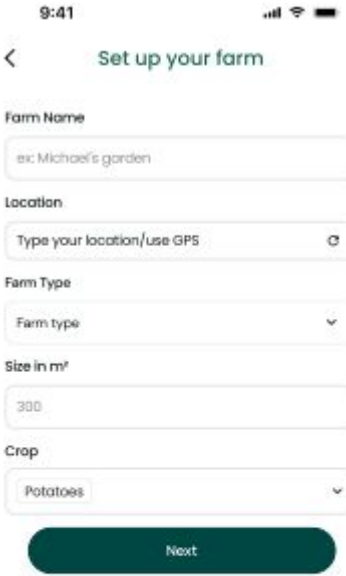


Wireframes/Mock diagrams of the proposed solution:



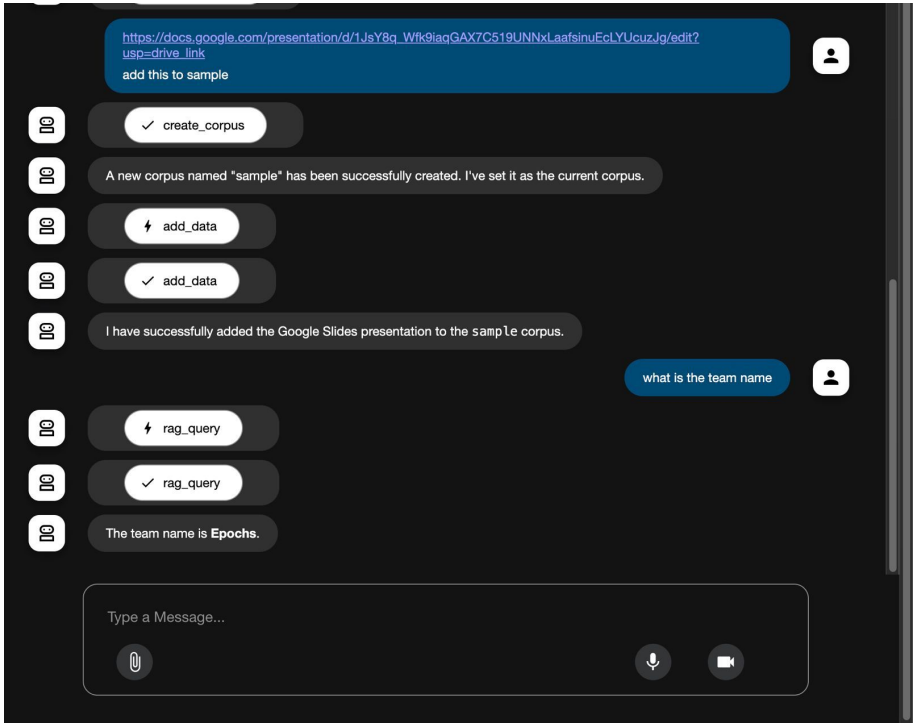


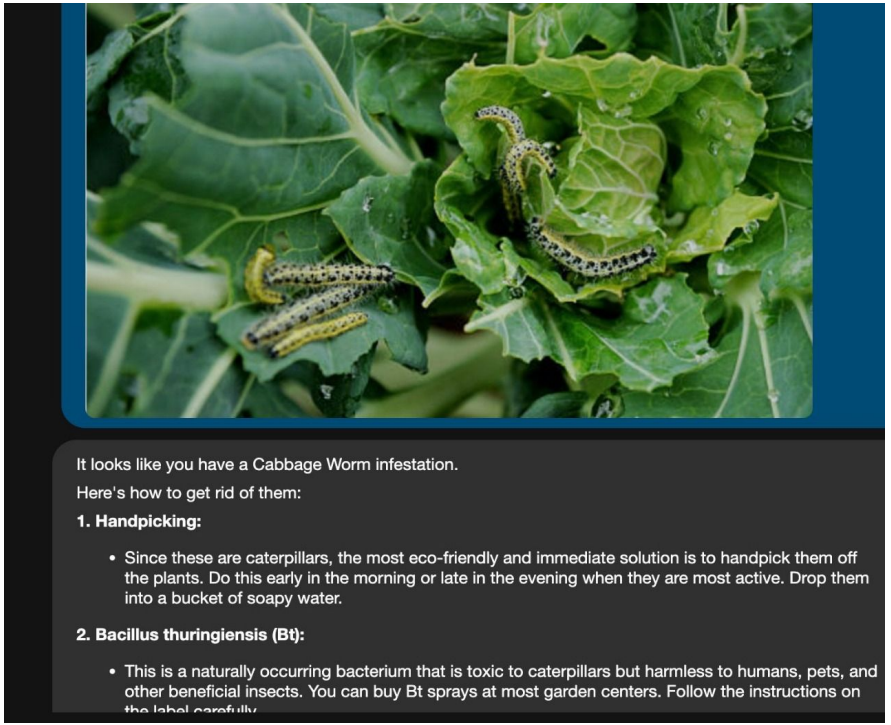




We have implemented a prototype of the project.
Prototype Github link: [Kisan: AI-Powered-Farming-Assistant]

RAG agent and Disease diagnosis Prototype Screenshots:





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Thank you!