

AI for Bharat Hackathon

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Team Name : Lalit Team

Team Leader Name : Lalit Rajpurohit

Problem Statement : Farmers lack timely insights and tools to prevent crop losses, optimize resources, and maximize income.

Brief about the Idea:

KrishiAI is an intelligent agriculture support platform designed to empower farmers by leveraging the power of Artificial Intelligence, data analytics, and mobile technology to address some of the most critical challenges faced in modern farming. The platform provides farmers with real-time insights and decision support tools that help improve crop productivity, reduce losses, and optimize the use of resources such as water, fertilizers, and pesticides. Through advanced image recognition technology, farmers can capture photos of crops using their smartphones to detect diseases at an early stage and receive accurate treatment recommendations, preventing large-scale crop damage. In addition, the platform offers smart irrigation guidance by analyzing soil moisture levels, weather forecasts, and crop requirements to recommend the right amount of water at the right time, helping conserve water and improve crop health. KrishiAI also includes a multilingual AI chatbot that provides instant agricultural advice, answers farmer queries, and shares best farming practices in local languages, making expert knowledge more accessible even in rural areas. Furthermore, the system integrates market price insights and predictive analytics to help farmers make informed decisions about when and where to sell their produce, ultimately increasing their profitability. By combining artificial intelligence with user-friendly mobile applications, KrishiAI aims to bridge the gap between technology and traditional farming, promote sustainable agricultural practices, enhance rural livelihoods, and contribute to overall agricultural growth and food security.

How is it different from existing solutions?

KrishiAI stands out by combining multiple AI capabilities into a single, easy-to-use mobile platform specifically designed for small and medium farmers. Unlike many existing tools that focus on only one feature such as weather updates or market prices, KrishiAI integrates crop disease detection, smart irrigation recommendations, market insights, and a multilingual AI assistant in one ecosystem. The platform is built with an offline-first approach to ensure usability in low-connectivity rural areas, and it provides localized recommendations tailored to crop type, region, and weather conditions. This holistic approach makes it more practical and accessible compared to fragmented solutions currently available.

How will it solve the problem?

KrishiAI solves key agricultural challenges by providing farmers with real-time, data-driven insights that enable better decision-making. Using AI image recognition, farmers can detect crop diseases early and receive treatment recommendations, reducing crop losses. Smart irrigation guidance helps optimize water usage based on soil and weather data, improving efficiency and sustainability. The AI chatbot provides instant expert advice in local languages, bridging the knowledge gap for farmers who lack access to agricultural experts. Additionally, market price insights help farmers decide the best time to sell their produce, improving income stability. By addressing productivity, resource management, and information access together, the platform provides a comprehensive solution to major farming challenges.

USP (Unique Selling Proposition)

The unique strength of KrishiAI lies in its all-in-one intelligent farming assistant that delivers personalized, real-time recommendations through a simple mobile interface. Its key differentiators include offline capability, multilingual AI support, localized insights, and integration of multiple smart farming features into a single platform. By making advanced agricultural intelligence affordable and accessible, KrishiAI empowers farmers to adopt data-driven farming practices without needing expensive equipment or technical expertise.

 List of Features Offered by the Solution:

 **Crop Disease Detection**

- ✓ Detect plant diseases using smartphone camera
- ✓ AI-powered image recognition with confidence score
- ✓ Early detection to prevent crop losses
- ✓ Treatment and prevention recommendations

 **Smart Irrigation Advisory**

- ✓ Soil moisture-based irrigation guidance
- ✓ Weather-based watering recommendations
- ✓ Suggested water quantity and schedule
- ✓ Helps reduce water wastage

 **AI Farming Assistant (Chatbot)**

- ✓ Instant answers to farming questions
- ✓ Multilingual support (local languages)
- ✓ Best practices and expert guidance
- ✓ Voice input support

 **Weather Insights & Alerts**

- ✓ Real-time weather updates
- ✓ Forecast for better crop planning
- ✓ Extreme weather alerts
- ✓ Seasonal recommendations

 **Market Price Insights**

- ✓ Live crop market prices
- ✓ Price trend predictions
- ✓ Sell timing recommendations
- ✓ Helps maximize farmer profits

 **Field Management**

- ✓ Add and manage multiple fields
- ✓ Crop tracking and history
- ✓ Health status monitoring
- ✓ Farm activity records

 **Smart Alerts & Notifications**

- ✓ Pest outbreak alerts
- ✓ Disease risk warnings
- ✓ Irrigation reminders
- ✓ Market change alerts

 **Farm Analytics Dashboard**

- ✓ Crop performance insights
- ✓ Yield tracking
- ✓ Resource usage analysis
- ✓ Decision support metrics

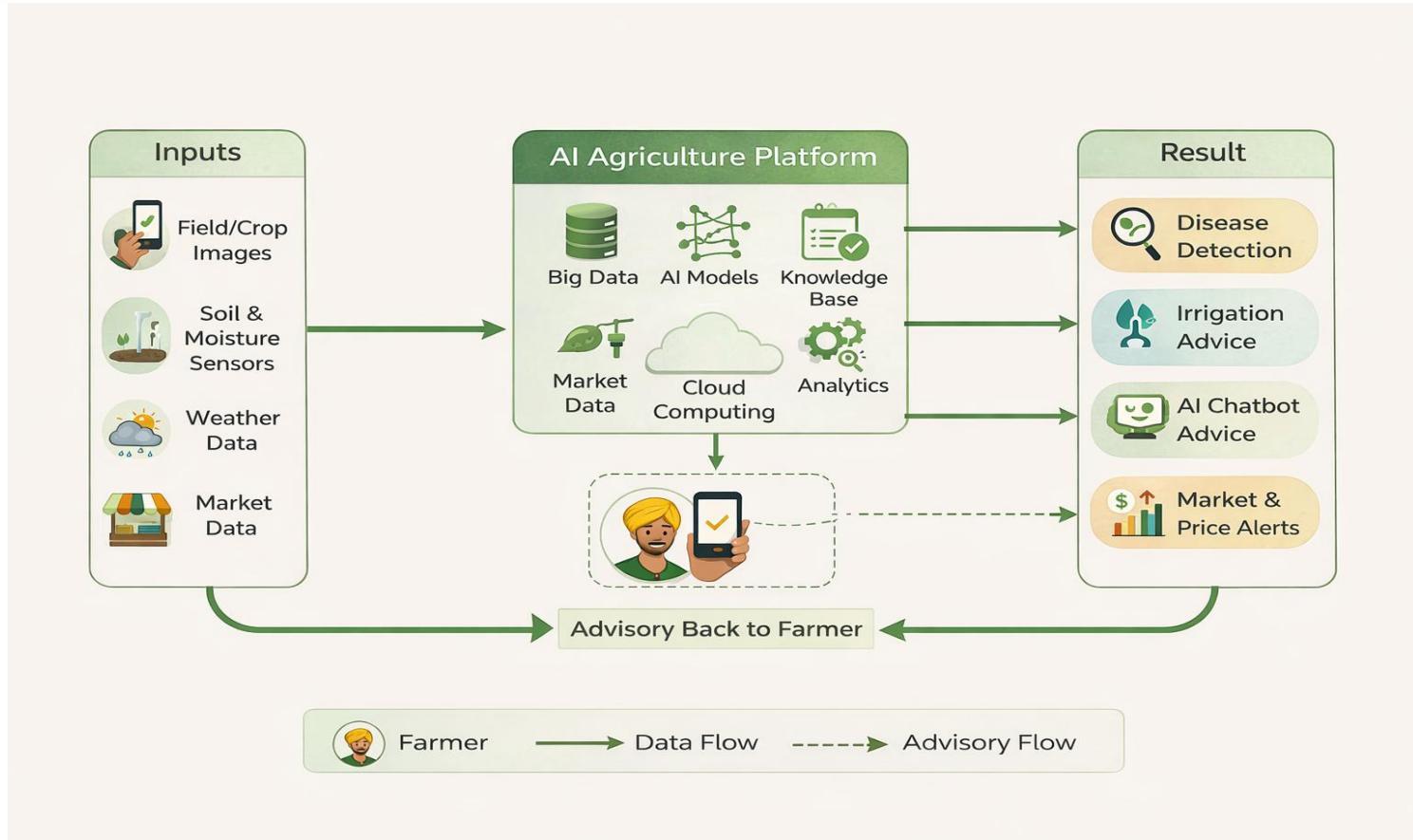
 **Offline Mode Support**

- ✓ Works in low or no internet areas
- ✓ Syncs data when connection returns

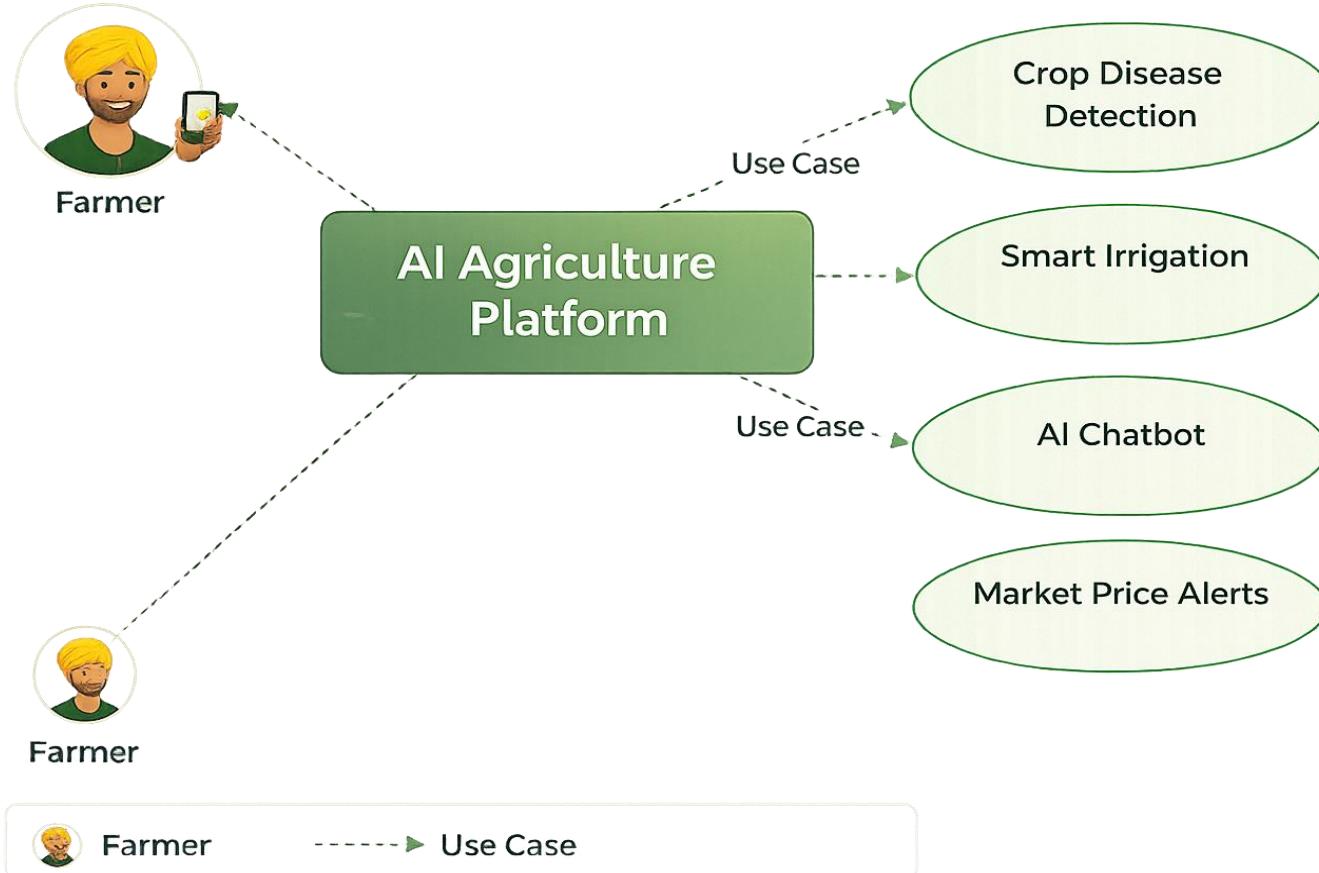
 **Secure Farmer Profile**

- ✓ Personal farm profile
- ✓ Data privacy and secure storage
- ✓ Language preferences

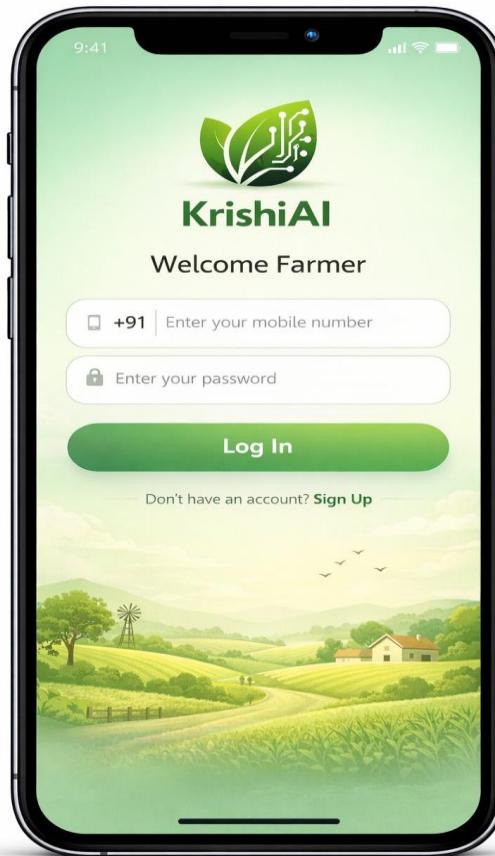
Flow diagram:



Use-Case Diagram:



Wireframes/Mock diagrams:



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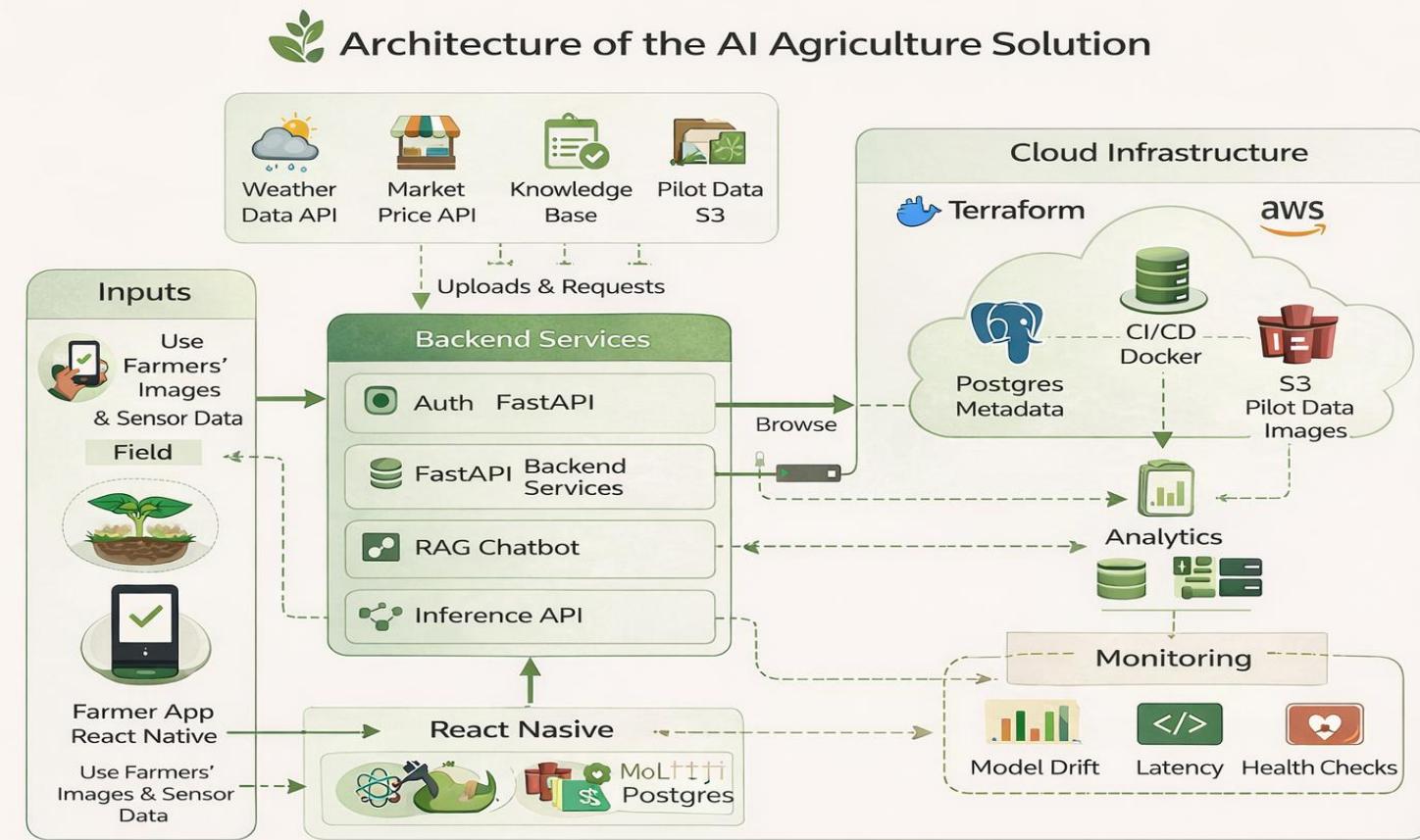
Wireframes/Mock diagrams:



Wireframes/Mock diagrams:



Architecture diagram of the proposed solution:



 Technologies to be Used in the Solution (KrishiAI) Frontend / User Interface

- **React Native** — Cross-platform mobile app development
- **React.js** — Web dashboard for admin and analytics
- **TypeScript** — Type-safe development
- **Material UI / Tailwind CSS** — Modern UI design

 Artificial Intelligence & Machine Learning

- **TensorFlow / PyTorch** — Model training
- **TensorFlow Lite** — On-device mobile inference
- **OpenCV** — Image processing
- **Scikit-learn** — Data analysis and predictive models
- **LLM APIs / NLP models** — AI chatbot

 Backend Development

- **FastAPI / Node.js** — Backend APIs
- **Python** — ML and data processing
- **REST APIs** — Communication layer

 Data & Analytics

- **Pandas / NumPy** — Data processing
- **Power BI / Tableau / Grafana** — Analytics dashboards

**External Data Integrations**

- Weather APIs
- Market price APIs
- Satellite or IoT sensor data

 Cloud & Infrastructure

- **AWS / Google Cloud / Azure** — Cloud hosting
- **Amazon S3 / Cloud Storage** — Image and data storage
- **Docker** — Containerization
- **Terraform** — Infrastructure as Code

 Database

- **PostgreSQL** — Main relational database
- **MongoDB** — Flexible data storage (optional)
- **Redis** — Caching

 Security

- JWT Authentication
- OAuth
- Data encryption

 DevOps & Monitoring

- GitHub Actions / GitLab CI — CI/CD
- Prometheus & Grafana — Monitoring
- Logging tools

Estimated implementation cost (optional):

- 👉 MVP Development: \$30K – \$50K
- 👉 Annual Running Cost: \$10K – \$20K
- 👉 Includes development, cloud, and maintenance

Add as per the requirements for the hackathon:

Estimated Implementation (Hackathon Version)

The proposed solution will be developed as a Minimum Viable Product (MVP) during the hackathon to demonstrate the feasibility and real-world impact of using Artificial Intelligence in agriculture. The implementation will focus on building core features such as crop disease detection using image recognition, a basic AI chatbot for farming assistance, and a simple dashboard to display insights. The system will be designed using open-source tools and lightweight cloud infrastructure to ensure quick development and scalability. The prototype will simulate real-time data using sample datasets and public APIs for weather and agricultural information. The solution will be developed in a modular way so additional features like smart irrigation and market prediction can be easily integrated in future versions. The implementation will emphasize usability, performance, and practical applicability in rural environments with limited connectivity.

Development Timeline (Hackathon Scope)

- **Phase 1:** Requirement analysis and design
- **Phase 2:** Frontend UI development
- **Phase 3:** Backend and API integration
- **Phase 4:** AI model integration
- **Phase 5:** Testing and demo preparation

Resources Required

- Laptop and development environment
- Open-source frameworks and libraries
- Sample datasets and APIs

Expected Outcome

The hackathon implementation will result in a working prototype demonstrating how AI can assist farmers in detecting crop diseases, accessing farming advice, and making better decisions. The prototype will validate the concept, showcase technical feasibility, and highlight the potential for scaling into a full production system.

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