SMART INDIA HACKATHON 2025

AI-Based Farmer Query Support and Advisory System

- **Problem Statement ID-** SIH25076
- **Problem Statement Title-** AI-Based Farmer Query Support and Advisory System
- **Theme-** Agriculture, FoodTech & Rural Development
- **PS Category-** Software
- **Team ID-** 50076
- **Team Name-** Hell Rangers

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AGRI FORGE

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The Problem

- **Language Barriers :** 70% farmers can't access help due to language
- **BarriersExpert Shortage :** 1 expert per 1000 farmers (1:1000 ratio) - not enough support
- **Rapid Disease Spread :** Crop diseases spread fast - need instant solutions
- **Ineffective Solutions :** Farmers often don’t get results even after following suggested advice, leading to frustration and crop loss
- **Information Gap :** Farmers don’t know yard-to-yard price differences and lose bargaining power.

Explaination Of Proposed Solution

- **Multilingual AI :** Understands and responds in 10+ Indian languages (supports voice & image inputs)
- **24/7 Agricultural Expert :** Always available with instant, consistent, and scalable advice
- **Early Warning System :** Detects crop diseases instantly, even before visible symptoms appear
- **Adaptive Guidance :** Updates diagnosis based on farmer feedback and escalates to experts if needed
- **Market Price Insights :** Provides real-time and predicted crop prices using nearby yard data and weather-based yield forecasts

Innovation & Uniqueness

- **Location-Based Language :** Automatically sets the app interface and AI responses to the farmer’s native state language.
- **Multimodal Intelligence :** Combines voice, text, and image inputs in one system for a complete solution.
- **User-Friendly Farmer Dashboard :** Simplified interface with 3 main buttons designed for low-tech users.
- **Predictive Weather Alerts :** Warns farmers in advance about weather risks and suggests actions to protect crops.

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TECHNICAL APPROACH

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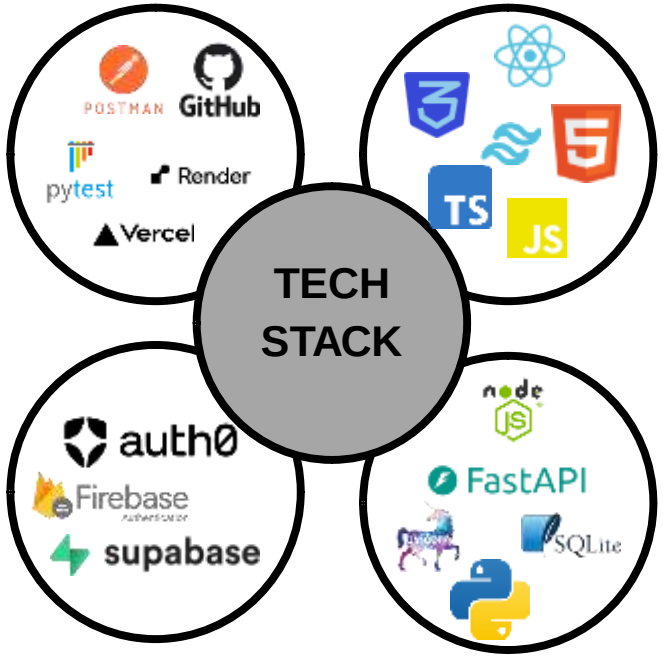
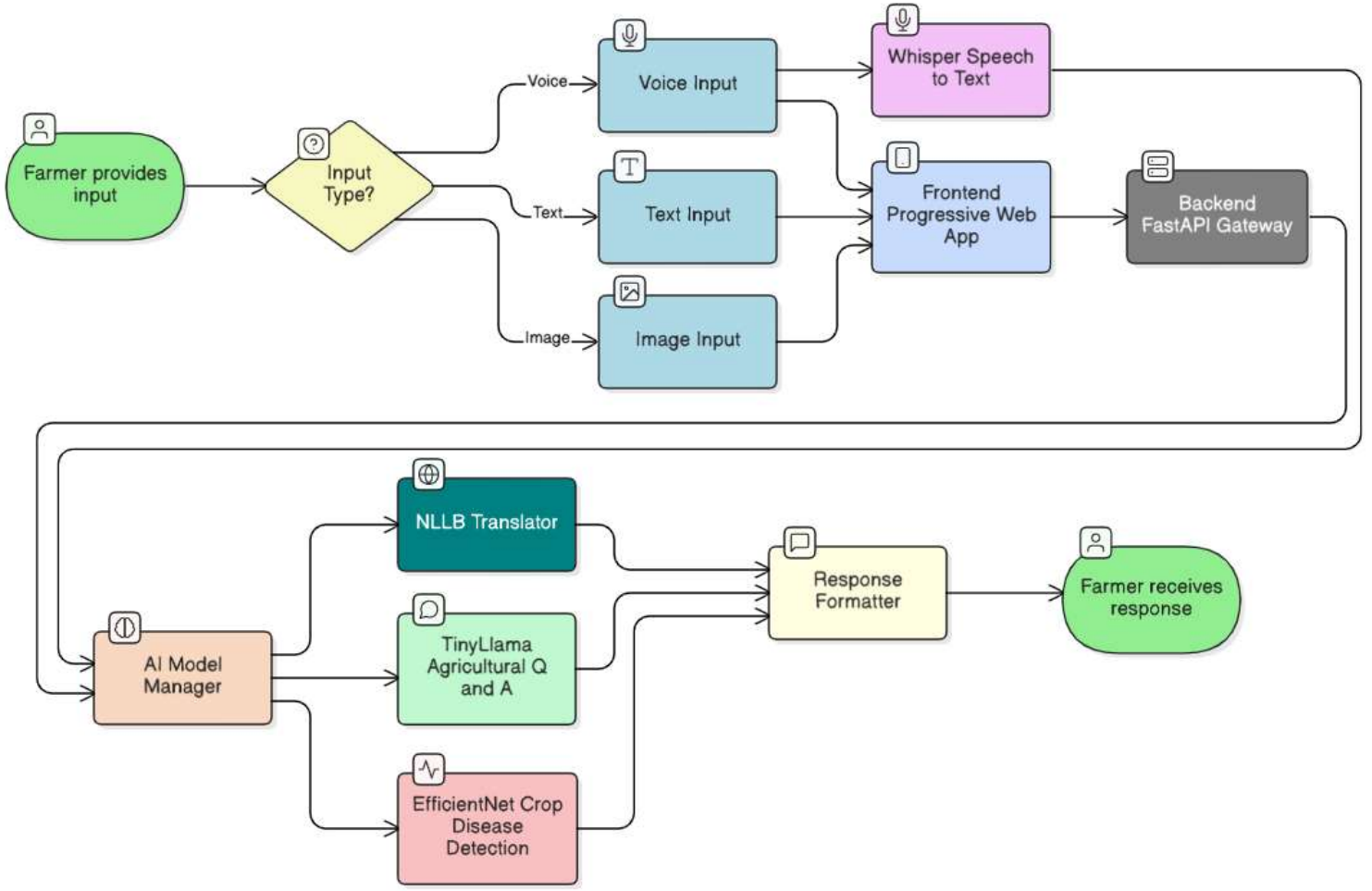
Deployment, Testing & Version Control :
Technologies that streamline code collaboration, testing, and smooth deployment workflows.

Frontend Technologies :
Technologies that create responsive, dynamic, and engaging user experiences.



Authentication & Security :
Technologies that protect user identities, ensure secure access, and safeguard data.

Backend Technologies :
Technologies that power APIs, manage data, and handle core server-side logic.



CLICK HERE TO VIEW THE DETAILED ALGORITHM AND FLOWCHART

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FEASIBILITY AND VIABILITY

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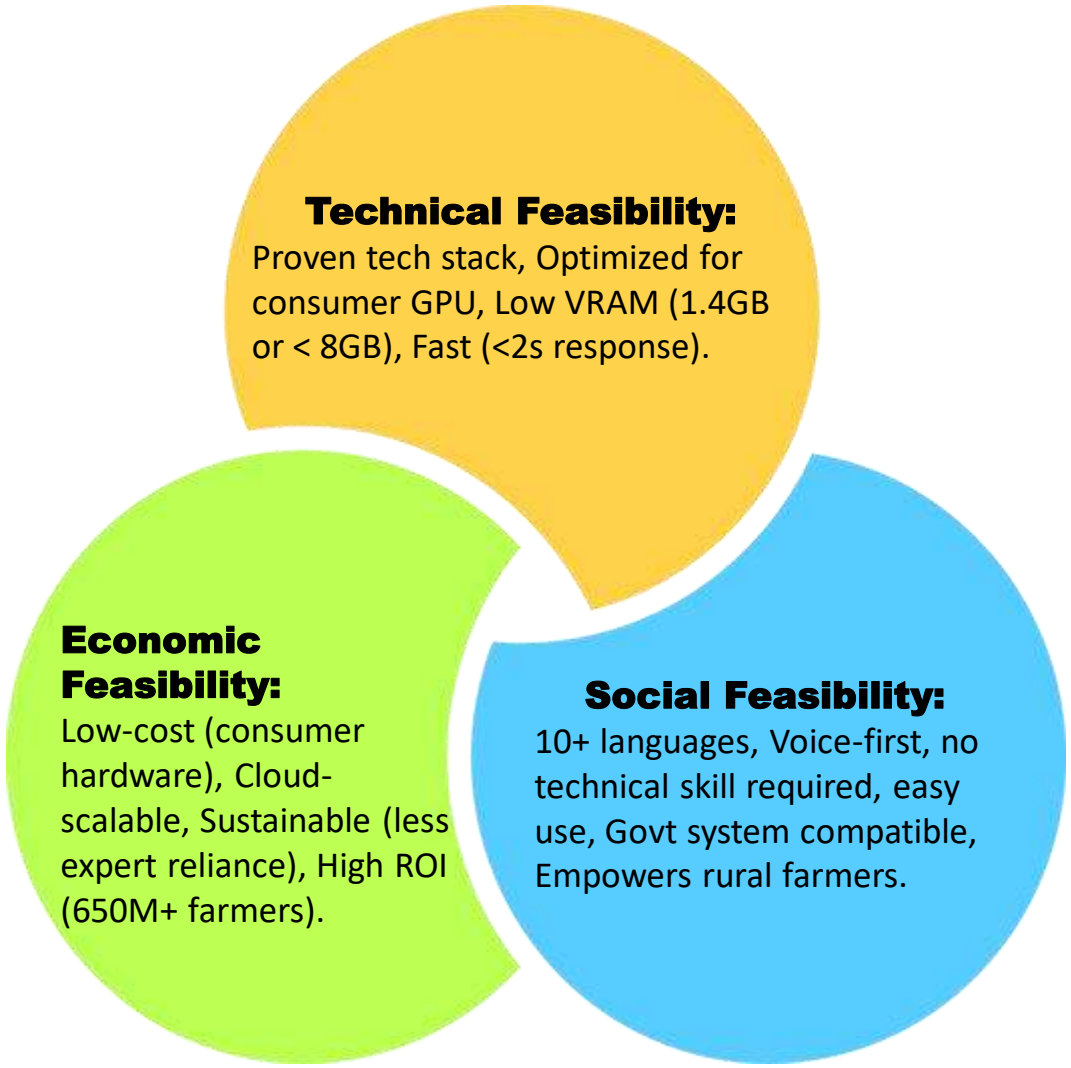
Feasibility Analysis



Challenges

- **Technical Challenges :** Ensuring 90%+ model accuracy, maintaining <4s real-time responses, managing memory efficiently, and enabling offline connectivity support.
- **Adoption Challenges :** Training farmers on new tech, integrating with govt systems, ensuring accurate data, and safeguarding farmer privacy.

Solutions

- **Technical Solutions :** Continuous testing with automated validation, real-time performance/VRAM monitoring, fallback response systems, and offline caching for common queries.
- **Adoption Solutions :** Partner with KVKs for outreach, provide multilingual training, roll out in pilot phases, and empower local champions to guide farmers.

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IMPACT AND BENEFITS

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IMPACTS

➢ **Primary Impact :**

- 650M+ Farmers – Direct, real-time guidance
- Rural Communities – Higher yields & income
- Extension Workers – Improved efficiency
- KVKs – Wider service reach

➢ **Quantified Impact :**

- 90%+ query resolution (first attempt)
- 24/7 availability, anytime support
- 10+ languages(Malayalam Included), breaking barriers
- Voice, text & image access.

BENEFITS

➢ **Social :**

- Faster advice, reduced crop loss
- Community empowerment (women, youth, regional languages)
- Equal access & digital inclusion

➢ **Economic :**

- Higher yields, lower input costs
- Better market access & faster insurance claims
- Boosts GDP, jobs, exports, and food security

➢ **Environmental :**

- Sustainable farming & precision practices
- Water conservation & soil health
- Climate adaptation, resilience & biodiversity protection

1. Personalized, real-time crop guidance

2. Multilingual support breaking barriers

1. 90%+ query resolution accuracy

2. 24/7 automated advisory system

1. Empowers rural communities & youth

2. Increases yields, lowers costs

1. Climate-smart & sustainable practices

2. Continuous learning and improvement

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RESEARCH AND REFERENCES

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REFERENCE	SIGNIFICANCE FOR AGRI FORGE	LINKS
ICAR Digital Agriculture – Government agricultural digitization initiative	Provides trusted crop practices & policies.	🔗
eNAM Platform – National Agriculture Market for crop prices and trade data	Integrates real-time crop price data.	🔗
India Meteorological Department (IMD) – Weather APIs	Offers location-based weather insights.	🔗
Soil Health Card Scheme (Govt. of India)	Enables personalized soil & fertilizer advice.	🔗
National Pest Surveillance System (Ministry of Agriculture)	Supports AI-based pest monitoring.	🔗
Department of Agriculture Development and Farmers' Welfare (Kerala Govt.)	Aligns with regional crop programs.	🔗
PlantVillage Dataset	Trains AI for accurate disease detection.	🔗
Agriculture Scientific Reports (Nature Journal, 2025)	Adds research-backed credibility.	🔗