HACK KRMU 5.0

01

AGRICULTURE + AI INNOVATION

FASAL

PROBLEM STATEMENT ID
[PS-07]

Digital Doctor for Farmers

Empowering Agriculture with **Real-Time AI Intelligence.**

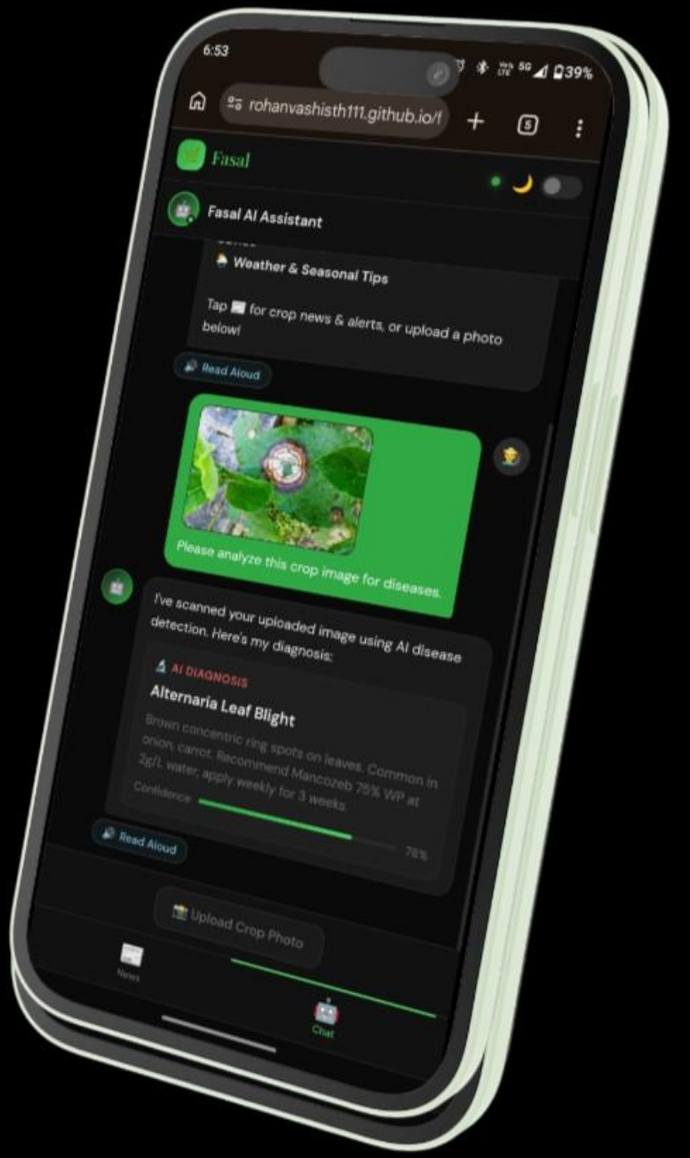
Team Details

TEAM NAME
Script Benders

INSTITUTE
K.R Mangalam University

TEAM ID
HK-119

MEMBERS
- YUG VERMA
- ROHAN
- ANANT KUMAR



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⚠ THE CRISIS

30-40%

Annual crop yield lost to pests & diseases globally

Source: FAO / ICAR Data

CORE PAIN POINTS

Delayed Diagnosis

Farmers wait days for experts to visit, allowing diseases to spread rapidly across fields.

Misinformation

Wrong pesticide use leads to soil degradation, resistance, and crop burning.

High Costs

Excessive chemical spending due to "guesswork" treatment reduces profit margins.

"The Gap: Most existing apps identify the disease but don't provide a structured recovery roadmap."

VS

THE FASAL SOLUTION

02

A 360° AI Health Assistant for Crops

1. **Upload Photo**
   Instant capture via mobile app (offline capable)
2. **AI Diagnosis**
   Identifies disease + severity level (e.g., "Early Blight - Severe")
3. **7-Day Treatment Plan**
   Structured roadmap for complete recovery

- **Actionable Intelligence**
  Specific dosages (e.g., 2g/L of Mancozeb)
- **Recovery Tracking**
  Follow-up scan reminders on Day 7

RECOVERY PROJECTION +85% Effectiveness

Day 1 Day 3 Day 7 (Recovered)

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TE CH STACK & APPROACH

03

THE ENGINEERING BEHIND FASAL

01

Frontend Layer

USER INTERACTION

React.js | html5 | css | Tailwind

- Image Capture / Upload
- Regional news display
- Client-side Compression

02

AI Engine

DEEP LEARNING CORE

Tensor flow | flask api | CNN | gemini api

- Feature Extraction (Leaf Patterns)
- Severity Regression Analysis
- Inference < 200ms

03

Backend

PROCESSING & DATA

Flask api | PostgreSQL | Firestore

- Orchestration & API Management
- Historical Data Logging

04

Output

ACTIONABLE RESULT

Chat | Notifications | SMS

- Disease Prediction + Confidence %
- 7-Day Treatment Roadmap
- Dosage Calculator

INPUT PHASE

PROCESSING PHASE

SOLUTION PHASE

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FLOW OF SOLUTION

04

1 CLIENT LAYER

Progressive Web App

- → Image Capture & Upload
- → Mobile Optimized Interface
- → Voice Playback

Frontend

→

2 API LAYER

Flask REST API

- → Image Preprocessing
- → Inference Routing
- → JSON Response Handling

Python

→

3 DETECTION ENGINE

TensorFlow CNN Model

- → Plant Species Classification
- → Disease Detection
- → Softmax Confidence Scoring

AI Core

→

4 ADVISORY ENGINE

Gemini API Integration

- → Context-Aware Treatment Plans
- → Preventive Advisory Logic

LLM Reasoning

→

5 DATA & CONTEXT

Firebase + External APIs

- → Diagnosis Logs Storage
- → Voice AI (Local Dialect)
- → Regional Agricultural News

Cloud Layer

End-to-End Processing Pipeline

Farmer Upload → AI Detection → Advisory Generation → Context Enrichment → Actionable Guidance

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UNIQUENESS & INNOVATION

05

WHY FASAL WINS

CORE INNOVATION

Recovery Intelligence Layer

Beyond simple detection: A structured path to health

D1-2 — Immediate Intervention
Chemical/Organic dosage application to halt disease spread. Alert neighbors.

D3-5 — Nutrient Optimization
Immunity building via specific fertilizer mix (NPK ratio adjustment).

D7 — Verification Scan
Follow-up AI scan to confirm recovery or adjust treatment plan.

Ecological IPM
Prioritizes bio-pesticides (Neem Oil) before chemicals to preserve soil health.

Market Intelligence
Live mandi price updates to prevent middleman exploitation.

Proactive Weather
"High humidity detected; spray for Blight now" - predictive warnings.

Multilingual + Voice
Breaking barriers with regional language UI and "Read Aloud" for low literacy.

High Accuracy
Current model confidence >78% on validation set (ResNet/EfficientNet).

Edge PWA
Works on entry-level smartphones with low data/offline capabilities.

FEASIBILITY & CHALLENGES

EXECUTION STRATEGY & VIABILITY

Technical Feasibility

Optimized Data Usage — <1MB / Scan

Client-side image compression ensures functionality even on 2G/EDGE networks.

Flask — WS / GCP

Serverless architecture handles millions of simultaneous scans during peak season.

Challenges & Mitigations

Device Constraints

- ✓ PWA Lite Version

Literacy / Language

- ✓ Voice & Regional UI

Business Model Sustainability

Sustainable revenue streams targeting multiple stakeholders in the agri-ecosystem.

B2B: Retail

Commission on fertilizer sales via "Shop" integration.

B2G: Data

Govt. dashboards for disease outbreak tracking.

Freemium

Free scan; Premium "Doctor-on-Call" & IoT sensors.

TARGET USER SEGMENTS

Individual Farmers	Small & Marginal holders	Primary
FPOs	Farmer Producer Orgs	Partner
Agri-Input Companies	Fertilizer/Seed brands	Revenue

RESEARCH & REFERENCE

PROJECTED IMPACT & FUTURE ROADMAP

+20%

FARMER INCOME

Projected annual increase via yield recovery

-15%

PESTICIDE WASTE

Reduction through targeted dosages

~2min

DIAGNOSIS TIME

Vs 3-5 days for manual expert visit

FUTURE ROADMAP

Q1 — SHORT TERM

- ✓ Expand to 50+ Crops
- ✓ 5 Regional Languages

Q2-3 — MID TERM

- IoT Soil Sensor Integration
- Nutrient Advisory Module

Q4+ — LONG TERM

- Satellite Prediction
- FPO Analytics Dashboard

RESEARCH & REFERENCES

- ICAR Guidelines on Integrated Pest Management (IPM)
- FAO Statistical Database (Crop Loss Data 2024)
- Pilot Field Trials: KRMU Agri-Tech Lab (Planned)