CoFarm – Production Ready Project Brief & Requirements (PBR)

Project Overview

CoFarm is a production-ready intelligent agriculture companion platform that integrates AI-powered crop disease detection and IoT-based soil analysis to assist farmers in making data-driven farming decisions.

Problem Statement

Farmers struggle with late disease detection, inefficient irrigation, and lack of scientific guidance due to language barriers and limited access to experts, resulting in crop loss and financial damage.

Proposed Solution

CoFarm provides AI-based crop disease identification, real-time soil monitoring using ESP sensors, and actionable recommendations tailored to crop type, growth stage, and environmental conditions.

Objectives

Enable early disease detection, reduce chemical misuse, optimize irrigation, and make modern farming guidance accessible to farmers.

Core Features

AI Crop Disease Detection, IoT Soil Monitoring, Smart Recommendation Engine, Multilingual Support, Crop Selection, User-Friendly Dashboard.

System Architecture

Frontend Web App, Backend APIs, AI Inference Service, IoT Data Pipeline, Database & Analytics Layer.

Technology Stack

Frontend: React/Next.js
Backend: Node.js or FastAPI
AI: CNN-based Image Classification
IoT: ESP32/ESP8266
Database: PostgreSQL or MongoDB

Deployment: Docker, Vercel, Render

Non-Functional Requirements

Scalability, Security, Performance, High Availability, Error Handling, Logging, Mobile Responsiveness.

Future Enhancements

Community Forum, Marketplace, Location-Based Insights, Advanced Analytics, Government & Agri-Tech Integration.

Expected Impact

Reduced crop loss, improved yield, optimized resource usage, increased adoption of scientific farming practices.