Team Details

Team Name: Green Innovators
Team Leader Name: Komal
Problem Statement: Small and marginal farmers face low productivity and profitability due to poor access to quality inputs, insufficient climate information, outdated farming practices, and inefficient irrigation. Many also stick to traditional crops despite more profitable alternatives. By monitoring weather, soil, and irrigation, we can recommend scalable crops to improve income and sustainability. Addressing these challenges is crucial for enhancing agricultural outcomes in rural areas.

Brief about the Prototype

- **Our AgriSmart empowers farmers by offering tools to optimize water use, enhance crop yields, and improve farming skills. The app features real-time weather updates and soil moisture tracking to ensure precise irrigation. This integrated approach supports sustainable practices and boosts overall productivity.**
- **Users are able to store their crop information and schedules in the app so that it can be used for further data analysis for taking precise decisions regarding irrigation schedules and management.**

Opportunities

- ## How different is it from any of the other existing ideas?
  Localized Real-Time Data: Unlike other platforms, AgriSmart offers highly localized weather and soil data tailored to individual farms.
  Comprehensive Education: Provides extensive training materials offering a more holistic approach than simple advisory apps.
  IoT Integration: Uses soil moisture sensors to provide real-time data, ensuring accurate and actionable insights.

- ## How will it be able to solve the problem?
  Data-Driven Decisions: Real-time weather updates and soil moisture data help farmers make informed irrigation decisions.
  Personalized Advisory: Tailored irrigation schedules and climate adaptation tips reduce crop failures and improve yields.
  Continuous Learning: Educational resources and expert interactions keep farmers updated on best practices and new technologies.

- ## USP of the proposed solution
  Real-Time, Localized Data: Offers hyper-local weather forecasts and soil moisture data.
  Integrated Education Platform: Combines training materials and data driven advice in one app.
  IoT-Enabled Insights: Uses IoT sensors for precise soil moisture monitoring and data-driven irrigation scheduling.

Weather Updates

- **Purpose:**
  - Provide users with the latest weather information for their specified location.
  - Ensure users have up-to-date weather details to make informed decisions.

Location-Based Queries

- **Dynamic Location Input:**
  - Allows users to enter any location to get weather updates specific to that area.

User Interaction Flow

- **Flow Diagram:**
  - **User Input → Weather API Processing → Data Retrieval → Return Response**

Chatbot

- **Purpose:**
  - Assist users by answering common questions and providing relevant information.
  - Guide users to appropriate sections for more detailed information.

Core Features

- **Greeting & Engagement:**
  - Welcomes users with personalized greetings.
- **Common Queries Handling:**
  - Responds to typical questions related to weather, soil fertility, and farming techniques.
- **Guidance on Resources:**
  - Directs users to specific panels for weather updates or educational resources.
- **Flow Diagram:**
  - **User Input → Chatbot Processing → Fetch Information (if needed) → Return Response**

Soil Moisture Calculation

Measurement Method:

- **Step 1: Soil Sample Collection**
  - Collect a soil sample from the field.
- **Step 2: Weigh Soil Sample (Wet)**
  - Measure the weight of the soil sample with moisture content.
  - **Formula:** Wwet (Weight of soil with moisture)
- **Step 3: Dry Soil Sample**
  - Dry the soil sample in an oven/ on stove to remove moisture.
- **Step 4: Weigh Dry Soil Sample**
  - Measure the weight of the dried soil sample.
  - **Formula:** Wdry (Weight of soil without moisture)
- **Step 5: Calculate Soil Moisture Content**
  - Soil Moisture Content (%)=(Wwet−Wdry)/Wdry)*100

Educational Resources

Access Comprehensive Information:

- **Articles & Guides:**
  - Explore detailed articles and guides on climate management, irrigation techniques, and crop management.
- **Educational Videos:**
  - Watch instructional videos that cover a wide range of agricultural topics, including soil health and pest control.
- **Crop Advice & Suggestions:**
 - Get expert advice on selecting and managing crops based on local climate conditions and soil types.

Search Bar for Easy Access:

- **Instant Search:**
  - Utilize the search bar to quickly find specific topics or resources within the educational section.

Process flow

1. **User Registration and Setup**:
   - Farmer registers on the app and inputs farming details.
2. **Real-time Data Collection**:
   - Calculate soil moisture.
   - Weather API provides localized weather forecasts.
3. **Data Analysis and Advisory**:
   - App analyzes data to generate personalized irrigation schedules.
   - Provides climate adaptation tips based on weather forecasts.
4. **Training**:
   - Users access tutorials, guides, and participate in forums.
5. **Action and Feedback**:
   - Farmers implement recommendations and provide feedback.
   - Continuous improvement based on user input.

Process flow diagram
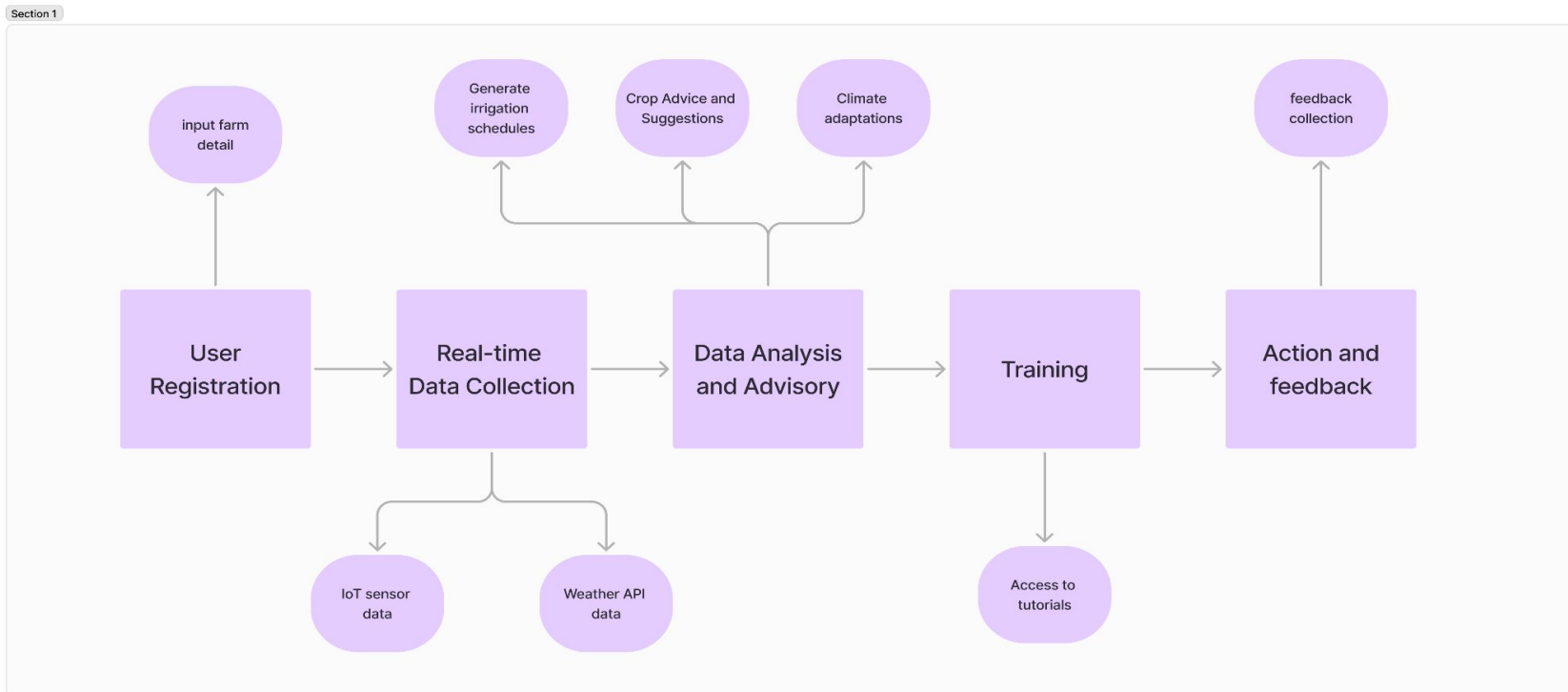
Wireframe of the proposed Solution
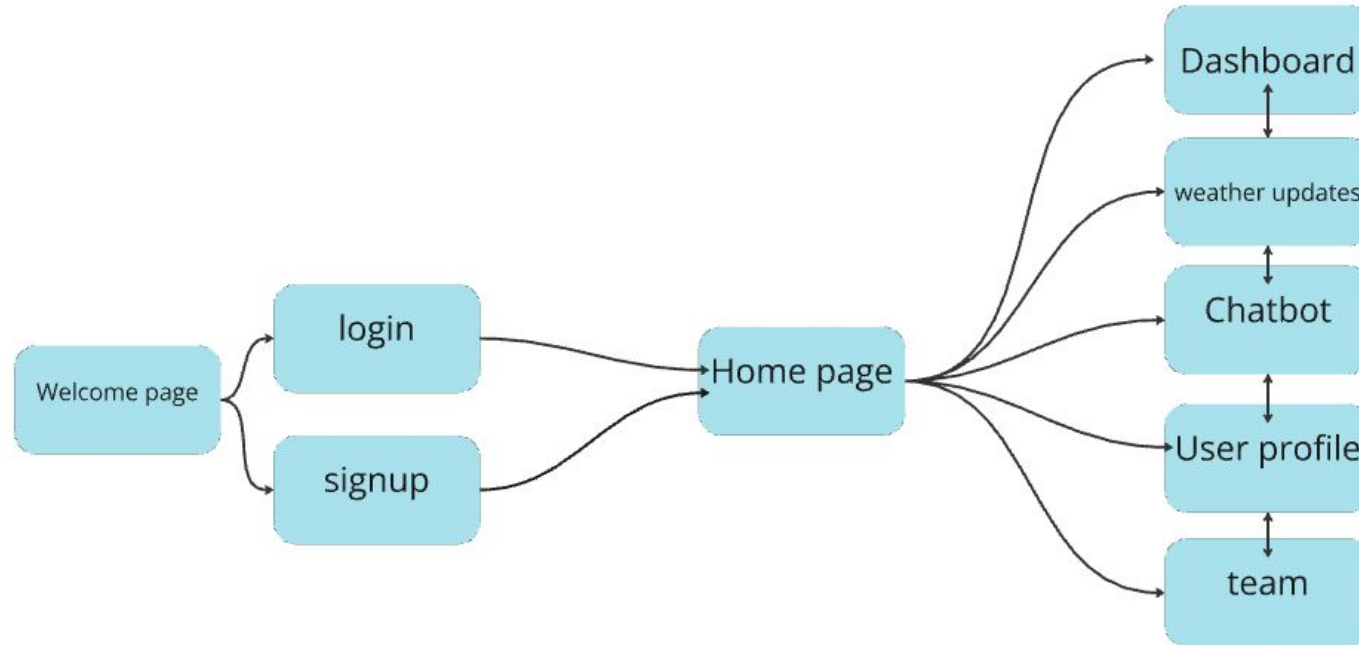
Architecture diagram of the proposed solution

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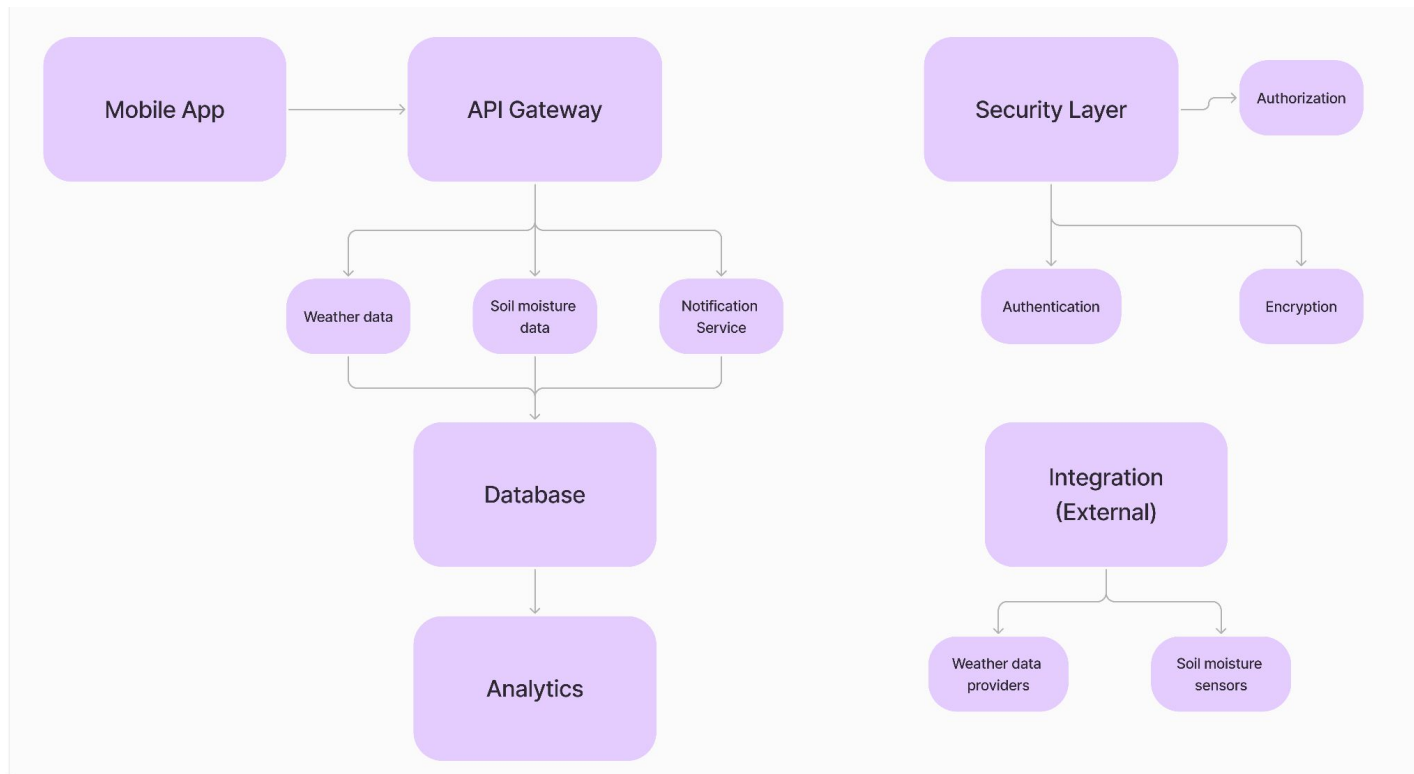
Technologies to be used in the solution

- **Frontend**: HTML,CSS, JavaScript
- **Backend**: Node.js
- **Database**: MongoDb
- **Weather API**: WeatherMap (for real-time weather updates)
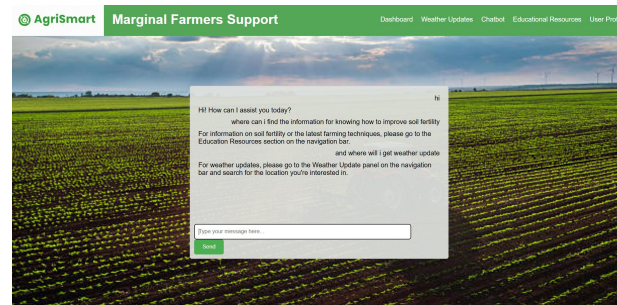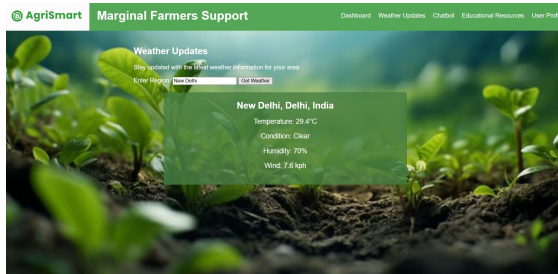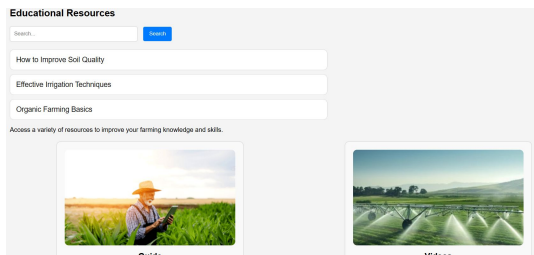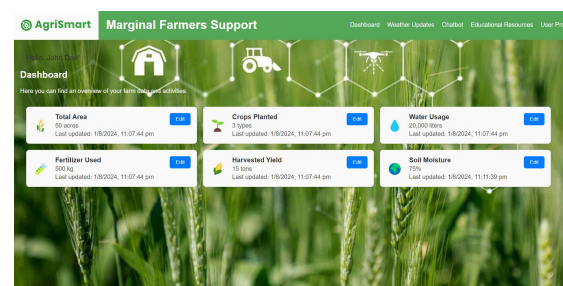- **Search API :** Serp API

Snapshot of the prototype
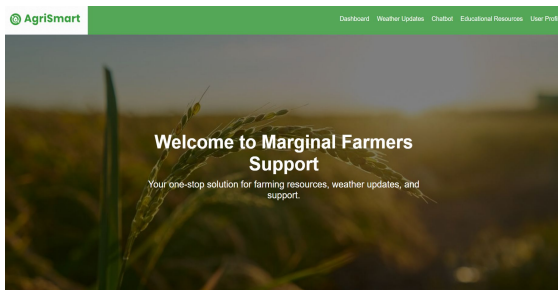
Prototype Performance Report

Objectives

- **Goal:** Enhance agricultural efficiency
- **Focus:** Crop management, resource optimization, actionable insights

Prototype Overview

- **Tech:** Mobile app, IoT, data analytics
- **Features:** Crop monitoring, weather forecasting, resource management

Key Metrics

- **Accuracy:** 90% weather forecast accuracy
- **Efficiency:** 15% reduced resource usage
- **Reliability:** 99% uptime

Future Developments

- App analyzes data to generate personalized irrigation schedules.
- Upgrade chatbot to provide personalized solutions related to crop management and realtime weather forecasts
- Farmers implement recommendations and provide feedback.
- Provide resources and tools focused on sustainable and eco-friendly farming practices.
- Users will be able to compare previous crop profits, perform market analysis, and decide whether to plant a new crop or continue with the same one.
- The platform will facilitate user connectivity, enabling farmers to network and share insights with each other.

Prototype Resources

Github Repository Link: Repo Link

Demo Video Link: Video Link

Final Product Link: Link