



Intermediate Report for Farmcast application

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1. Introduction:

As the agriculture sector remains an important sector worldwide, supporting the population through food production and economic development, farmers roles remain critical; Most farmers face many challenges daily including pest infestations, soil issues, weather related issues and resource management problems.

FarmCast is an application designed for the purpose of not just assisting with one of these issues but countless of them. It serves as an agricultural forecasting and management system, providing the user with real-time based data on the weather and soil compatibility with different climates and crops. **FarmCast** strives to minimize the risk of farmers actions and increase crop yield, all while being the only application that includes all the important features at a second's notice.

FarmCast will target small-holder farmers as well as commercial farmers. Its collection includes a phone application targeting small-holder farmers, as well as a more data filled website targeting commercial farmers.

2. Project management plan

Project management plan: -

1.) First Meeting (Face-to-Face) on 10/26/2024

- We studied the project's topic and familiarized ourselves with the intermediate report.
- Turned the vague topic into a clear-cut idea
- We named the project FarmCast.
- We researched similar projects on the same topic.
- We divided the tasks to be done in the intermediate report.

2.) Second Meeting (Face-to-Face) on 10/27/2024

- We brainstormed features for the application.
- We brainstormed some of the potential functionalities and how they could be implemented in the system
- We started working on points 1,2 and 3 on the intermediate report.

3.) Third Meeting (Face-to-Face) on 10/28/2024

- Completed 4 and 5
- Finalized the progress report

4.) Fourth Meeting (Face-to-Face) on 11/23/2024

- Finalized the Intermediate report
- Made a presentation on the intermediate report

3. Information Collection Method: Interviews and Surveys

Farming and agriculture are without a shadow of a doubt one of, if not the most, important industries in the world. It is by no means an exaggeration to say that they form the backbone of many economies. Thus, it is imperative that the software and hardware of weather prediction systems in agriculture be state-of-the-art, delivering high-quality weather predictions that reflect the critical nature of the data they process.

To accomplish this, we must first gather the required information from industry professionals and the system's stakeholders to navigate how this system can be executed. The two main methods we will use are performing interviews with farmers, agronomists, irrigation engineers, crop consultants etc., as well as carrying out online surveys to get an idea about what our stakeholders and potential users would like to see from this system. Important information such as usage patterns, preferences and which functionalities are the most important to users could all be attained from the survey. Combining these two methods will build a comprehensive understanding of user needs.

4. Analysis of Similar Systems

A.Crop.io

A farm management system software that provides features to monitor crops, forecast yield and more.

B. Agrisync

A mobile platform designed to assist farmers by providing them with communication to agricultural advisors

C. CropWise

A digital agriculture platform made for farmers and agronomists to help optimize farming

5. Strengths and Weaknesses of the Similar Systems

A. Crop.io

Benefits:

- Can track your crop history
- Satellite imagery
- Collaboration tools

Drawbacks:

- Expensive
- Internet dependent

B. Agrisync

Benefits:

- Real time communication features
- Can integrate with other software
- Good support team

Drawbacks:

- Too little features for agricultural management
- Focuses too much on communication

C. Cropwise

Benefits:

- Resource efficiency

- Use of sensors
- Increased productivity

Drawbacks:

- Complexity
- High Costs
- Limited Geographic coverage

6. Proposed Structure of System

Farmcast is a system cultivated to support farmers of all kinds; its structure contains the following:

-UI:

Provides an intuitive way to interact with the system

Platforms include mobile (IOS and Android) and any web browser.

Features:

- Show daily weather forecast
- Notifications for certain weather conditions
- Crop/ irrigation data sections

-Application Layer:

Is the logical layer of the system, it connects the UI to external APIs such as weather APIs and delivers results

-Data management layer:

Where all the systems data is stored.

User database, crop database and weather database.

-External APIs:

Such as weather APIs that give the system real-time weather data, and sensor integration that measures metrics like soil pH and moisture through capable devices.

-Modular Components:

Farmers:

- Easy access to weather forecasts

- Simple access to crop health and irrigation schedules

Agronomists:

- Data analysis for predicting crop performance
- Crop trends and historical data

Irrigation Engineers:

- Irrigation schedule
- Real-time field data

System Admin:

- Access to tools for account management and system monitoring

7. UML Diagrams

Figure 1.1 High level Architecture diagram:

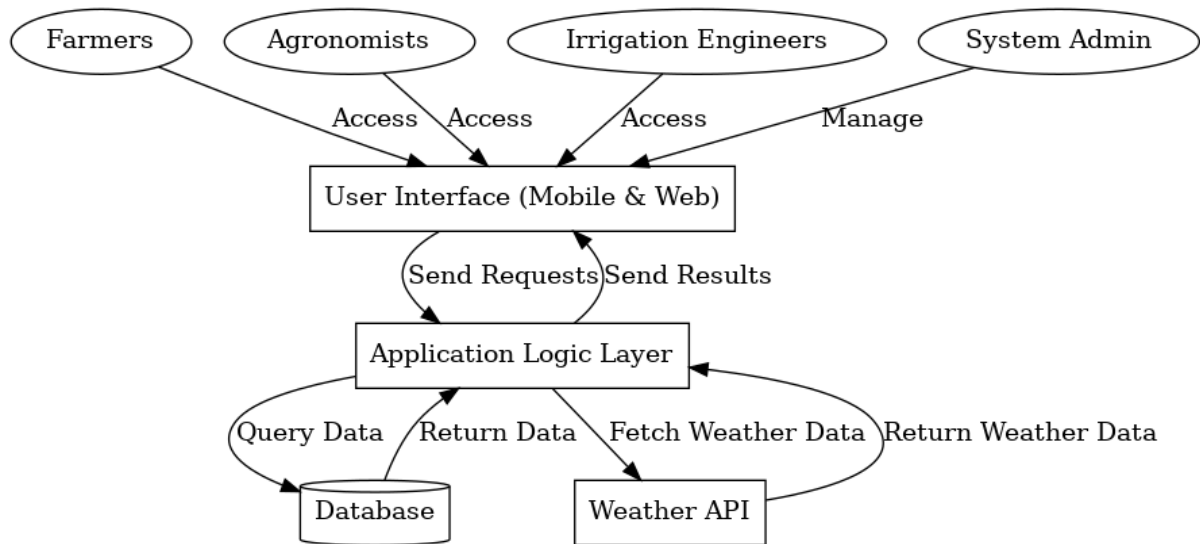


Figure 1.2 Organizational Scheme:

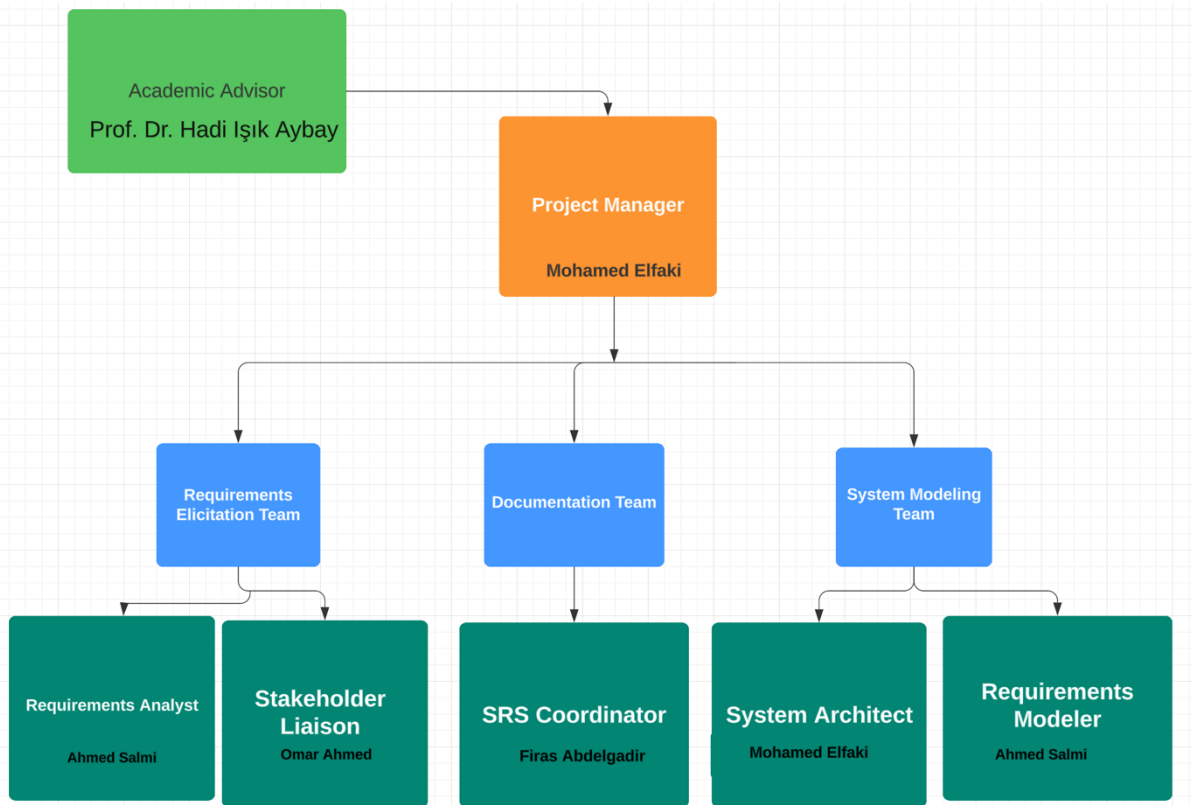


Figure 1.3 Use Case Diagram

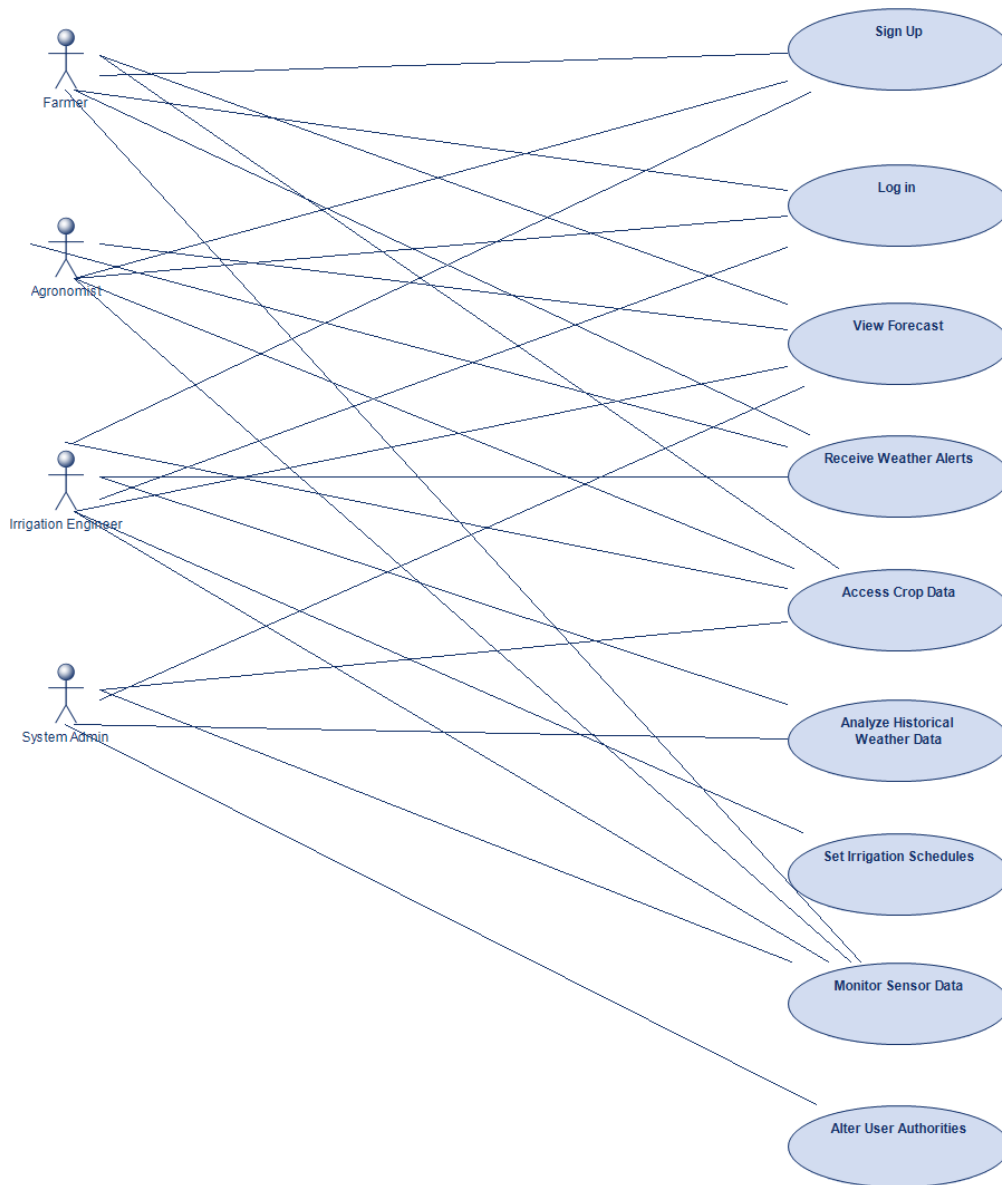


Figure 1.4 State Machine Diagram:

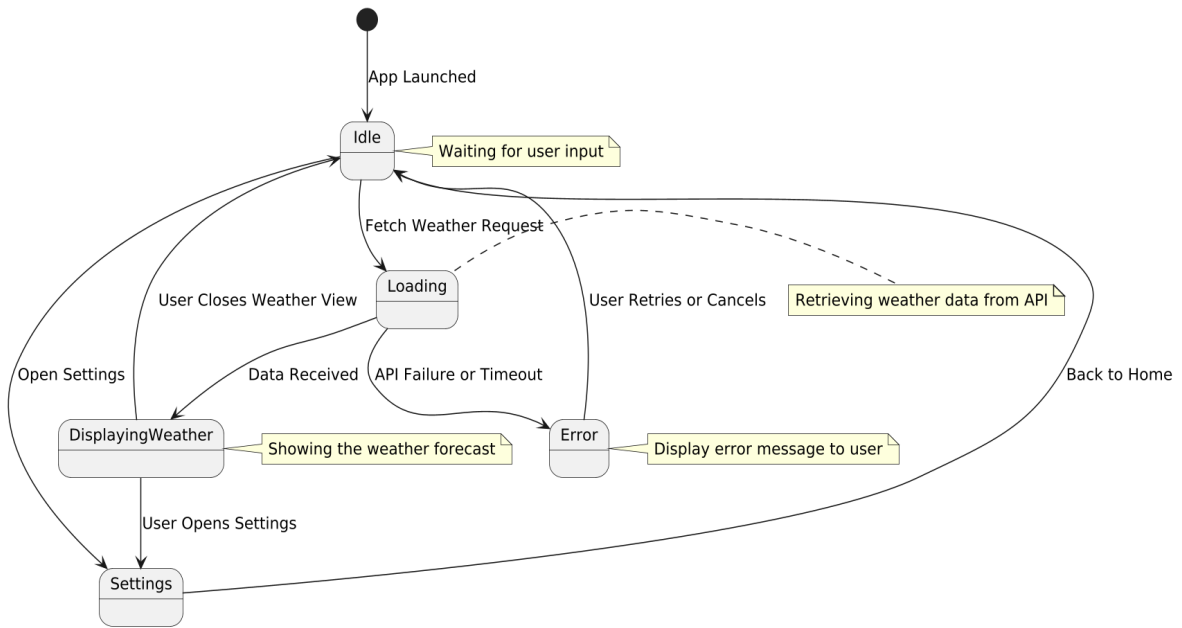


Figure 1.5 Class Diagram:

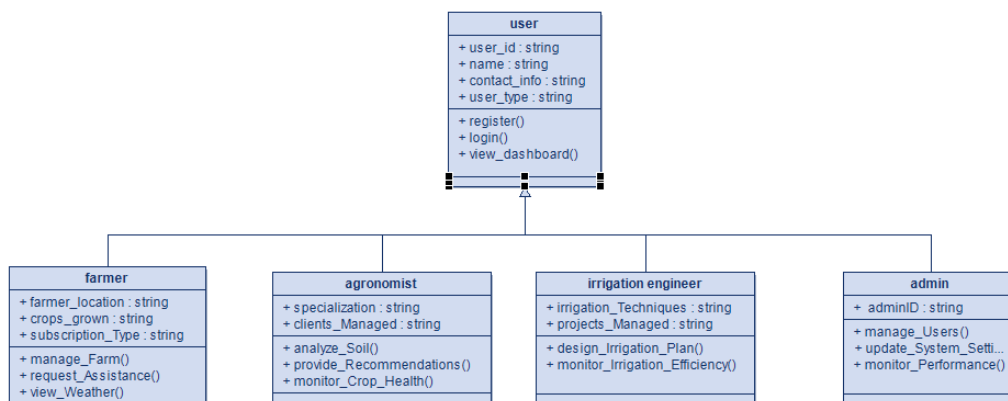


Figure 1.6 Sequence Diagram:

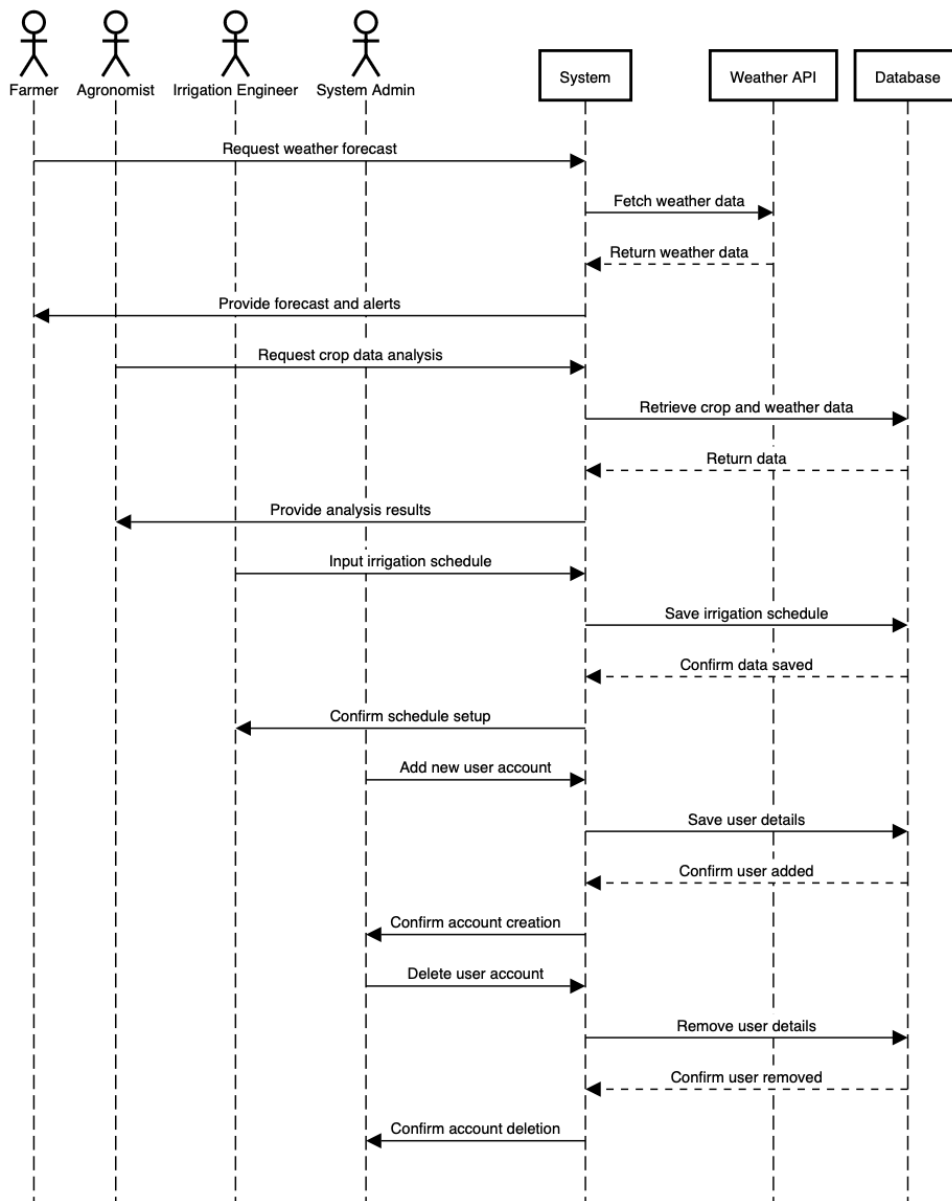
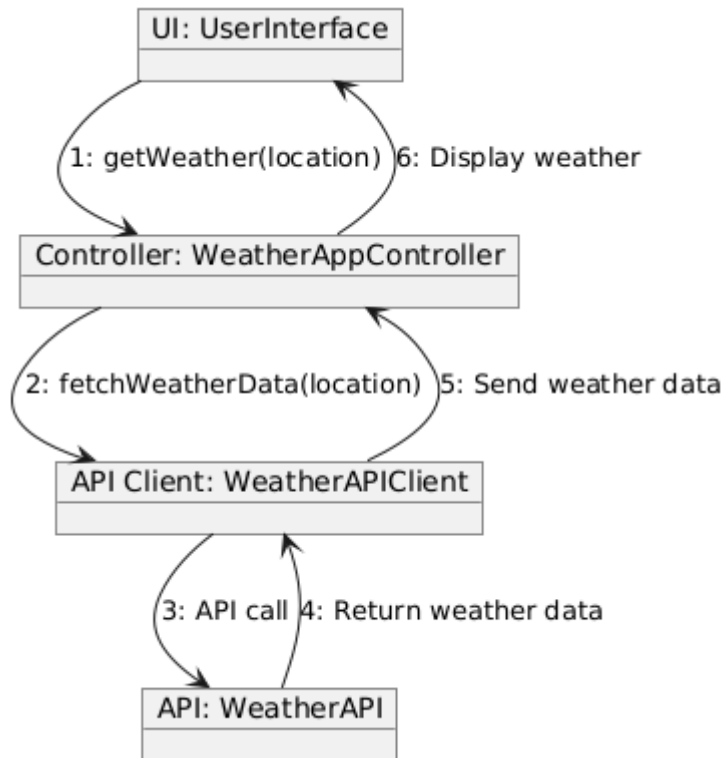


Figure 1.7 Collaboration Diagram:



8. Conclusion

- To conclude, this has been the intermediate report detailing what we've managed to accomplish so far in our project. We held four meetings during which we outlined what our vision for this project is and how we plan on making it a reality, by defining all the different aspects of this project from the project plan, to comparing it to similar projects in the market, as well drawing some UML diagrams to explain how the system is supposed to work.

9. References

AI in Precision Agriculture

Explains how AI and machine learning improve farming by integrating weather forecasting for optimized crop management.

[Data Science Central](#)

Agrometeorology and Crop Prediction

Provides insights into using weather data and forecasting models for better agricultural practices.

[Agrometeorology](#)

Weather-Based Crop Yield Prediction

Discusses models that use weather data to estimate crop yields and prepare for extreme conditions

[AgriSurfer](#)

Irrigation and Weather Forecasting

Highlights how predictive tools assist in managing irrigation based on weather data

[AgriSurfer](#)

Climate Prediction for Farmers

Offers details on long-term weather models to support farming in a changing climate

[Agrometeorology](#)

Sustainable Water Management in Farming

Explains AI tools for optimizing water usage under different weather conditions.

[AgriSurfer](#)

Using Satellite Data in Agriculture

Showcases how weather-based satellite analytics can assist farmers in planning for extreme weather.

[AgriSurfer](#)

Weather Impacts on Crop Development

Describes how weather affects crop health and growth stages with strategies to mitigate risks.

[Agrometeorology](#)

Cropwise Website

Used in similar systems comparison

[Cropwise](#)