Project MSS Data & Security Science March 2024

Technical Project

4th April 2023 –

**Specifications Document**

1. **Overview**

One way to address our farming challenges is through various high-tech practices collectively known as precision agriculture. Precision farmers use technology such as self-steering tractors and aerial drones to find ways of more efficiently using water, fertilizer, and other resources. FarmBot is an open source precision agriculture machine, meaning anyone can take the designs and build their own.

The main goal is to develop a Web Application for displaying and managing the watering activity of the CONNECTED GARDEN (FarmBot). The goal of this project is to make a model of a Web application for the management of this connected garden. The garden will be divided into zones, each having the following characteristics :

— an identification number(x, y and z coordinates),  
— a content (a simple character string), — a watering duration in minutes,  
— and a frequency expressed in days.

1. **FUNCTIONAL REQUIREMENTS**:-

The features we would like in this irrigation management application are as follows :

1. View all zones by number – The garden will be considered as a rectangular area and divided into several small square areas with each side measuring 1 mm. X and Y coordinates are to be assigned to each of these areas/zones starting from the top left corner of the rectangle/garden.

2. Display for each zone the type of plant it contains, the duration and the watering frequency – Each zone/small square can contain one and only one plant/seed at a time . Information regarding the plants will be stored in the database and will be available at any time the user needs.

3. Add a type of plant in an area specifying the duration and watering frequency – User will be able to select a particular zone inside the garden and plant a seed/remove a plant/water a plant at that point. Watering frequency will be defined at the time of planting the seed and it can be modified at any time.

4. Modify one of the characteristics of an area – The user will be able to edit/modify the data stored for a particular area.

5. Delete the contents of an area. – User can remove a plant at any time.

1. **NON FUNCTIONAL REQUIREMENTS:-**
2. Since this is a simple web application for the simulation of a garden , there will be no need of any advanced equipment such as sensors , real life gardening tools, etc. We only have to develop a web application that allows the user to feel like they are performing the gardening activities(Virtually of course!).
3. **SCOPE OF THE APP**:-

For the moment, this web application will be focusing only on the seeding, watering and removing activities in the garden. User will also be able to know more about each plants in the garden and the database as well. Hence, the web app will be a simple demo / simulation of a garden.

1. **USER INTERFACE (UI) AND USER EXPERIENCE (UX) REQUIREMENTS:-**
2. The application must be of dynamic type as the user should be able to view and modify their gardens dynamically at real time.
3. The garden(Rectangular area) will resemble a real garden and images of garden and vegetables will be used in the UI to provide better experience.
4. **DATA REQUIREMENTS:-**
5. Information regarding each zone, plant and the watering schedule need to be stored in the database.
6. Data from the openfarm community are useful for this project.
7. **TECHNICAL REQUIREMENTS:-**
8. A Programming language for developing the web app

Front End : HTML,CSS and JavaScript with ReactJS

Back End : Node.js

Code Editor : Visual Studio Code

1. A database to store the data for the web application (MySQL or PostgreSQL or MongoDB)
2. Plant and vegetable information from openfarm community.
3. A user interface for the app
4. A web server to deploy the web app
5. **ASSUMPTIONS AND CONSTRAINTS:-**
6. Lack of experience in creating a dynamic web application is the main constraint we are facing right now
7. Lack of adequate knowledge in the required languages is another constraint we are concerned about
8. **USE CASES AND SCENARIOS:-**
9. A menu need to be created for the end user to perform the actions like viewing the details of each plan. When a particular zone is selected, another menu field should be there which contains the options for viewing data related to the plant. Also, buttons to delete or add a plant from/into the point/zone. At the time of adding a plant , all the details regarding that plant will be given by the user. (name, type, watering interval, etc.)When a plant is added at a point , it will be added into the database. When a plant is deleted from the garden, it will also be deleted from the database.

Edit Schedule

Schedule for a plant

Overall schedule

Watering Schedules Page 



Chart

Description automatically generated

Garden Name