PROJECT REQUIREMENTS SPECIFICATION

PerfectCrop-The right crop for your soil

UE18CS390A – Capstone Project Phase – 1

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1. Introduction

Our project comes under the domain of Precision Agriculture. It helps farmers make informed decisions with regards to the kind of crop they must invest in to get good returns.

1.1. Project Scope

The aim of this project is to build a predictive model to recommend the most suitable crop to grow based on the various parameters that influence the fertility of the soil.

This project enables the farmers to grow the most suitable crop by factoring in various soil characteristics like N, P, K contents and pH and atmospheric conditions like temperature, humidity and rainfall. This results in greater yield of crop and therefore, stabilizing their financial status.

In this project, the focus is on analyzing the existing data and employing suitable models in order to give the best recommendations possible to the farmers. On the other hand, we will not be diving too deep into the implementation of how the data will be extracted but we will be researching about the methods used to collect the same. One of our data sources is only limited to 22 crops but we will make an effort to find more data in order to make this product more robust with regard to its recommendation power.

2. Product Perspective

Usually, farmers and horticulturists don't have a firm idea as to what is the best crop to be grown due to the limited knowledge of the soil parameters and the surrounding conditions. This often results in poor yield of crops which impacts the farmers financially thereby instigating the farmers to take extreme measures like committing suicide.

So our project is a return of favour to all those hard working men and women who slog all day at the fields so that we are able to consume nutritious food.

2.1. Product Features

Our product ingests parameters that describe the soil and its surrounding atmospheric conditions such as N, P, K, temperature, humidity, pH and rainfall as input and outputs the name of the most suitable crop that could be grown in order to achieve maximum yield and have a successful harvest season.

2.2. Operating Environment

Our plan is to build a web application that provides a simple user interface for the farmers to interact with in order to make informed decisions with regards to crop selection. We will also be developing a mobile version of this web application in order to increase the usability of this application with all the hardware limitations of each person accounted for. This mobile adaptation will be for android devices only.

2.3. General Constraints, Assumptions and Dependencies

- Good quality network connection to use the web application
- Good quality network connection to install the mobile application
    - After the installation is complete, network connection is not required to make use of the application.
- A minimum of 4 GB of RAM is a must for the smooth functioning of the application.
- The mobile must have Android as its operating system.

2.4. Risks

The data which we are utilizing must be from a reliable source as farmers will be investing their time, efforts and resources in growing the crop recommended by our model with the aim of maximizing their profits.

We must also ensure that the mobile application is lightweight so that it can function efficiently even if there's a fluctuation in the network connectivity.

3. Functional Requirements

- After finishing with all the installation and setup, the user needs to input the soil and atmospheric parameters requested by the application.
- The application validates the parameters input by the user and raises an exception in case of an erroneous input. It then prompts the user to change the value and this continues until all the parameters are correctly input by the user.
- The application passes these values to the machine learning models and returns to the user the name and details of the crop that is most suitable to be grown based on the results obtained from the analytics.

4. External Interface Requirements

4.1. Hardware Requirements

A good quality network connection is necessary for using the web application and also for downloading the mobile application. However, on successfully installing the mobile application, network connection is no longer required to use the same. The mobile running the application is required to have a minimum of 4 GB of RAM and must have android as its operating system.

5. Non-Functional Requirements

5.1. Performance Requirement

- Smartphone
  - Android Operating System
  - 4 GB of RAM (Minimum)
  - 5.5 inch display (Minimum)
  - Good quality network connection (Wi-Fi or Cellular Data)
- PC
  - Windows 10
  - 4 GB of RAM (Minimum)
  - Good quality network connection (Wi-Fi or Ethernet)
  - Web Browser like Chrome, Firefox

5.2. Security Requirements

The client will have to create an account in order to make use of our application. The client's login credentials will be stored in an encrypted format and it will be made sure that no other user is able to compromise any other fellow user's account

Appendix A: Definitions, Acronyms and Abbreviations

N: Nitrogen

P: Phosphorus

K: Potassium

pH: power of Hydrogen

GB: Gigabyte

RAM: Random Access Memory

Appendix B: References

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