Software Requirements Specification

For

GreenScan

- **Plant Disease Detection Model**

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Table of Contents

Table of Contents ..... **ii**

1. Introduction **1**

1.1 Purpose 1

1.2 Document Conventions 1

1.3 Intended Audience and Reading Suggestions 1

1.4 Product Scope 1

1.5 References 1

2. Overall Description **1**

2.1 Product Perspective 1

2.2 Product Functions 1

2.3 User Classes and Characteristics 2

2.4 Operating Environment 2

2.5 Design and Implementation Constraints 2

2.6 User Documentation 2

2.7 Assumptions and Dependencies 2

3. External Interface Requirements **2**

3.1 User Interfaces 2

3.2 Hardware Interfaces 2

3.3 Software Interfaces 3

3.4 Communications Interfaces 3

4. System Features **3**

4.1 Disease Detection 3

4.2 Image Processing 3

4.3 Recommended Steps 3

4.4 Suggested Solutions 4

5. Other Nonfunctional Requirements **3**

5.1 Performance Requirements 3

5.2 Safety Requirements 3

5.3 Security Requirements 3

5.4 Software Quality Attributes 4

5.5 Business Rules 4

6. Other Requirements **4**

1. Introduction

1.1 Purpose

The purpose of this document is to specify the requirements and features of GreenScan, a plant disease detection software. This document will provide a clear understanding of the system's functionality, limitations, and objectives

1.2 Document Conventions

The document follows IEEE Standard.

1.3 Intended Audience and Reading Suggestions

This document is intended for the development team, stakeholders, and end-users.

1.4 Product Scope

GreenScan is a plant disease detection software that detects plant diseases in real-time. The software is intended for use by farmers, researchers, and agronomists who need to monitor the health of crops in real-time.

1.5 References

I. Plant Disease Detection by Imaging Sensors
- Anne-Katrin Mahlein (18 January, 2016)

II. Plant diseases and pests' detection based on Deep Learning
- Jun Liu & Xuewei Wang (24 February, 2021)

2. Overall Description

2.1 Product Perspective

GreenScan is a standalone software that can be used on any personal computer or mobile device. The software is designed to be user-friendly and requires no special technical skills to operate.

2.2 Product Functions

The following are the key functions of GreenScan:

- Automatic diagnosis of plant diseases
- Recommended steps to take
- Recommended link to buy the solution from.

2.3 User Classes and Characteristics

The following are the user classes and their characteristics:

- Farmers: Farmers need a software that can detect plant diseases in real-time and provide early detection alerts to prevent the spread of disease.
- Researchers: Researchers need a software that can analyse plant diseases in detail and provide them with accurate data to study the patterns of plant diseases.
- Agronomists: Agronomists need a software that can track the history of plant diseases and provide them with recommendations for disease management.

2.4 Operating Environment

The website can be accessed from any device with internet connectivity.

2.5 Design and Implementation Constraints

- The system must be hosted on a web server and accessible through a web browser.
- The front-end of the system must be built using React JS.
- The back-end of the system must be built using FastAPI and TFServing.
- The system must be compatible with major web browsers, including Chrome, Firefox, and Safari.
- The system must be able to run on both desktop and mobile devices.

2.6 User Documentation

The website will let user know the required next steps as the user proceeds

2.7 Assumptions and Dependencies

- Users will have access to a device with a web browser and a camera for uploading images.
- Users will have basic knowledge of using a web application.
- Users will have access to a stable internet connection.
- The system will be tested using sample images of plants with known diseases.

3. External Interface Requirements

3.1 User Interfaces

The GreenScan system shall have a graphical user interface (GUI) that allows users to upload plant images and view the results of the disease detection process. The GUI shall be intuitive, user-friendly, and accessible.

3.2 Hardware Interfaces

The GreenScan system shall be compatible with standard hardware components, including cameras and image capture devices, as well as any necessary peripherals.

3.3 Software Interfaces

The GreenScan system shall interface with third-party machine learning libraries and frameworks, such as TensorFlow and Keras.

3.4 Communications Interfaces

The GreenScan system shall be able to send and receive data via standard communication protocols, including HTTP, TCP/IP, and SMTP.

4. System Features

GreenScan provides following features:

4.1 Disease Detection

The GreenScan system shall utilize machine learning algorithms to analyze plant images and detect the presence of disease. The system shall be able to detect a variety of plant diseases, including but not limited to blight, rust, and powdery mildew.

4.2 Image Processing

The GreenScan system shall have the ability to preprocess images before analysis, including resizing and normalization.

4.3 Recommended Step

The GreenScan will let the user know about the recommended steps that he/she should take in order to avoid or prevent or heal the plants

4.4 Suggested Solution

GreenScan will also provide recommended site to buy the suggested solution to buy from so that users will have to face no hassle.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The GreenScan system shall be able to analyze images in real-time, with a maximum processing time of 30 seconds per image. The system shall be able to handle a minimum of 1000 images per day.

5.2 Safety Requirements

The GreenScan system shall not pose any safety risks to users or plants.

5.3 Security Requirements

The GreenScan system shall have security measures in place to protect user data and prevent unauthorized access to the system.

5.4 Software Quality Attributes

The GreenScan system shall be scalable, reliable, maintainable, and portable.

5.5 Business Rules

The GreenScan system shall comply with all relevant laws, regulations, and ethical considerations related to plant disease detection and agriculture.

6. Other Requirements

- The system must be able to accurately detect plant diseases
- The system must be able to provide users with information about the detected plant disease, including its causes, symptoms, and potential treatments.
- The system must be able to handle a large number of queries simultaneously.
- The system must be fast, with a response time of less than 5 seconds for each query