Project Scope Statement: Plant Disease Detection System

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Abstract

This document outlines the scope of the Plant Disease Detection System project, designed to assist users in identifying plant health issues based on uploaded images. The system provides insights into potential causes related to environmental factors such as Soil moisture , humidity and temperature, and facilitates user access to nearby plant care centers for further assistance.

1 Context of the Project

The project provides a convenient, tech-driven solution to help users monitor plant health through computer vision and environmental data. Users can upload a plant image for diagnosis, and if the plant is identified as unhealthy, they can check real-time environmental factors (Soil moisture ,temperature and humidity) to gain insights into potential causes. Additionally, the system offers location-based information on the nearest plant care centers for further assistance.

Figure 1: tomato plant disease

2 Problem Statement

Plant diseases can spread rapidly if not detected, impacting plant health and yield. Environmental conditions like Soil moisture, humidity and temperature play a key role in disease development, but without accessible tools for monitoring, users may miss early indicators of plant distress. This project provides an all-in-one solution that allows users to assess plant health and understand contributing factors in real-time.

3 Ambitions

Our objective is to create a system that allows users to upload images for plant disease diagnosis, monitor real-time environmental conditions, and easily locate nearby plant care centers. This comprehensive approach enables users to proactively manage plant health and seek expert assistance if needed.

4 Scope Description

Target areas include agricultural zones, gardens, or regions where plant health monitoring is crucial.

Offers quick plant disease detection and insights into Soil moisture ,humidity and temperature.

Provides location-based recommendations for the nearest plant care facilities.

Designed for farmers, plant enthusiasts, and organizations looking to improve plant health through accessible monitoring and resources.

5 Architecture

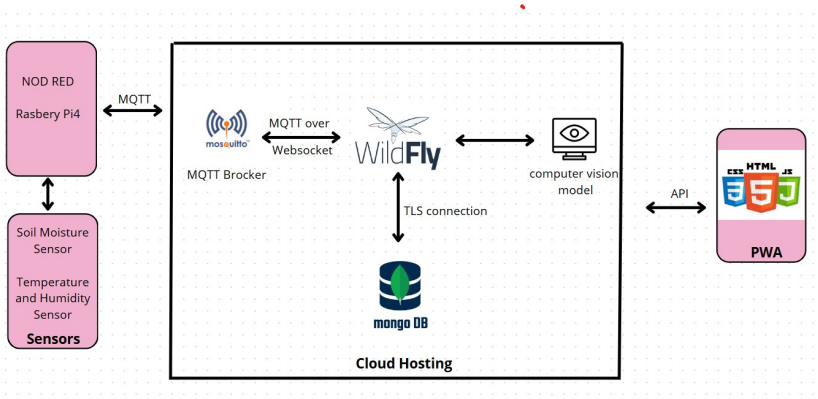

Figure 2: project architecture

6 Business Model

6.1 Customer Segments

- Farmers, agricultural businesses, and plant care providers who require effective tools for managing plant health and maximizing crop yields.
- Individual plant owners and gardening enthusiasts looking for quick and reliable diagnostics for their plants.
- Educational institutions and research organizations that may utilize the system for teaching or research purposes in botany and agriculture.
- Gardening clubs and community gardening projects that can benefit from collaborative health assessments of plants in shared spaces.

6.2 Value Propositions

- Accurate and rapid plant disease identification through advanced image recognition technology.
- Insights into environmental conditions, such as Soil moisture ,humidity and temperature, that affect plant health.

- Access to a database of nearby plant care centers for users needing professional assistance.
- User-friendly interface and seamless experience for both casual users and professionals.

6.3 Channels

- A web application accessible via desktop and mobile devices for easy image uploads and information access.
- Social media platforms for marketing, engagement, and customer support.
- Collaboration with agricultural extension services and local nurseries to reach farmers and plant care providers.
- Online communities and forums for gardeners and plant enthusiasts for word-of-mouth promotion.

6.4 Customer Relationships

- Building a community around the product via social media and forums where users can share experiences and solutions.
- Regular updates on plant health tips and relevant information to maintain user engagement and trust.

6.5 Revenue Streams

- Subscription model for advanced features, including detailed reports on plant health and insights into environmental data.
- Pay-per-use fees for professional assessments or consultations with plant care experts.
- Affiliate marketing partnerships with local plant care centers and agricultural suppliers.
- Potential advertising revenue from related businesses on the platform.

6.6 Key Activities

- Developing and maintaining the machine learning algorithms for disease detection and environmental analysis.
- Continuous updates and improvements to the user interface and overall user experience.
- Marketing activities to reach potential users and promote the benefits of the system.
- Collaborating with plant care experts and institutions to refine diagnostic capabilities and provide accurate information.

6.7 Key Resources

- A skilled team of software developers and data scientists.
- Access to a robust database of plant diseases and environmental factors influencing plant health.
- Cloud infrastructure for hosting the application and processing images efficiently.

6.8 Key Partnerships

- Collaborations with agricultural universities and research centers for data and algorithm validation.
- Partnerships with local agricultural extension services to promote the tool among farmers.
- Alliances with gardening retailers and plant care service providers to offer users recommendations and resources.

6.9 Cost Structure

- Development and maintenance costs for the web application and machine learning models.
- Marketing and outreach expenses to acquire new users.
- Operational costs associated with cloud services and data storage.
- Customer support and community management to foster user relationships and handle inquiries.

7 Constraints

7.1 Working Methodology:

Agile Development

7.2 Technical Stack:

Server Side: Jakarta EE

Database: MongoDB

Application Server: WildFly

Client Side: HTML,CSS,JavaScript

IoT Edge: Raspberry Pi 4

Continuous Integration: GitHub Actions

8 Project Timespan

The project is expected to be completed within six months, with key milestones including:

- Step1: Building the user interface Duration: 1 week
- Step2: Building the server side Duration: 2 weeks
- Step3: Developing the machine learning model Duration: 2 weeks
- Step4: Implementing the location based services: 1week
- Step5: Deploying the application server and establishing the MLOps architecture. Duration: 2 weeks

9 Exclusions

This project will not provide real-time alerts or notifications regarding plant health. Instead, it focuses on giving users the information needed to make informed decisions about their plants based on uploaded images and environmental insights.

10 Conclusion

The Plant Disease Detection System aims to bridge the gap between plant care knowledge and technology, empowering users to make informed decisions about their plants. By combining machine learning with user-friendly design, we anticipate a positive impact on plant health management.