Malaysia-Japan International Institute of Technology

SCSJ 3553: ARTIFICIAL INTELLIGENCE SECTION 11

Progress 1

Project proposal :

Section: 15
Lecture name:
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1. AI solution

Maintaining optimal conditions for indoor plants, especially in environments like greenhouses, homes, or small indoor spaces, can be challenging due to varying light, temperature, and soil moisture levels. The inconsistency in these environmental factors can lead to suboptimal plant health and even plant loss. There is a need for a sophisticated solution that employs sensor technology and automation to monitor and adjust these conditions seamlessly. Additionally, the system should provide users with a user-friendly mobile app for remote monitoring, customizable plant preferences, and real-time notifications, making plant care more accessible and efficient.

The "Smart Plant Care System" is an integrated solution that employs advanced artificial intelligence (AI) to monitor and optimize the growth conditions of indoor plants in settings such as greenhouses, homes, or small indoor spaces. The system combines sensors, a central control unit, and a user-friendly mobile app to create an automated and intelligent plant care experience.

1.1 Components of the AI Solution:

Sensors:
- A network of sensors is strategically placed to continuously monitor critical environmental parameters:
- Light Sensors: These sensors measure the intensity and duration of light exposure.
- Temperature Sensors: These sensors track temperature levels to ensure they remain within the desired range.
- Soil Moisture Sensors: Sensors in the soil monitor soil moisture to prevent overwatering or underwatering.
- When the soil moisture sensor detects dry soil, it communicates with the central control unit to trigger the system to provide water to the plant.

Data Processing and AI Algorithms:

- Collected sensor data is transmitted wirelessly to a central control unit.
- The central control unit processes the data in real-time using advanced AI algorithms.
- AI algorithms interpret the data, identify deviations from predefined plant care conditions, and provide actionable insights.

Central Control System:

The central control unit is connected to sensor that enable the system to take corrective actions:

- Watering Systems: When the soil moisture sensor detects dry soil, it communicates with the central control unit, which activates the watering system to provide the appropriate amount of water for the plant.
- Heating or Cooling Systems: If the temperature exceeds or falls below the desired range, the system can activate heating or cooling systems to maintain optimal conditions.
- Smart LED Grow Lights: The system can adjust the intensity and duration of smart LED grow lights to supplement natural light when necessary.

Mobile App Interface:
- The mobile app serves as the primary user interface and provides the following features:
- Plant Dashboard: Users can view a dashboard displaying real-time data for all monitored plants, including current conditions (light, temperature, soil moisture), and growth trends.
- Alerts and Notifications: The app delivers real-time alerts and notifications when any environmental parameter falls outside the predefined range. Users can acknowledge or dismiss alerts.
- Plant Preferences: Users can customize plant preferences based on plant type, ideal conditions, watering schedules, and growth stages.
- Manual Control: Users have the option to manually adjust plant care settings or initiate immediate actions such as watering or lighting adjustments.

The core objective of this AI solution is to provide a seamless and intelligent plant care experience, ensuring that plants thrive in their respective environments. The system minimizes user intervention, promotes sustainable and efficient plant care practices, and empowers users to maintain healthy indoor plants effortlessly. It adapts to the specific needs of different plant species, making it suitable for a wide range of indoor gardening scenarios.

2. The goal of AI solution

The goals of the AI solution for the "Smart Plant Care System" are to:

1. Automate Plant Care: Enable the system to autonomously monitor and adjust environmental conditions for plants, reducing the need for manual intervention.

2. Optimize Growth: Ensure that plants receive ideal conditions for growth, leading to healthier and more vibrant plant life.

3. Minimize Resource Waste: Prevent overwatering and overexposure to light by tailoring care to each plant's specific needs, conserving resources.

4. Provide Real-time Monitoring: Offer users real-time visibility into plant conditions through the mobile app, keeping them informed.

5. Enhance User Experience: Create a user-friendly interface that empowers users to customize plant care preferences and make manual adjustments when desired.

6. Increase Plant Health and Longevity: Maximize the well-being of plants by responding to their immediate requirements and addressing issues promptly.

7. Educate and Inform: Educate users about plant care needs and provide insights into plant growth trends over time.

8. Environmental Sustainability: Promote environmentally friendly plant care practices by reducing water and energy waste.

3. Describe the process of Emphatize in DT

3.1 Users:

People who love indoor plants and have a real desire for greenery in their living environments but face time constraints due to their busy lives.

3.2 Problem Statement:

People who love indoor plants often struggle to maintain the proper conditions for their plants due to their busy lives, resulting to inconsistent plant health and growth.

3.3 Pain:

Even with their best intentions, these plant enthusiasts often see their plants in distress. For example, some tropical plants lose their vibrancy and develop brown tips because there isn't enough humidity.

Their succulents suffer from overwatering because they can't find the time to check the right soil moisture for each pot.

The inconsistent growth and look of their plants become a source of frustration and disappointment. These plant lovers invest a lot of time and care into their plants, and it's disheartening to see inconsistent results, especially when time is a constraint.

3.4 Goal:

The main aim for these plan lovers is to find a solution that makes plant care easier, even with their busy schedules. They want a way to ensure that their indoor plants consistently receive the right care and flourish. Simplifying plant care, while enjoying the beauty of thriving indoor plants, is their goal.

4. Describe the process of Define in DT

4.1 User Needs:

User Need 1: Real-time Monitoring
Insight: Users want to monitor their plants continuously and in real-time to ensure that the environmental conditions (light, temperature, and soil moisture) are suitable for each plant's specific needs. They seek up-to-the-minute information to respond promptly to any deviations in these conditions.

User Need 2: Customized Plant Care
Insight: Users need a system that allows them to customize plant care settings for different plant species. Plants have varying requirements, and users want to set specific parameters for light intensity, temperature range, and soil moisture levels based on each plant's unique needs.

User Need 3: Educational Insights
Insight: Users have varying levels of plant care knowledge. Some may be novices, while others are experienced gardeners. They desire a system that not only monitors conditions but also provides insights and educational content. Users want to learn about optimal care practices, plant growth stages, and how to identify signs of plant health.

4.2 Stakeholder Needs:

Stakeholder Need 1: Data Security

Insight: Stakeholders, such as developers and manufacturers, have a significant responsibility to ensure the security and privacy of user data. They must implement robust security measures to protect sensitive information related to plant care and user preferences.
Stakeholder Need 2: Scalability

Insight: Stakeholders need to design the system with scalability in mind. As the system gains popularity, it should accommodate a growing number of plant species and users. The system's architecture should be flexible to support expansion.
Stakeholder Need 3: User Engagement

Insight: Engaging users is essential for the success of the system. Stakeholders should focus on user-centric design, providing user-friendly interfaces and actionable insights. By keeping users engaged and satisfied, the system is more likely to achieve long-term success and adoption.
Persona Examples:

4.3 User Persona Example - Plant Enthusiast:

Name: Sarah
Background: A passionate plant enthusiast with a diverse collection of indoor plants.
Needs: Sarah is an experienced gardener who values real-time monitoring, customization of care settings for various plant species, and access to educational content to further enhance her knowledge.
User Persona - Novice Gardener:

Name: John
Background: A novice gardener with a small collection of indoor plants.
Needs: John is new to plant care and appreciates a user-friendly system that helps him customize care while providing guidance. He's interested in learning more about plant care practices.
Stakeholder Persona - System Developer:

Name: David
Background: A skilled software developer responsible for the system's development.
Needs: David prioritizes data security, scalability, and user engagement features in the system. He is dedicated to creating a robust and adaptable platform.
Stakeholder Persona - Product Manager:

Name: Emily
Background: A product manager with a focus on system success in the market.
Needs: Emily's role centers on ensuring the system meets user needs, has the capacity to grow with user demands, and effectively engages users to make the system a market success.
By delving into these user and stakeholder needs in greater detail and offering specific persona examples, the "Smart Plant Care System" can be developed with a comprehensive understanding of the diverse requirements. This knowledge will serve as a

solid foundation for the subsequent phases of the Design Thinking process, ensuring the system effectively addresses the actual needs of its users and stakeholders.