



**UNIVERSITY OF
PLYMOUTH**

NSBM Green University

Faculty of Computing

PUSL2022 - Introduction to IOT

Internet of Things (IoT) Group Project

Group L

Project Initiation Document

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Title: Smart Agricultural Plant Pot Background

Background

Smart Agriculture plant Pot aims to optimize plant growth and resource utilization. We are creating this project for apartment house owners. Because in urban city areas, people are very busy, and they cannot take care of their home plants. And we know that there are only one or two plants in these apartment houses. Therefore, we can implement this Smart Agriculture plant Pot for them.

The primary goal of this project is to create a sophisticated monitoring system that combines sensors, data analytics, and automation to enhance crop productivity, reduce resource wastage, and provide real-time insights to the user. By integrating smart technology into the plant pot, we aim to create a self-sustaining environment that adapts to the specific needs of each plant, ultimately leading to more efficient and sustainable agricultural practices.

Smart agricultural plant pot generally has the following features:

Sensors: Sensors used to measure the plant's environment, such as humidity, temperature.

Microcontroller: Microcontroller used to collect data from sensors and control the parameter facts.

Wireless communication module: The wireless communication module is used to send data from the microcontroller to the remote server.

Aim: This project is aimed at developing a Smart Agriculture plant Pot to give a solution for the apartment house owners to take care their plants without any human integration.

Literature Review:

The literature review delves into existing research and solutions related to smart agriculture and plant monitoring systems. It involves an in-depth exploration of previous studies addressing similar challenges. This includes examining the methodologies, techniques, and outcomes of these endeavors. By critiquing these approaches, we aim to identify their strengths and weaknesses, ultimately paving the way for our project to fill any gaps or shortcomings in the current body of work.

For example, existing studies may have focused on specific aspects of plant monitoring, such as soil moisture levels or temperature control. Our project may seek to integrate a broader range of sensors and employ more sophisticated data analytics techniques to provide a comprehensive and adaptable solution for smart agriculture. Additionally, we may aim to enhance user interface and accessibility to ensure that farmers can easily interpret and act upon the data provided by the system.

By conducting a thorough literature review, we gain a comprehensive understanding of the state-of-the-art technologies and methodologies in the field of smart agriculture, which informs the development of our Smart Agriculture plant Pot.

Objectives

Sensor Deployment: The first stage involves setting up a network of sensors strategically across the agricultural field. Important factors including temperature, humidity, and soil moisture content will all be measured by these sensors.

Data Collection: The sensors will collect data continuously, building up a large dataset that depicts the current condition of the plant. Making educated decisions and maximizing crop management both depend on this data.

Data Transmission: After being gathered, the data will be wirelessly transferred to a local server platform for processing and storage.

Decision Support: Using a user-friendly interface like a mobile app. They will receive notifications from this platform.

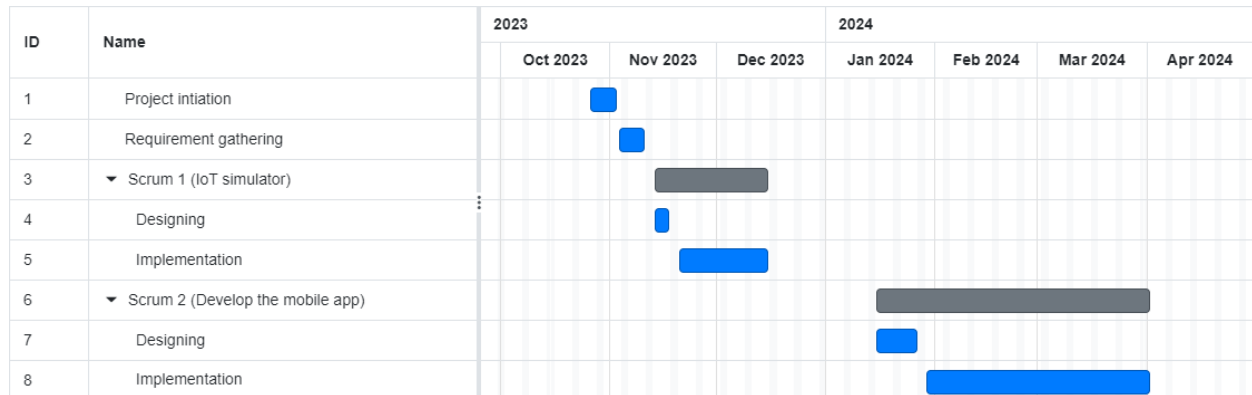
Resource Optimization: By offering customized advice based on the gathered data and analysis, the system wants to help users in making the best use of resources.

System Overview

Certainly! Here's an explanation of the components of a Smart Agriculture Plant pot:

- 1) **Sensor Integration:** In a Smart Agriculture plant pot, various sensors are integrated to collect data about environmental conditions, such as soil moisture, temperature, and humidity. These sensors provide real-time information about the plant's surroundings.
- 2) **Embedded/Edge Computing System:** An embedded or edge computing system is used to process the data collected by the sensors locally. This system can perform initial data analysis, filter out noise, and reduce the need for constant data transmission to a local server. It helps in real-time decision-making and reduces latency.
- 3) **Communication Infrastructure:** This project relies on multiple communication methods, including Wi-Fi, Cellular networks.
- 4) **Storage of Data:** In our project we processed data from the sensors can be stored either in the local server. Local server storage may provide more control over data and potentially reduce long-term costs.
- 5) **Analysis of the Stored Data:** Data analysis tools and algorithms are applied to the stored data to derive meaningful patterns. These analyses can help identify trends, anomalies, and insights into plant health, allowing informed decisions to be made regarding watering.
- 6) **Interface:** An interface (mobile application) is developed to provide users with a visual representation of the system's infrastructure. It offers real-time monitoring of sensor data, analytics results, and control options. Users can visualize plant conditions and make adjustments.

Gantt chart



Assumptions: We take 26th October 2023 as the starting date and 1st April 2023 as the ending date.

As well as we breakdown the project tasks as scrum 1 and 2.

After the developing the whole project we are planning to do the testing part due the rest of the time period.

Budget plan (Estimated)

IoT components	Prices
DPDT ON-OFF-ON Toggle switch	180.00
NODE MCU V1.0	1100.00
ARDUINO NANO	1450.00
MOTOR OUTPUT	1100.00
MOTOR CONTROL RELAY	100.00
MOISTURE SENSOR	220.00
Liquid Crystal Display (LCD)	500.00
DHT11 SENSOR (Humidity Sensor)	320.00
Digital LCD Temperature Sensor	450.00
Total	<u>5420.00</u>

Outcome

The intended final product of the Smart Agricultural plant pot is an innovative and technologically advanced planting system. It combines various sensors and automation features to create an environment that is highly conducive to take care the plant. These sensors monitor crucial factors like soil moisture, temperature, humidity. Based on this data, the system autonomously adjusts conditions to optimize the growth of plants.

By providing precise and real-time control over growing conditions, the smart pot aims to increase crop while minimizing resource usage. Ultimately, the goal is to contribute to a more efficient, productive, and environmentally-friendly approach to agriculture.

References

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Group Contribution

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