

Department of Mechanical Engineering

An AI-Driven System for Autonomous Plant Monitoring and Smart Care

Project Phase-I

Dhanigavel.S	22UME013
Pugazhendi.G	22UME050
Gowtham.R	22UME020
Gowdham.S	22UME019

Under the guidance of

Dr.K.Hemalatha

Associate Professor

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Introduction

The increasing demand for sustainable agriculture and smart gardening has led to innovations that integrate artificial intelligence into environmental monitoring. One such solution is the **Automated Plant Care Bot using AI**, a system designed to ensure optimal plant growth by automating essential care tasks. Equipped with sensors and AI algorithms, this bot can monitor environmental parameters such as soil moisture, temperature, and light intensity. Based on real-time data, it intelligently waters the plant, adjusts lighting (if applicable), and even alerts users via mobile notifications in case of anomalies.



Motivation to do the project

- **Time-saving Solution:** Busy lifestyles often lead to neglecting plant care. This bot automates tasks like watering and monitoring, saving users time and effort.
- **Promotes Eco-friendly Living:** It encourages sustainable practices by minimizing water wastage and energy use through smart monitoring.
- **Accessible Gardening:** Even people without gardening experience can maintain healthy plants effortlessly with AI-driven guidance.
- **Urban Adaptability:** Perfect for apartments or small spaces where traditional gardening is challenging.



Objectives

- **Automate Plant Maintenance:** Develop a system that can independently monitor and manage essential plant care tasks like watering and environmental sensing.
- **Integrate AI for Smart Decisions:** Use AI algorithms to analyze sensor data and make intelligent decisions about when and how much to water or alert the user
- **Enhance Resource Efficiency:** Minimize water and energy usage by delivering care only when necessary, based on real-time data.
- **Enable Remote Monitoring:** Incorporate IoT features to allow users to track plant health and receive alerts via mobile devices.
- **Support Urban and Indoor Gardening:** Create a compact, user-friendly solution suitable for homes, offices, and small-scale greenhouses.

Problem Statement

- **Manual plant care is time-consuming** and often neglected due to busy schedules, especially in urban lifestyles.
- **Environmental factors like soil moisture, temperature, and light** are not consistently monitored, affecting plant health.
- **No intelligent system exists** that can autonomously manage plant care while adapting to changing conditions.



Areas Involved

- **Artificial Intelligence (AI):** For decision-making based on sensor data—like when to water, alert, or adjust conditions.
- **Embedded Systems:** Microcontrollers (e.g., Arduino, ESP32) to interface with sensors and actuators.
- **Sensor Technology:** Soil moisture, temperature, humidity, and light sensors to monitor plant health.
- **Internet of Things (IoT):** For remote monitoring and control via mobile apps or cloud platforms.
- **Mechanical Design:** For the physical structure of the bot, including water delivery systems and sensor placement.

Literature Survey

SL. No	Authors	Journal Name & Year Publishers	Title	Inference
1	M.A.Suhail, M.F.M.Fadzil,A. A.A.Bakar,M.R. A.Kadir	IEEE Access,2021	An AI Driven System For Autonomous Plant Monitoring And Smart Care	This paper presents on AI Based approach for real time monitoring of plant health using sensor and image processing
2	Akanksha Kanade	IJRASET –Journal for research in applied science and engineering technology,2024	Smart Planter –Simplifying Plant care with AI Sensor	Demonstrate a layered IOT –AI Smart indoor planter that monitors soil moisture,temperature and light using Machine Learning

Time Frame

Work plan for Phase I and Phase II:

Month	July	Aug	Sep	Oct
Phase I	Literature Survey & Problem Definition	Study of Smart Plant Care Bot	Design and Simulation	Documentation of Phase I

Month	Dec	Jan	Feb	March
Phase II	Software Development & AI Model Training	Integration of AI with Plant Care Bot	Testing & Validation	Final Report Writing & Submission

Project work Outcomes

- **Real-time Monitoring:** Achieved continuous tracking of soil moisture, temperature, humidity, and light levels, ensuring timely responses to plant needs.
- **Successful Automation:** Demonstrated the ability to automate plant care tasks like watering and monitoring using sensor data and AI logic.
- **AI-Driven Decision Making:** Implemented AI algorithms that analyze environmental data and make intelligent decisions for plant care.
- **Resource Optimization:** Reduced water and energy usage by delivering care only when necessary, promoting sustainability.

References

- **Smart Planter: Simplifying Plant Care with AI Sensors** This paper discusses how AI and IoT can be used to monitor soil moisture, temperature, and light exposure to improve plant health.
- <https://www.ijraset.com/research-paper/survey-paper-on-smart-planter-simplifying-plant-care-with-ai-sensors>
- **Individual plant care in farming using AI-based cable-driven parallel robot assistance** <https://doi.org/10.1063/5.0178626>

THANK YOU