**ML-Based Plant Care Assistant – Project Abstract**

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**Overview**

The ML Plant Care Assistant is an intelligent system designed to automate and optimize plant care using machine learning and sensor technologies. It addresses common challenges faced by plant owners—such as inconsistent watering, poor lighting, and lack of timely intervention—by continuously monitoring environmental conditions and predicting plant needs.

Objectives

* To develop a smart assistant that monitors plant health parameters in real time.
* To use machine learning algorithms for predictive care actions.
* To provide actionable insights and automate tasks like watering and fertilization.
* To enhance accessibility and efficiency in plant maintenance, especially for beginners and busy individuals.

**Core Technologies**

* Sensors: Soil moisture, temperature, humidity, and light sensors collect real-time data.
* Machine Learning: Algorithms analyze sensor data to predict watering needs, detect stress conditions, and suggest care routines.
* IoT Integration: Enables remote monitoring and control via mobile or web apps.
* Mobile Interface: A user-friendly app displays plant health status, sends alerts, and allows manual overrides.

**System Architecture**

1. Data Collection Layer: Sensors embedded in the soil and environment gather continuous data.
2. Processing Layer: ML models trained on plant-specific datasets analyze patterns and predict care needs.
3. Action Layer: Automated systems (e.g., water pumps, grow lights) respond to ML predictions.
4. User Interface Layer: Displays insights, trends, and alerts to the user.

**Methodology**

* Requirement Analysis: Identify key plant care parameters and user needs.
* Model Training: Use historical data to train ML models for different plant species.
* Implementation: Integrate hardware and software components into a cohesive system.
* Testing & Validation: Evaluate system performance across various plant types and environments.

**Benefits**

* Reduces manual effort and guesswork in plant care.
* Improves plant health and longevity through timely interventions.
* Makes indoor gardening accessible to novices.
* Can be scaled for smart homes or commercial horticulture.