Lab Report

Project Title: Plant Growth Tracker: A Python-Based Data Collection and Visualization Tool

Submitted by:

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1. Abstract

The **Plant Growth Tracker** is a Python-based program designed to help users **record, manage, and visualize plant growth data** over time. This project provides an **interactive menu-based system** for entering plant growth data, storing it in a CSV file, and displaying it in tabular or graphical form. By using **pandas for data storage** and **matplotlib for visualization**, the project ensures an efficient and structured method to track plant development. The program also includes **data validation and error handling**, making it reliable and user-friendly.

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2. Introduction

2.1 Background

Monitoring plant growth is essential for **researchers, botanists, and gardening enthusiasts**. Traditionally, plant growth is recorded manually, making data organization and analysis time-consuming. This project aims to **digitize and simplify** the process by providing an automated system for tracking plant development.

2.2 Objectives

The key objectives of this project are:
✓ To develop a **user-friendly** plant growth tracking tool.
✓ To store plant growth data **efficiently** in a CSV file.
✓ To **visualize plant growth trends** using graphs.
✓ To ensure **data accuracy** with validation and error handling.

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3. Methodology

3.1 Tools & Technologies Used

- **Python 3**: Primary programming language.
- **pandas**: Used for handling and storing data in CSV format.
- **matplotlib**: Used for graphical visualization of plant growth trends.
- **os**: Used for file management operations.

3.2 Implementation Steps

1. **Data Entry Module:** Users enter the **date, plant name, height**, and optional notes.
2. **Data Storage:** Data is saved in a CSV file (**plant_growth_data.csv**) for future use.
3. **Data Retrieval:** Users can view stored data in a **structured tabular format**.
4. **Growth Visualization:** Users can generate a **graphical representation of plant growth trends**.
5. **Error Handling:** The program ensures correct input formats for **dates and numeric values**.

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4. Results

The **Plant Growth Tracker** successfully achieves its objectives:
✓ Users can **record plant growth data** and store it permanently.
✓ The system provides **easy access and management** of plant growth records.
✓ Users can **visualize plant growth trends** through **interactive graphs**.
✓ The program includes **data validation**, ensuring accuracy and reliability.

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5. Discussion

5.1 Strengths of the Project

- The **menu-driven interface** ensures smooth user interaction.
- Data is **permanently stored** in a CSV file for future reference.
- The **graphical visualization** helps users understand plant growth trends easily.

5.2 Limitations & Future Improvements

- The program currently runs on **a command-line interface (CLI)**; a **Graphical User Interface (GUI)** could enhance usability.
- Future improvements could include **automated data collection** using IoT sensors or integrating **machine learning models** to predict plant growth trends.

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6. Conclusion

The **Plant Growth Tracker** is an effective and structured approach to **recording, managing, and analyzing** plant growth data. By combining **data storage, retrieval, and visualization**, it provides users with a **simple yet powerful tool** for tracking plant growth. This project can be further developed into a **full-scale application** for researchers, farmers, and gardening enthusiasts.

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7. References

1. Python Documentation: https://docs.python.org/3/
2. pandas Library: https://pandas.pydata.org/

3. matplotlib Library: https://matplotlib.org/