**1. Introduction**

The image acquisition model is a crucial component of the project, enabling the capture of consistent images for analyzing plant growth, leaf count, and health in controlled environments. This model serves as the foundation for effective image processing and data analysis.

**2. Objective of the Image Acquisition Model**

The objective is to design an image acquisition system that:

* Captures time-lapse images under different controlled conditions. We should ensure the consistency in lighting and camera positioning.

**3. Experimental Setup**

The experimental setup includes:

* A Controlled environment with minimal external light interference. Here we are using 3 tomato plant pots for our experiment.
* 1st pot - We are not controlling any factor of growth. This is the main pot we are using to monitor the plant’s growth and health issues.
* 2nd pot – We are controlling only the sunlight by keeping the pot in a room to monitor the color change of the leaves without sunlight. Then we will include the algorithm to our image processing system to identify the color change of the leaves.
* 3rd pot – We are controlling only water for the plant to monitor what will happen without water. Then we will include the algorithm to our image processing system to identify that the plants need water.

**4. Equipment and Materials**

* **Cameras:** We are using Mobile camaras
* **Lighting:** LED panels providing consistent and even illumination.

**5. Image Acquisition Techniques**

* **Time-lapse Capture:** Images are captured at regular intervals to monitor changes over time. We are capturing images in every 24 hours.

**8. Data Storage and Management**

* **Storage:** Images are stored in structured directories labeled by date and time.
* **Formats:** PNG and JPG

**9. Challenges and Limitations**

* **Lighting Variability:** Managing consistent lighting in dynamic environments.
* **Camera Positioning:** Ensuring no displacement over long durations.

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