



# **PROJECT PROPOSAL**

*Monitoring of Plant Growth in Controlled Environments*



**ICT 2403 - GRAPHICS & IMAGE PROCESSING**

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# PROJECT *DESCRIPTION*

## Background

In recent years, the integration of technology in agriculture has gained significant attention. One of the key areas of focus is the monitoring of plant growth in controlled environments, such as greenhouses. This project aims to leverage image processing techniques to analyze and monitor plant growth over time, providing insights into growth patterns, leaf count, and overall plant health.

## Problem

The primary challenge addressed by this project is the need for an efficient and accurate system to monitor plant growth in controlled environments. Traditional methods of monitoring are often labor-intensive and subjective, leading to inconsistencies in data collection and analysis. This project seeks to develop an algorithm that can automatically capture and analyze time-lapse images of plants, segmenting plant regions to highlight changes in growth patterns, leaf count, and health indicators.



# AIM AND *OBJECTIVES*

## **AIM**

To design and develop an image processing system that effectively monitors plant growth in controlled environments.

## **OBJECTIVES**

- 01 *To establish a robust image acquisition model that captures time-lapse images under consistent conditions.*

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- 02 *To develop algorithms for image pre-processing and segmentation to analyze growth patterns and health indicators.*

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- 03 *To provide insights into plant health and growth trends based on the analysis conducted.*



# METHODS

## 01 *Image Acquisition Model*

- Set up a controlled environment (Ex: greenhouse) with consistent lighting and camera positioning.
  - Use time-lapse photography techniques to capture images at regular intervals.
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## 02 *Image Processing Techniques*

- **Pre-processing** : Apply techniques such as noise reduction and contrast enhancement to improve image quality.
  - **Segmentation** : Utilize algorithms (Ex: thresholding, edge detection) to isolate plant regions from the background for further analysis.
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## 03 *Image Processing Techniques*

- Analyze segmented images to extract quantitative data on leaf count, growth patterns, and health indicators.
- Use statistical methods to evaluate the accuracy of the algorithms developed.

# SIGNIFICANCE



The significance of this project is its potential to enhance agricultural practices through technology. By automating the monitoring process, farmers can gain timely insights into plant health and growth trends, allowing for more informed decision-making regarding resource allocation (Ex: water, nutrients). This proposal outlines a comprehensive approach to addressing the challenges associated with monitoring plant growth in controlled environments using advanced image processing techniques. The successful implementation of this project could lead to significant advancements in agricultural efficiency and sustainability.