Internship Project Report

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# Project Title: Crop and Weed Detection

# Company: UCT

## 1. Background of the Project

India, being one of the largest agricultural economies in the world, faces many challenges in crop production. One of the major problems farmers face is weed infestation. Weeds compete with crops for nutrients, water, and space, resulting in reduced crop yield. The use of pesticides to manage weeds can be harmful if not used precisely. This project aims to solve this problem using computer vision technology.

## 2. Problem Statement Relevance

Weeds are unwanted plants that reduce crop productivity. The problem is that traditional pesticide spraying affects both crops and weeds. This causes wastage and can harm the crops. The goal is to build an object detection system that can identify and locate weeds in an image so that pesticides can be sprayed only on the weed, not the crop.

## 3. Design & Implementation Details

We used a dataset consisting of 1300 images labeled in YOLO format, containing sesame crops and different types of weeds. Images were resized to 512x512 pixels. Data augmentation was performed using Keras' ImageDataGenerator to increase dataset diversity. The images were manually annotated to identify weeds and crops. YOLOv5 was selected for object detection. The model was trained using Google Colab.

## 4. Results

The model was able to detect weeds with high accuracy, and draw bounding boxes around them. This approach makes it possible to spray pesticides selectively. The detection was fast and suitable for real-time deployment with further improvements.

## 5. Learnings

I learned how object detection models like YOLO work. I got hands-on experience with image processing, data annotation, model training, and evaluation. This project also helped me understand real-world applications of AI in agriculture.