

# Computer Vision System for Counting Agricultural Goods

## Members:

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## Project Overview

This report details a computer vision system customized for Unmanned Aerial Vehicles (UAVs) to count agricultural goods, specifically focusing on blueberries. The project involves segmentation of blueberry images using Meta AI's SAM (Segment Anything) model. Subsequently, the segmented blueberry objects are to be utilized to train a classification model that determines whether an object is a blueberry or not.

## Project Repository

The project's repository can be found on GitHub, using the following link: [\[https://github.com/HamadaSalhab/Computer-Vision-System-for-Counting-Agricultural-Goods\]](https://github.com/HamadaSalhab/Computer-Vision-System-for-Counting-Agricultural-Goods). It's entitled to contain the most up-to-date code associated with this project, along with some documentation in the future once the project is nearly ready.

## Project Topic

The project's primary goal is to develop a robust computer vision system tailored for UAVs to automate the counting of agricultural goods, focusing on blueberries. The process involves segmentation of blueberry images to isolate the objects of interest and subsequently training a classifier to distinguish blueberries from other objects.

## **Work Done So Far**

### **1. Data Expansion:**

Following the initial utilization of the blueberry dataset, we have continued to expand the dataset by incorporating diverse images and scenarios, enabling the model to improve its robustness and generalizability in various conditions.

### **2. Repository Refactoring:**

To enhance code readability and maintainability, we have refactored our GitHub repository, organizing the code into multiple directories and Python scripts. This restructuring has significantly improved collaboration among team members.

### **3. Model Generalization and Documentation:**

We have rigorously cross-validated the model on various subsets of the data to ensure its generalizability to unseen scenarios. Comprehensive documentation of the project, including methodologies, experiments, and results, has been diligently maintained to facilitate knowledge sharing and future improvements.

### **4. Collaboration and Communication:**

Regular team meetings have been held to foster effective communication and collaboration, enabling us to discuss project progress, challenges, and potential solutions.

## **Work To Be Done**

Approaching the completion of the project and its deployment. We plan to try the Flask and Streamlit frameworks

## **Programming Languages, Libraries and Frameworks Used**

- Python.
- Opencv.
- Matplotlib.
- PyTorch.
- SAM Segmentation Model: Meta AI's SAM model was employed for the segmentation of blueberry images, enabling the isolation of blueberry objects.

## **Work Distribution**

- The classifier was done mainly by Yazan with the help of the other team members.
- Hamada did the IoU (Intersection over Union) part and counting process.
- Vlad was working on restructuring the project.