

Final Year Project

Title:

Automated Citrus Orchard Orange Detection and Counting System

Description:

Our project is focused on revolutionizing citrus farming through cutting-edge technology. We are developing an innovative system that simplifies the task of citrus fruit counting for farmers. By harnessing the power of image processing and artificial intelligence, our solution allows farmers to effortlessly count oranges on their trees with just a few clicks.

The primary focus of our project is to create a user-friendly application that empowers farmers to capture images of their citrus trees from all angles and, within moments, receive an accurate count of the oranges present on each tree. This technology not only streamlines the labor-intensive process of manual counting but also enhances accuracy, reducing the potential for errors.

Our system's key features include advanced image analysis algorithms that can identify oranges, a user-friendly interface designed specifically for farmers, and the flexibility to support both real-time and batch processing. With a commitment to accuracy, reliability, and ease of use, our project aims to significantly improve the efficiency and productivity of citrus farming while promoting sustainable agricultural practices.

Group member: Farhan Ali (2020-ag-6562)

Department: Computer Science

Degree: Software Engineering

Software Development Methodology: Agile Methodology

Functional requirement:

Image Capture: The system should allow the farmer to capture pictures of the citrus tree from all four sides using a smartphone or a camera.

Image Processing: The application should process the images to identify the citrus oranges on the tree.

It should be able to analyze the images for color, size, and shape to distinguish oranges from leaves or other objects.

Orange Detection: The system should accurately detect and outline each individual orange in the images.

It should provide a visual representation of the detected oranges to the user.

Counting Functionality: The application should count the number of detected oranges and display the count to the farmer.

It should provide an option to save or export the count data.

User-Friendly Interface: The user interface should be intuitive and user-friendly, designed for farmers with varying levels of tech-savviness.

It should guide the user through the image capture process and provide feedback on the detected oranges.

Real-time or Batch Processing: Depending on the farmer's preference, the system should support both real-time processing (where oranges are counted immediately after each image is captured) and batch processing (where multiple images are processed together).

Accuracy and Reliability: The system should be accurate in detecting oranges, with a low rate of false positives or false negatives.

It should work reliably under various lighting conditions and with different types of citrus trees.

Non-Functional requirement:

Performance: The system should process images and provide results in a reasonable time frame, ideally within a few seconds.
It should be able to handle a reasonable number of oranges on a tree (e.g., 100+).

Scalability: The system should be designed to handle a growing number of users and images as more farmers adopt it.

Accuracy and Precision: The system should have a high level of accuracy in detecting oranges.
It should be precise in distinguishing between individual oranges and avoid counting the same orange multiple times.

Compatibility: The application should be compatible with a wide range of smartphones and cameras commonly used by farmers.

Security: The user's images and data should be kept secure and not accessible to unauthorized users.

Usability: The application should have an intuitive user interface, and it should be easy for farmers to understand and use without extensive training.

Robustness: The system should be robust enough to handle imperfect conditions, such as variations in lighting, weather, and tree types.

Maintenance and Support: There should be a plan in place for maintaining and updating the application as needed.
User support should be available to assist farmers with any issues or questions.

Cost-effectiveness: The project should aim to be cost-effective both in terms of development and ongoing operational costs for farmers.

Data Privacy and Compliance: Ensure that the system complies with data privacy regulations, especially if it involves storing or transmitting user data.