

Apple Orchard Segmentation Robot

Due to very thin margins, large farms are looking to automation and precision agriculture to increase yields while decreasing expenses. Current implementations use ground robots that require controlled lighting conditions and suffer from less accurate color matching algorithms for estimation.

Description of the Invention

An unmanned aerial vehicle (UAV) system collects high resolution spatio-temporal data to automatically estimate apple orchard yield parameters (e.g. count, size of apples, number of apples per tree). The small UAV, built with low-cost, commercial off-the-shelf hardware and software components, carries a computer that collects images from onboard stereo cameras. The robot can obtain good views of apples in natural settings (i.e., an orchard row), and computer vision algorithms use the stereo images to detect, segment and estimate the size and count of apples. The algorithm works with no constraints on illumination, specularity or occlusions, and can also detect tree trunks to offer apple-per-tree counts.

Features and Benefits

- Detects, segments and estimates apple size and count
- Unmanned aerial vehicle (UAV) system
- Automatically estimates apple orchard yield parameters
- Uses low-cost, commercial off-the-shelf hardware and software components
- Works in natural settings: no constraints on illumination, specularity or occlusions
- Also detects tree trunks

Potential Applications

- Precision agriculture
- Automated agriculture
- Apple orchards
- Yield monitoring
- Improving quality of outcomes associated with green and yellow apples
- Detection of abnormal tree trunks
- Guidance systems



Technology Status

Pilot scale demonstration

Publications

2015 IEEE International Conference on Robotics and Automation

IP Status

Patent Pending

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Case Reference

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