

Towards Low-cost, Vision-based Estimation of Yield and Crop Load in Vineyards

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Despite advances in vineyard management techniques, one of the most challenging aspects of viticulture is estimating yield and vine vigor. While LiDAR, machine learning, and other computer vision tools have become more prevalent in agriculture for solving these types of problems, cost and specialized training for these systems can be highly prohibitive for small scale farms. However, with accessibility to increasingly higher quality cameras in smartphones, the potential for computer vision in improving management practices for small scale farming is tremendous. Accurate yield estimates are used for resource allocation such as tank space, packaging, labor, and for revenue prediction. Crop load (the ratio of reproductive growth to vegetative growth), vine vigor, exposed leaf area, and sunlight interception relate directly to fruit composition, disease prevalence and vine health. In this poster we present the complexity and challenges associated with traditional methods for estimating yield, vine vigor, and crop load, and propose novel approaches for solving these problems using low-cost, easy-to-use, smartphone-based computer vision systems, and how these estimates have to the potential to improve vineyard management practices.

Reference: Jaramillo, Jonathan, Justine Vanden Heuvel, and Kirstin H. Petersen. "Low-Cost, Computer Vision-Based, Prebloom Cluster Count Prediction in Vineyards." *Frontiers in Agronomy* 3 (2021): 8.

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Open-source Software: opencv.org, opensfm.org, tensorflow.org