

**Project title:** Application of novel machine learning techniques and high speed 3D vision algorithms for real time detection of fruit

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**Date project commenced:** 14/09/2017

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## AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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Date 30/10/2020

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Date ..30/10/2020

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# **GROWER SUMMARY**

## **Headline**

Working towards autonomous fruit harvesting and accurate long term forecasting.

## **Background**

Novel digital technologies including vision systems, robotics and autonomous systems are seen as potential game changers for the horticulture sector. Vision systems can be used to assess and sense the crop to enable better decision support; robotics and autonomous systems offer new means to drive productivity. These issues apply to all soft and top fruits, but also more widely across the whole fresh produce sector. However, all picking and vision systems are dependent on the development of complex algorithms developed to identify, measure and locate fruit in real time. The development of these systems is not trivial, especially in outdoor environments where the background light level and quality can change within an instant.

## **Summary**

This project aims to progressively implement crucial components required for robust autonomous fruit harvesting. The problem is comprised of five major milestones, Fruit: segmentation, detection/classification, maturity evaluation, quality grading and finally 3D localisation and pose estimation. The new challenge will be to minimise computational requirements to identify fruit whilst maximising processing speed and recognition fidelity. This project will initially focus on strawberry and be anticipated eventually include other soft fruit. Recent work focusses on long and short term tracking of individual fruits spatially and temporally to build a map useful for yield forecasting and online harvesting applications.