



Project title: Bioinspired vision systems for automated harvesting

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Location of project: The University of Sheffield

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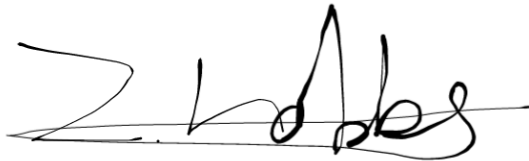
AUTHENTICATION

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.

Zeke Hobbs

PhD Student

The University of Sheffield



Signature

Date 1 Nov 2020

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Date

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GROWER SUMMARY

- *Drosophila suzukii* is a pest species that is able to find soft fruits with vision.
- Deep learning is being used to detect soft fruits for automated harvesting. Using a *Drosophila suzukii* inspired model has the potential to improve the efficiency of these models. (detection speed and model training times).
- *Drosophila* are able to see UV (335nm and 355nm), blue (460nm) and green (530nm).
- Have small brains that are efficient at finding soft fruits.
- Some colour paths in the brain are mapped allowing for simpler artificial networks to be made with similarities to *Drosophila Suzukii*.

Headline

A new vision system for soft fruit detection is being developed to increase the efficiency of current fruit detectors. Using UV, blue and green sensitive cameras as input to a small neural network to detect fruit in real time.

Background

- Computational fruit detection can be used for automated harvesting, yield estimation, intelligent pest and diseases detection.
- As *Drosophila suzukii* is a pest species an understanding of their visual system will allow growers develop pest management schemes that hinder the visual system of *Drosophila Suzukii*.

Summary - add here the future work

Modeling *Drosophila suzukii*'s visual system will lead to pest management schemas that hinder *drosophila*'s vision and to fast efficient fruit detection for automated harvesting and crop monitoring.

Financial Benefits

Reduction in needed pesticides for *Drosophila suzukii*. With the addition of improvements in yields due to the development of automated harvesting and crop management.

Action Points

Currently the system is still under development.

SCIENCE SECTION

See *CP 170 2020 Annual Report Appendix 1 - Towards Bio-inspired fruit detection for horticulture*, publication presented at UK RAS Conference 2020.

FUTURE WORKS

- Currently we are in the process of writing up new findings from our research into the brain of *Drosophila*.
- Secondly we are going to benchmark the network against other Deep Learning and image processing methods for fruit detection.