Soft Fruit Perception Workshop

- Detection and localisation of strawberry fruit

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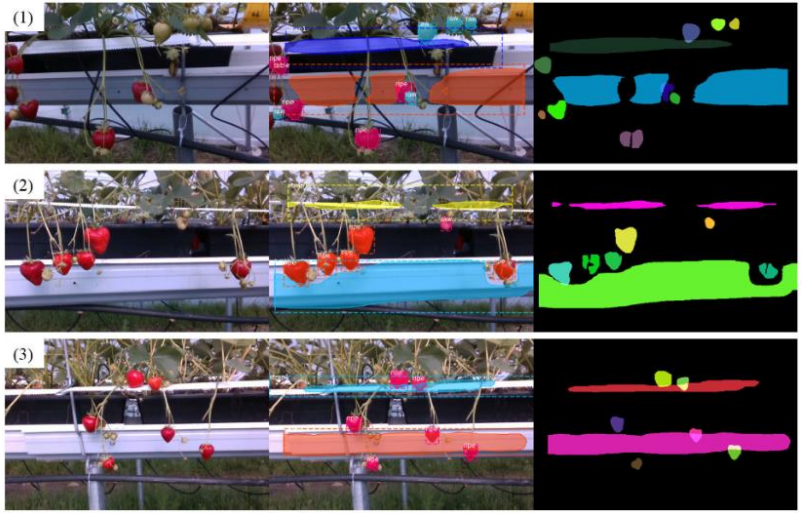
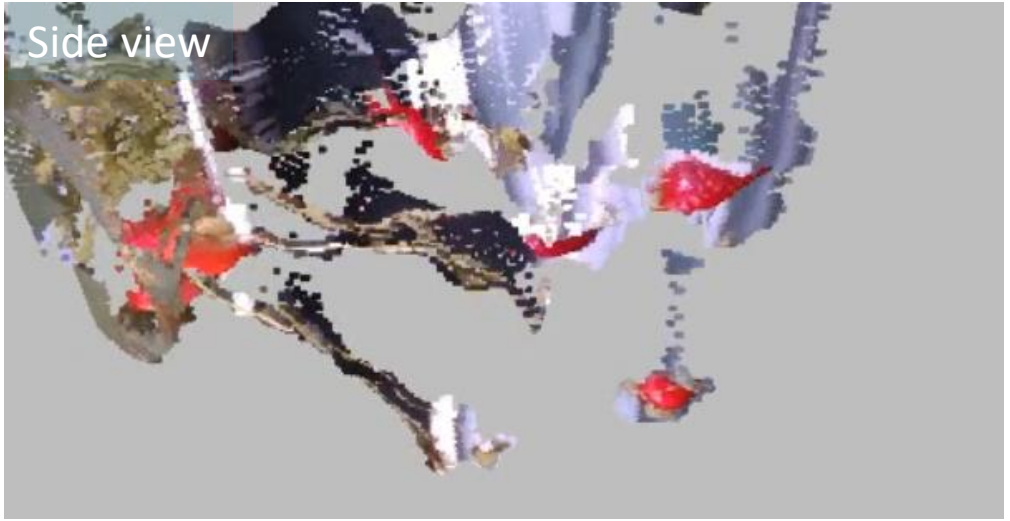
Mask RCNN + localisation:

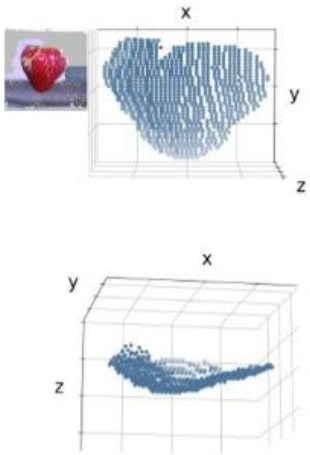


Mask RCNN segmentation and results

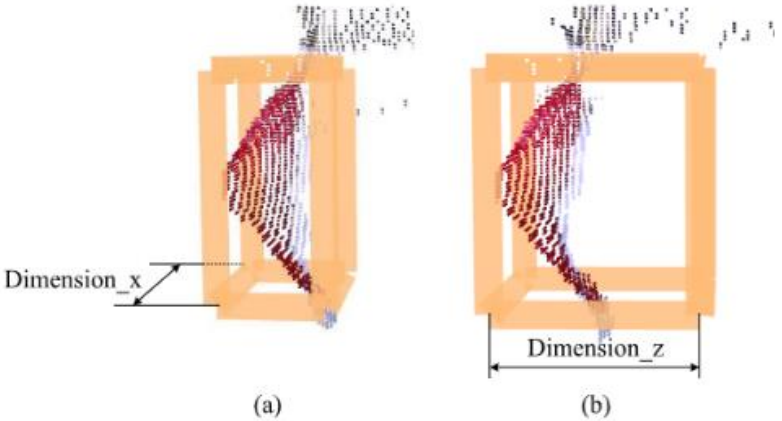


Strawberry polytunnel point cloud

Mask RCNN + localisation:



Extracted strawberry points using segmented strawberry mask



Localisation of strawberry using extracted points

Previous work based on Mask RCNN and localisation results :

1. Detection and 2D localisation refinement

Ge, Y., Xiong, Y. and From, P.J., 2019. Instance Segmentation and Localization of Strawberries in Farm Conditions for Automatic Fruit Harvesting. *IFAC-PapersOnLine*, 52(30), pp.294-299.

2. Environment perception

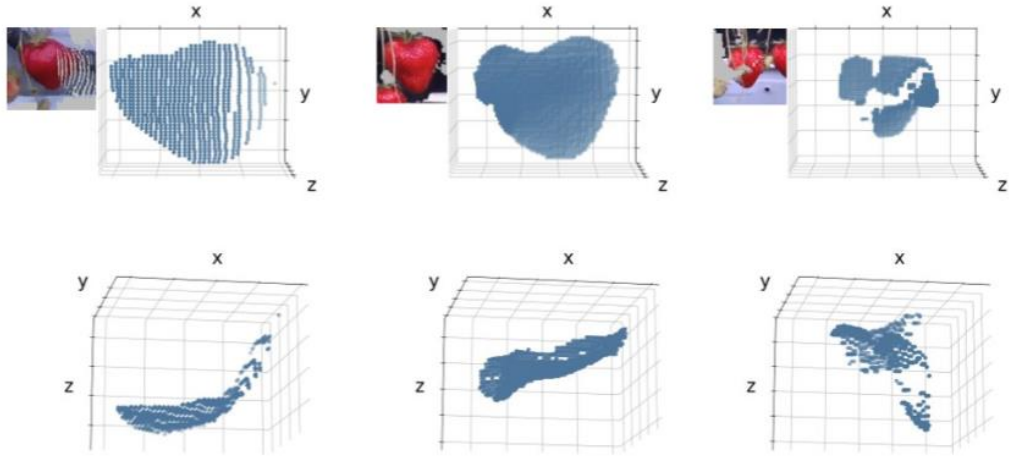
Ge, Y., Xiong, Y., Tenorio, G.L. and From, P.J., 2019. Fruit localization and environment perception for strawberry harvesting robots. *IEEE Access*, 7, pp.147642-147652.

3. Shape completion

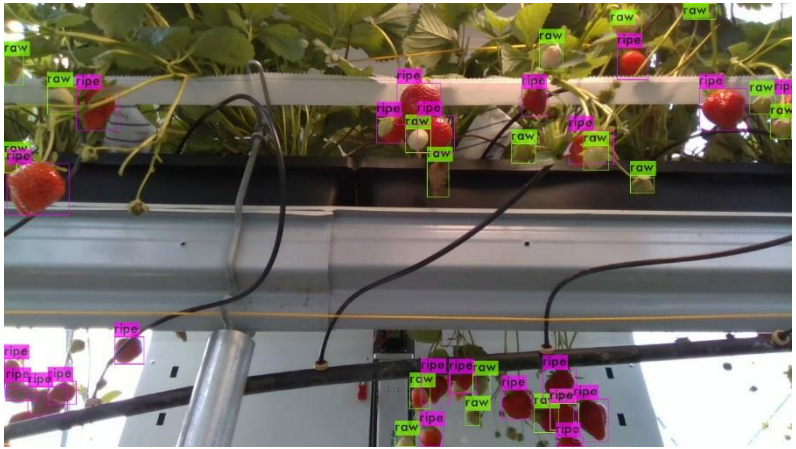
Ge, Y., Xiong, Y. and From, P.J., 2020. Symmetry-based 3D shape completion for fruit localisation for harvesting robots. *Biosystems Engineering*, 197, pp.188-202.

4. Identification of nonpickable strawberry

Ge, Y., Xiong, Y. and From, P.J., 2020. Classification of pickable and unpickable strawberries under farm conditions. In *2020 IEEE International Conference on Automation Science and Engineering (CASE).* IEEE.

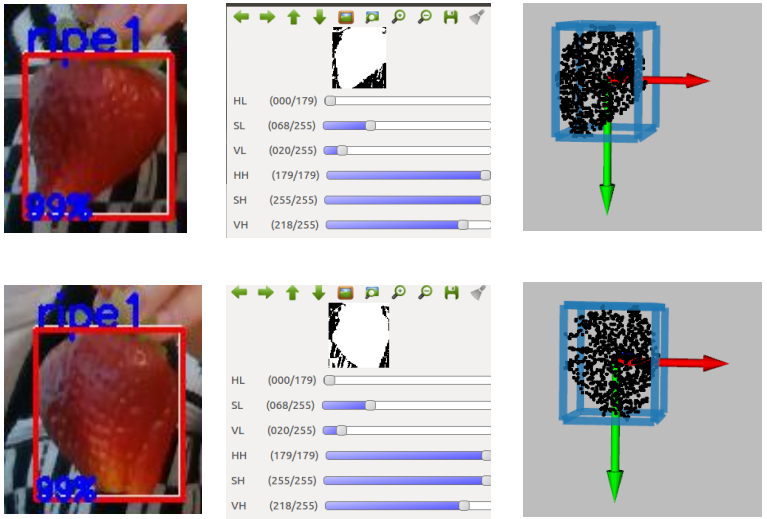


1. Using faster detection network

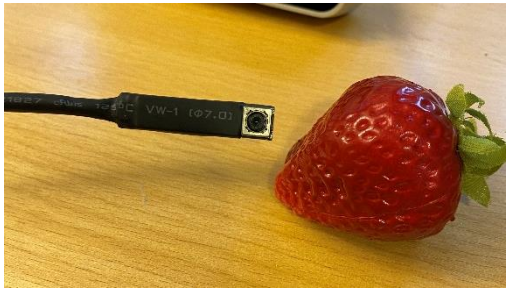


Detection network: yolo v3, 30 fps
(Mask RCNN: <2 fps)

Problem: how to accurately localize strawberries using detected bounding boxes.



2. Preparation of image capture for use of grading



Small wide-angle camera 125

Images taken by small wide-angle camera
from different sides

THANK YOU