Drones for Agriculture

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Social drones Lab

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VIRAL

1st Educational Seminar on ICT in Agriculture

Virtual - 16th September 2020

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Outline

Who?

How?

Which?

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Short bio

MSc. Electronics and Computer science, New University of Lisbon (Portugal) and University of Rome *La Sapienza* (Italy)

PhD. Robotics and Automation, Polytechnic University of Madrid (UPM), Spain, *cum laude*

Postdoctoral researcher, Wageningen University & Research (ESG-GRS), Netherlands

2008 2011 2014 2015 2017 2019

MSc. Robotics and Automation, Polytechnic University of Madrid (UPM), Spain, *cum laude*

Assistant professor, Carlos III University of Madrid (UC3M), Spain

Assistant Professor, Wageningen University & Research (SSG-INF), Netherlands

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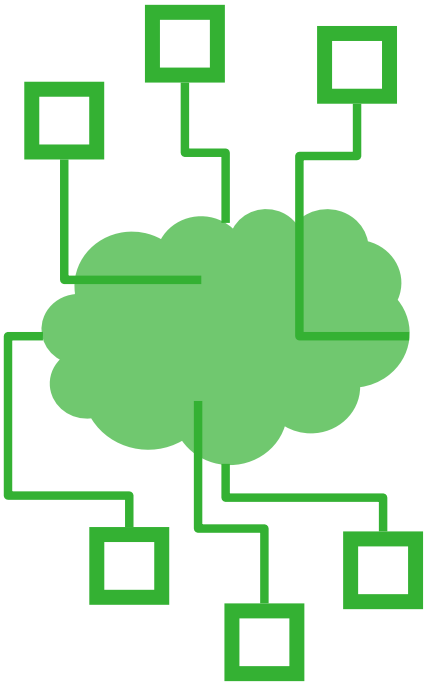
Research

"Bridging the gap between drones and people"

Machine vision & olfaction

Artificial Intelligence



Autonomous aerial scouting

Cultural practices

Non-expert readable information

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Education

MOOC DroneX 1

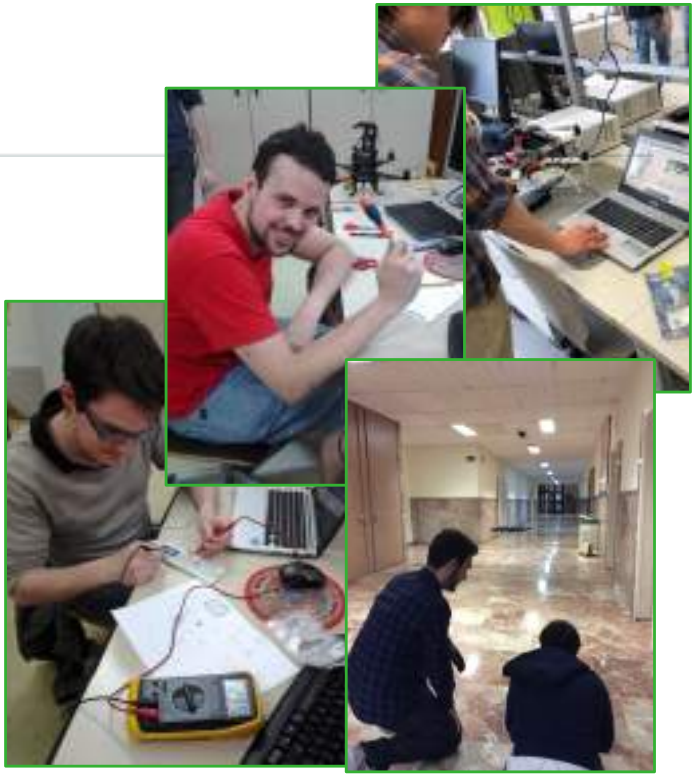
MOOC DroneX 2

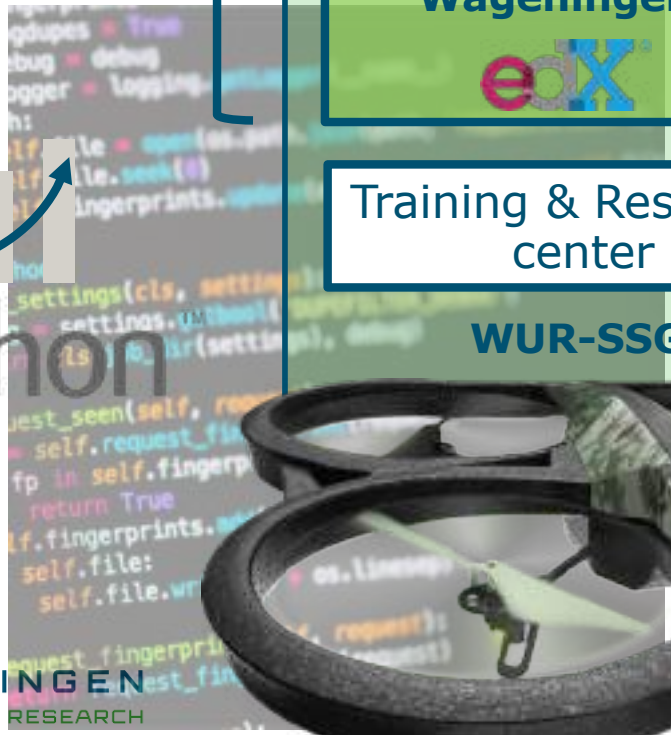
WageningenX

edX

Training & Research center

WUR-SSG





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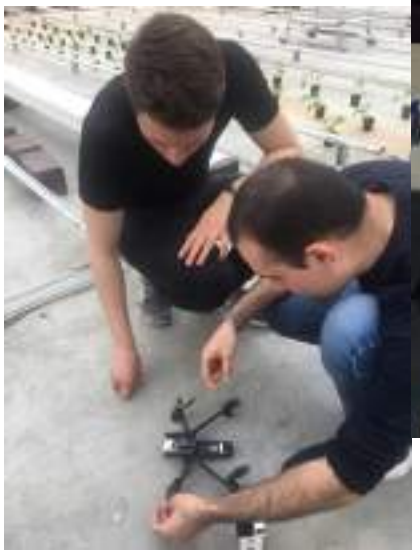
Social Artificial Intelligent Drone (SAID) Lab *a.k.a* Social Drones Lab

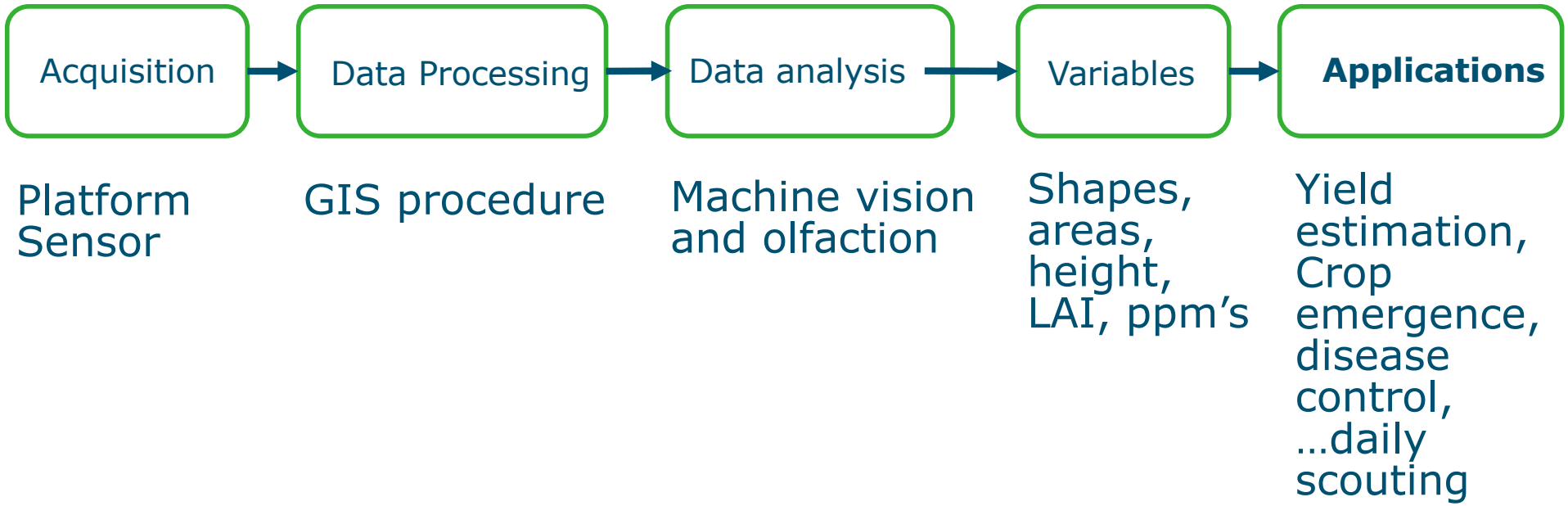


- Design AI approaches that translate raw drones data in practical information
- Explore human-drone interaction channels
- Boost drones technology education
- (…)
- Use drones for good ☺

Collaborations with knowledge institutes

The Not So Short Introduction to Aerial Surveying

Modus operandi



UAV’s platforms

AR200

DJI Matrice

DJI M210 RTK

Riegl RiCopter

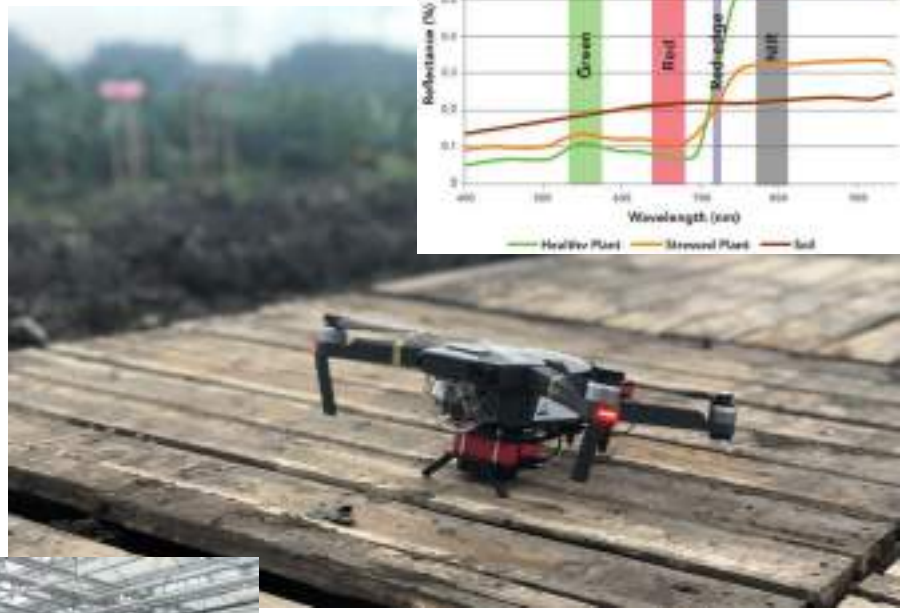
DJI Phantom

DJI Mavic

Sensor payloads

16Mpx RGB **camera**

< 2000€



< 4000€

20Mpx RGB **camera**

< 1000€

21 Mpx RGB **camera**

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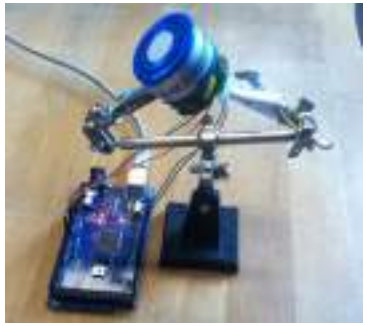
Sensor payloads



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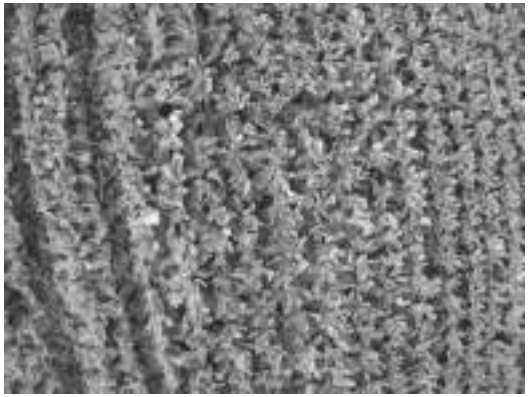
Other *handy* instrumentation

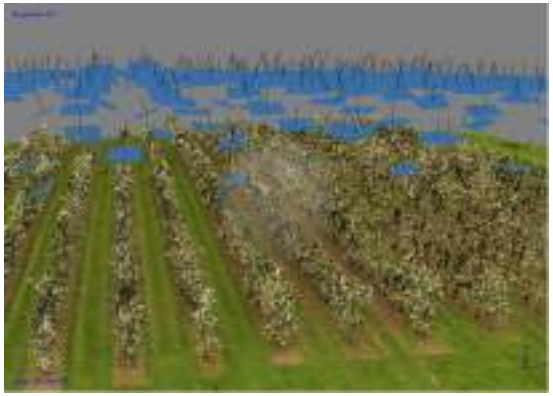
Data processing software

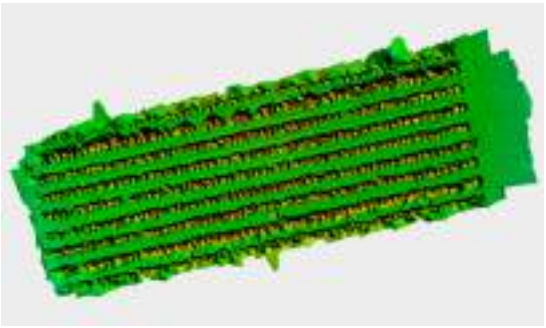
DroneMapper

PhotoScan
3D Modeling and Mapping
Agisoft

OpenDroneMap







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Real time rocks!

ROS
Robot Operating System

Data analysis

Non Real Time

it's OK...

MATLAB

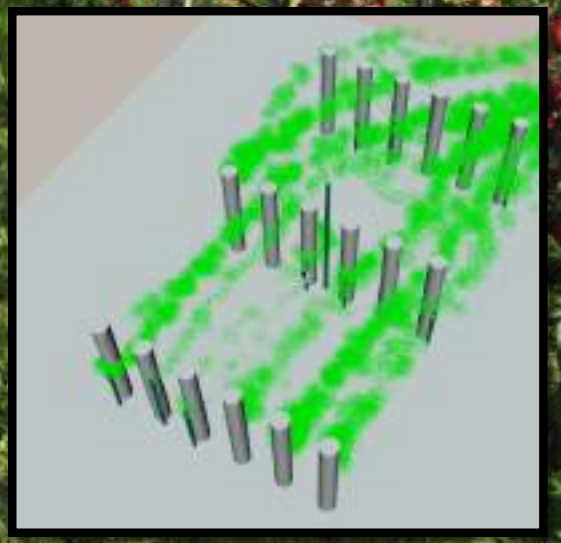
python™

...but Real Time

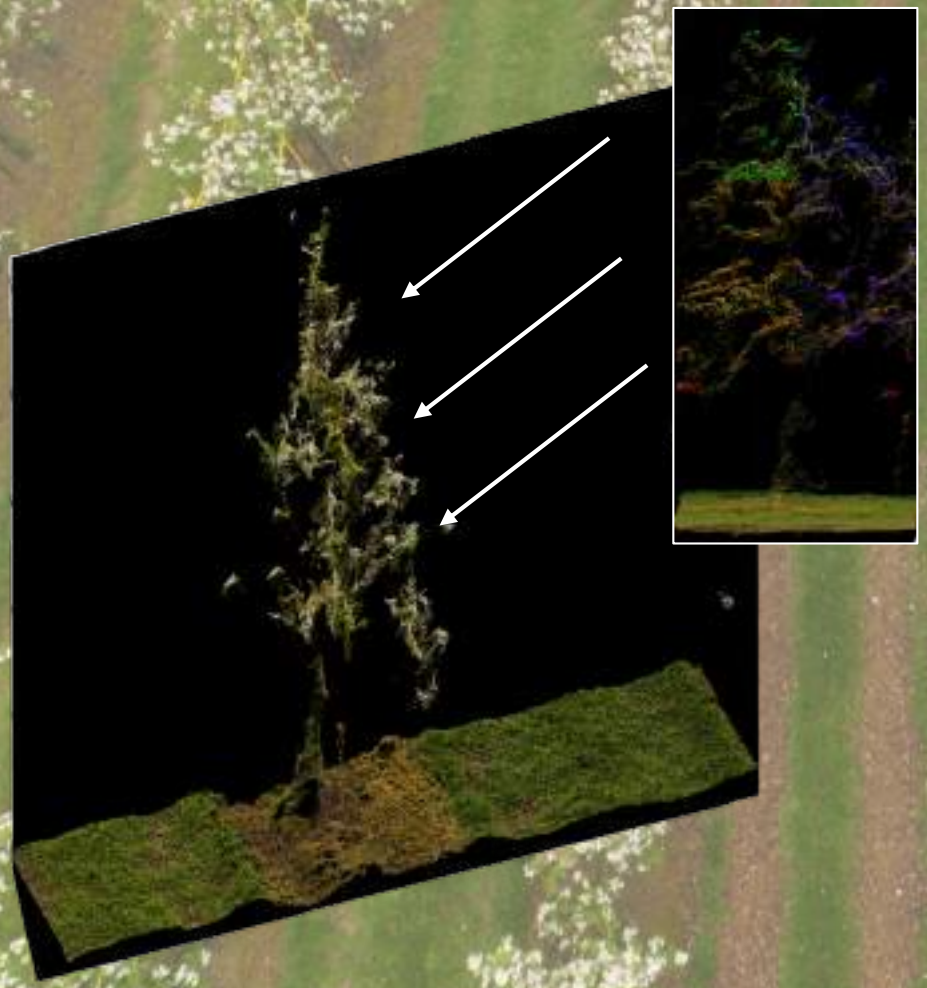
rocks!

Variables and applications

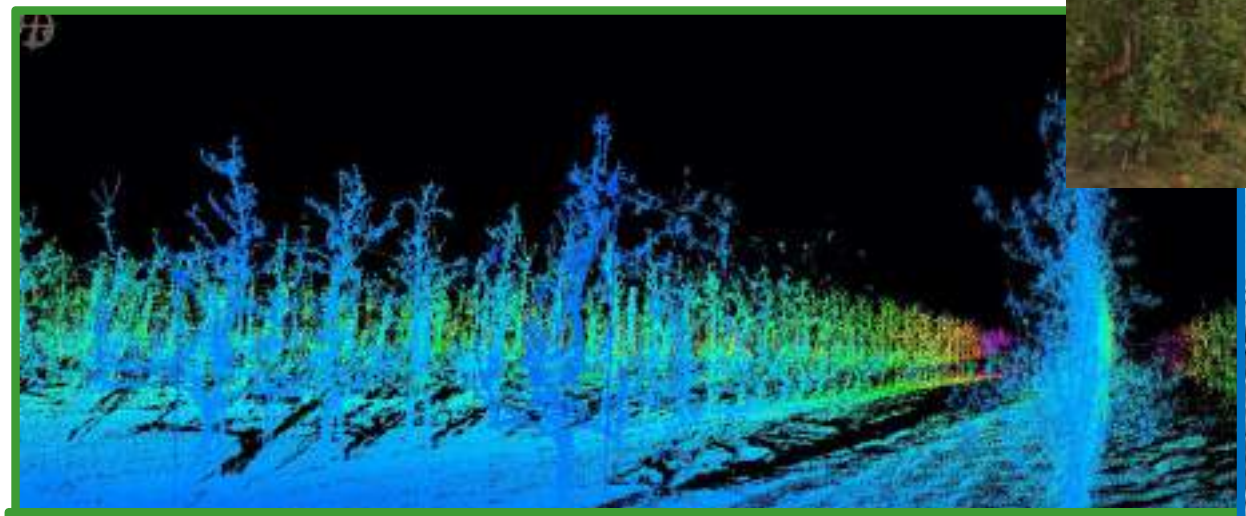
Ripeness assessment

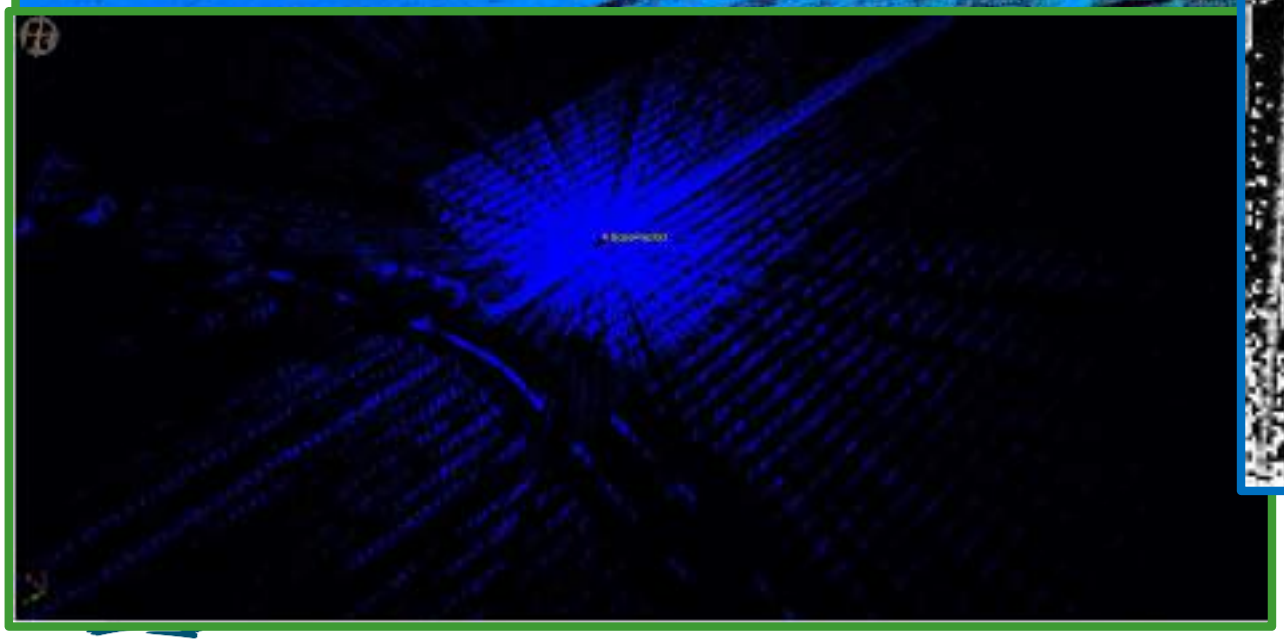


Flower blossom estimation



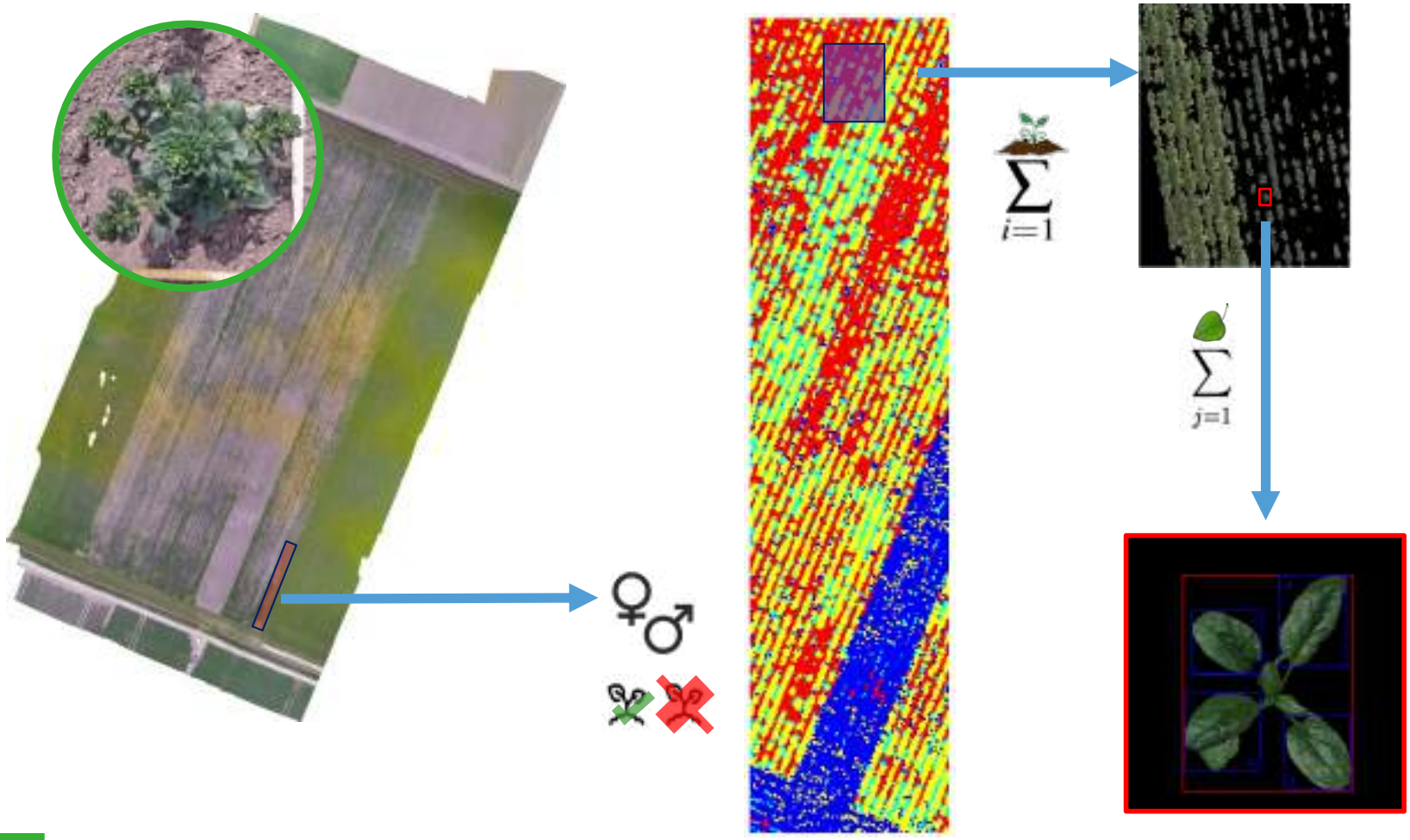
Tree height monitoring



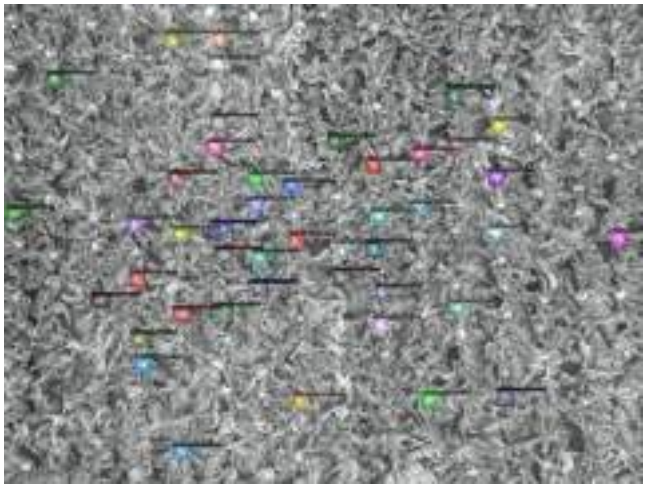


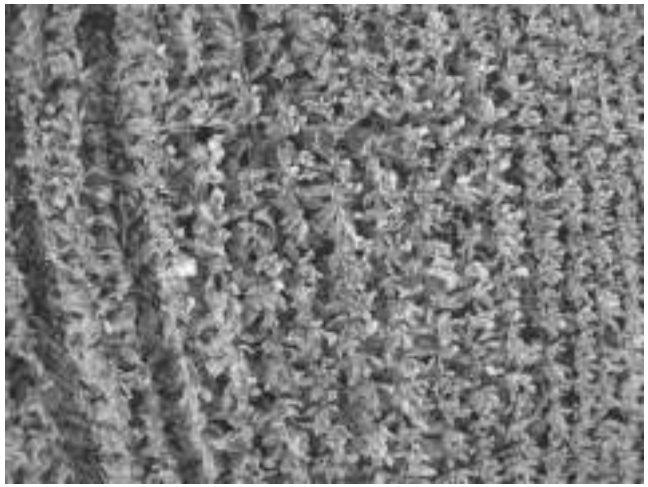
Plant breeding

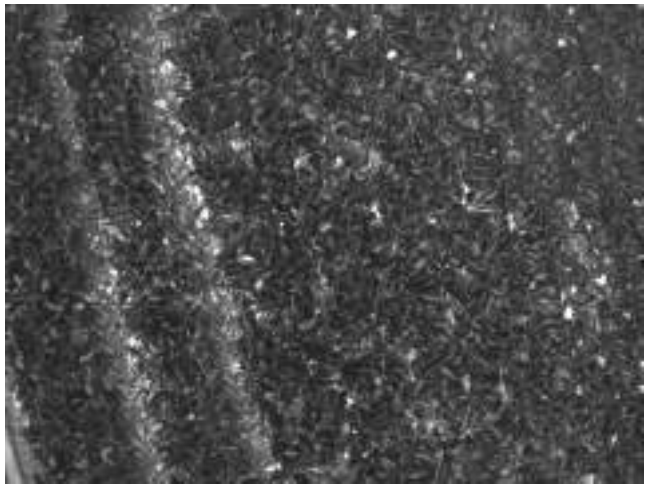
Pretrained AlexNet convolutional neural network



Ripeness assessment







Mask R-CNN

Weed detection

Multiple pretrained convolutional neural network

Autonomous flying - Food safety

ROS

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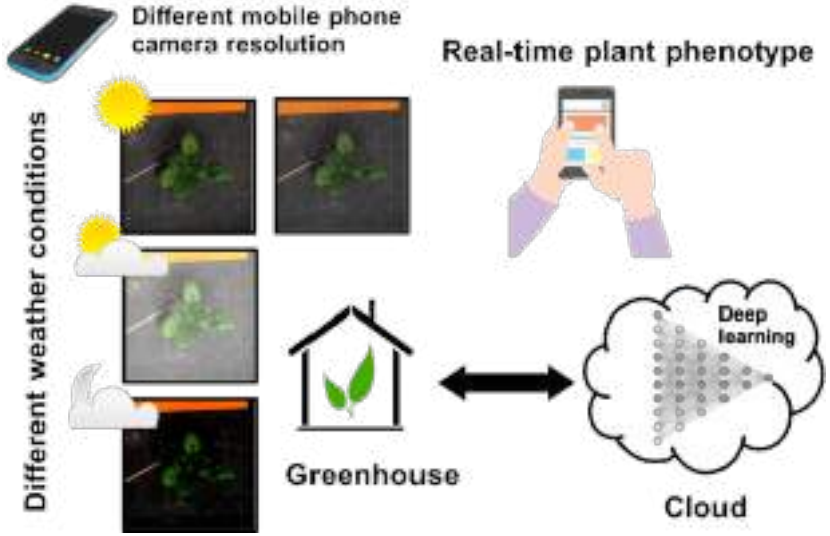
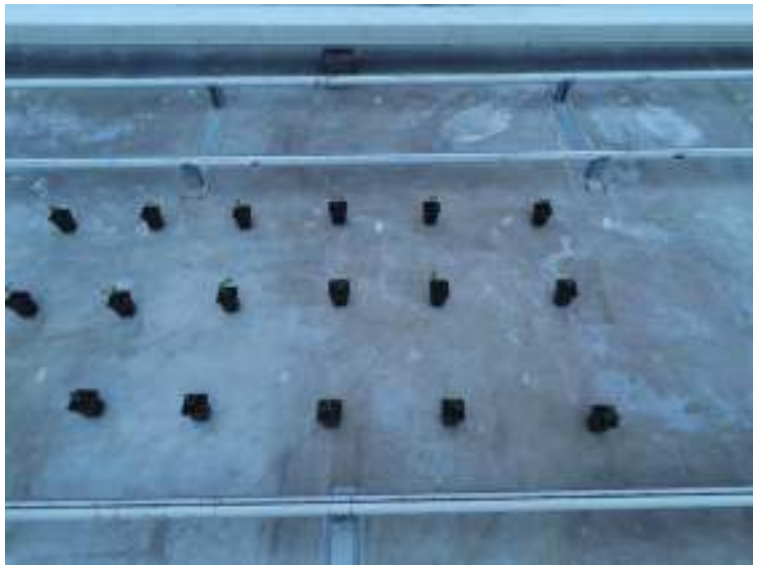
Autonomous flying– Plant phenotyping





Participative Deep Learning

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MOOC Drones for Agriculture: Prepare and Design Your Drone (UAV) Mission

Module 1: Remote Sensing, UAV's and Applications
Module 2: Planning a mission and acquiring the data
Module 3: From acquisition to visualisation

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Thank you!

www.joao-valente.com

ILFIELDROBOTICS

Social Artificial Intelligent drones Lab

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