Integrated Pest Management

Assisted by BIG DATA acquisition

using

Unmanned Aerial Systems

Manual Scouting
- The cornerstone of IPM

- *Why we scout?*

Scientifically proven method to reduce the losses due to pests and diseases. Avoid spraying large quantities of pesticides needlessly

- *How often is scouting performed?*

Ideally, scouting an area of crop is done on a weekly basis depending on the crop. However, the fact of the matter is that manual scouting is:

1. Time consuming
2. Labour intensive

Gathering data on crops is essential

- Most industries thrive on gathering data
- High tech/modern greenhouses use Walking Plant Systems (WPS)
- They are a great way of gathering data on crops
- However, unless you are building a new greenhouse, the cost to retro-fit these systems is huge.
- For most greenhouse operators, the available tools for data acquisition are limited.

What if….

a system could acquire large amounts of data

in a matter of minutes,

without the need for adding expensive infrastructure..?

So who are we?

- 4 aerospace students (clueless about greenhouse farming)
- Told we could not fly drones inside greenhouses…
- Project started one year ago at Bunnik Plants® VALUE ADDING GROWERS
- Still clueless about greenhouse farming BUT we have built and flown many drones inside greenhouses ☺
- We got carried away: Applied Drone Innovations Ltd ADI
- Team has been slowly growing ☺
- Unfortunately our money has not been growing ☹

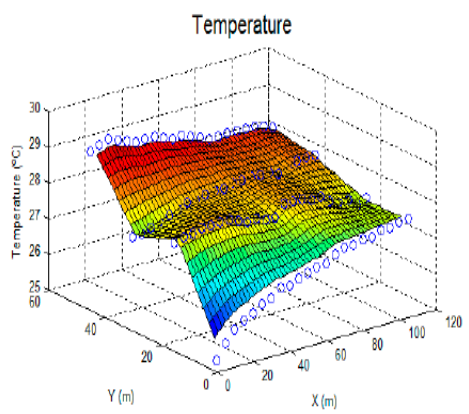
What are we doing right now?

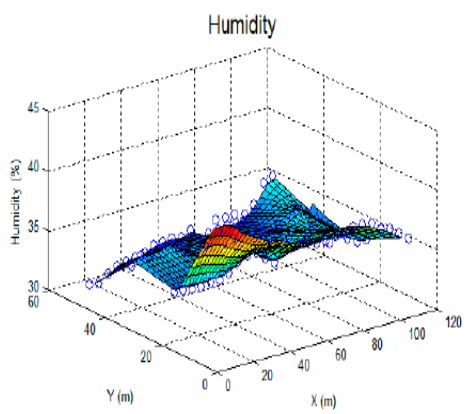
- Our focus - Minimal Viable Product (MVP)
- Working with an Orchid greenhouse
- Using a colour camera mounted under a drone
- Detect visibly sick plants (Fusarium, Erwinia etc.)
- Not by looking at the images with our own eyes

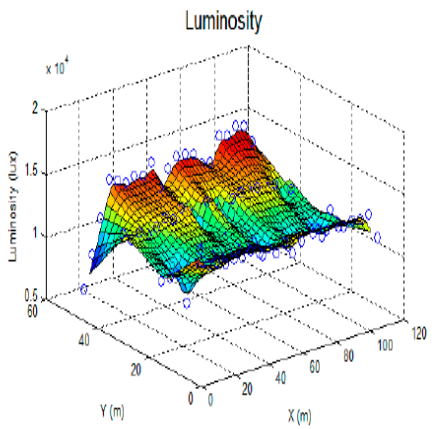
- So how exactly are we doing this?

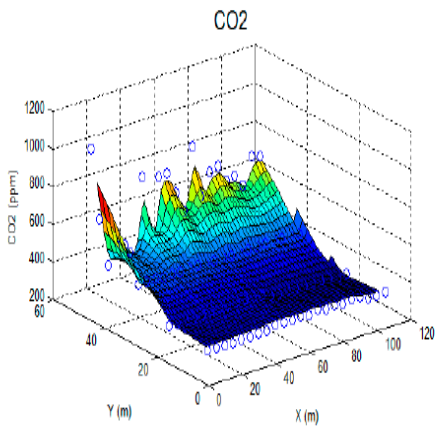
Machine Learning

- By stitching the images into a large mosaic (think modern Gaudi)
- Developing software which autonomously detects the sick plants
- Combining this with the sensory equipment on the drone
- Creating 3D maps of temperature, humidity, luminosity and CO_2 everywhere the drone flies









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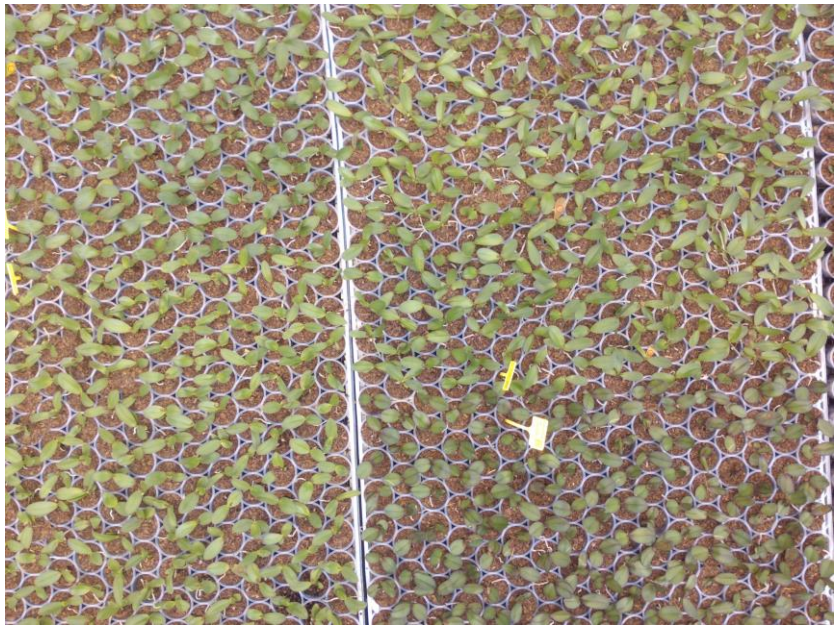

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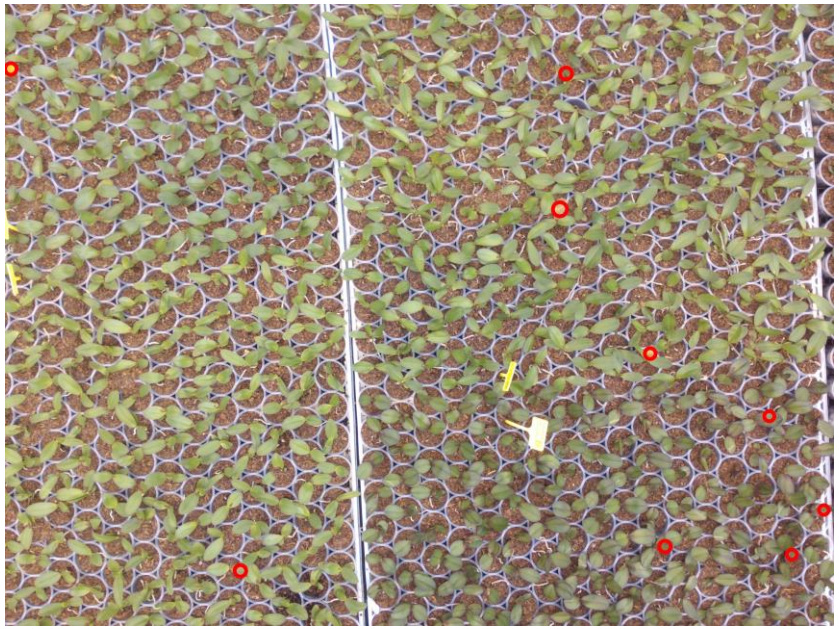

What is it good for?

- We believe having access to this scale of data is beneficial
- Can see where problem areas are and fix them
- Track the changes you make (weekly, monthly, yearly basis)
- Further develop crop modelling to make accurate predictions
- We are not trying to replace the people who have the very important job of scouting
- Rather, provide scouters with a tool that can assist them in being more efficient

The Future: Our 20/20 Vision

- Is to keep developing the system until it is fully autonomous
- Integrate multi-spectral camera systems which are able to detect plant stress *before* it is visible to the human eye
- Automatically log the data digitally (cloud server)
- Provide accurate advice to greenhouse growers

Challenges

- We have a lot of work to do before our 20/20 vision – full automation, proving multispectral camera technology etc.
- Data interpretation
- Gaining expertise from experts in the field (Olaf, Wageningen etc.)
- The more friends we have, the easier the road ahead will be
- Applying for government funding RAAK – MKB (**Mid-March**)
- Come speak to us if you're interested in joining our upcoming research proposal

Thank you

- Please take 2 minutes to fill in a small questionnaire (it's in Dutch) ☺
- **Website**: www.adinnovations.nl or Find us on Facebook
- **Email**: adinnovationsltd@gmail.com
- Whilst you fill in the questionnaire…drone flight demonstration

ADI

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