



Step by step towards a digital Vineyard

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Precision Viticulture



Time / costs



Quality



Ressources



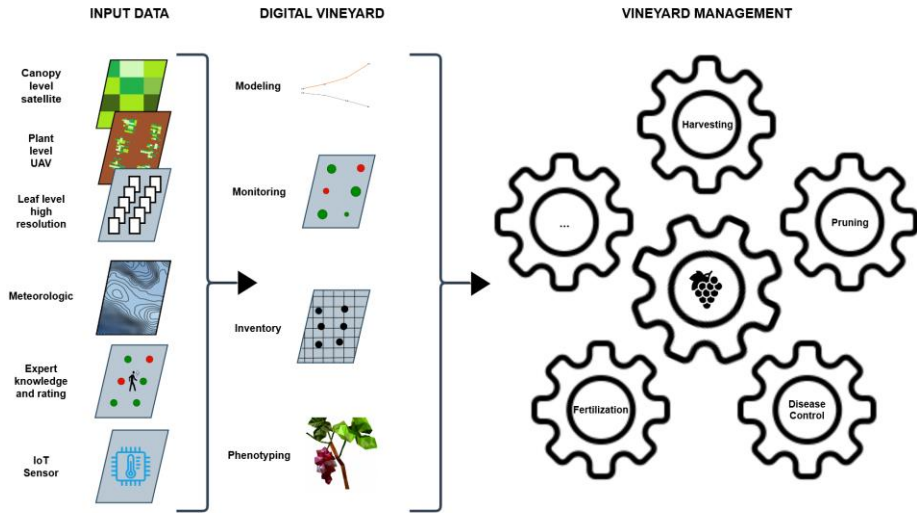
Efficiency



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COMMECT – Horizon Europe



Bridging the digital divide and addressing the need of Rural Communities with Cost-effective and Environmental-Friendly Connectivity Solutions

36M (09.2022 – 10.2025)

20 partners (EU, and no-EU)

5 Living Labs

Project Coordinator: Maria Rita PALATTELLA, LIST
<https://www.horizoneurope-connect.eu/>



5 Living Labs Multi-Sector | Multi-Actor

- LUXEMBOURG
Digitalisation of Viticulture
- NORWAY
Connected Forestry
- DENMARK
Connected Livestock Transport
- TURKEY
Smart Olive Tree Farming
- SERBIA
Sustainable Agriculture and Preservation of Natural Environment



Partners



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Smart XG, Last Mile and Edge Connectivity Solutions



Satellite



Cellular



UAV Networks



EDGE Networks

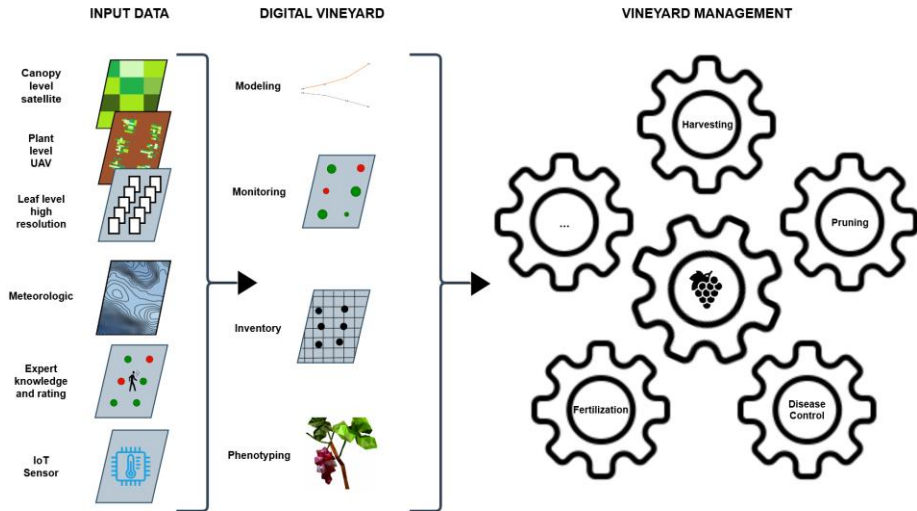


Non-Cellular



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IoT Sensors



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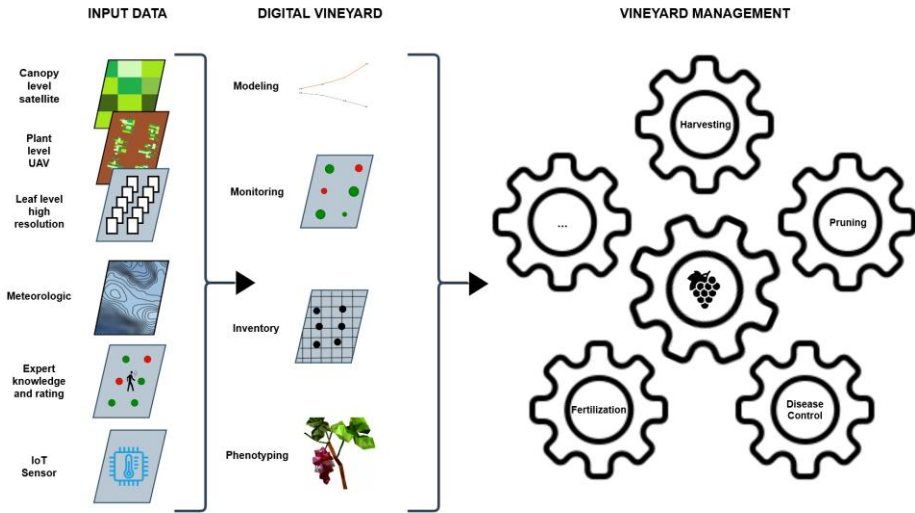
IoT - Sensors



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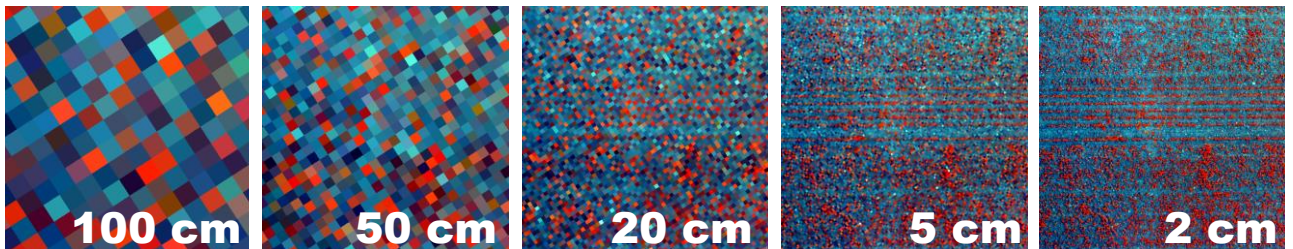
Image Data

IoT Sensors



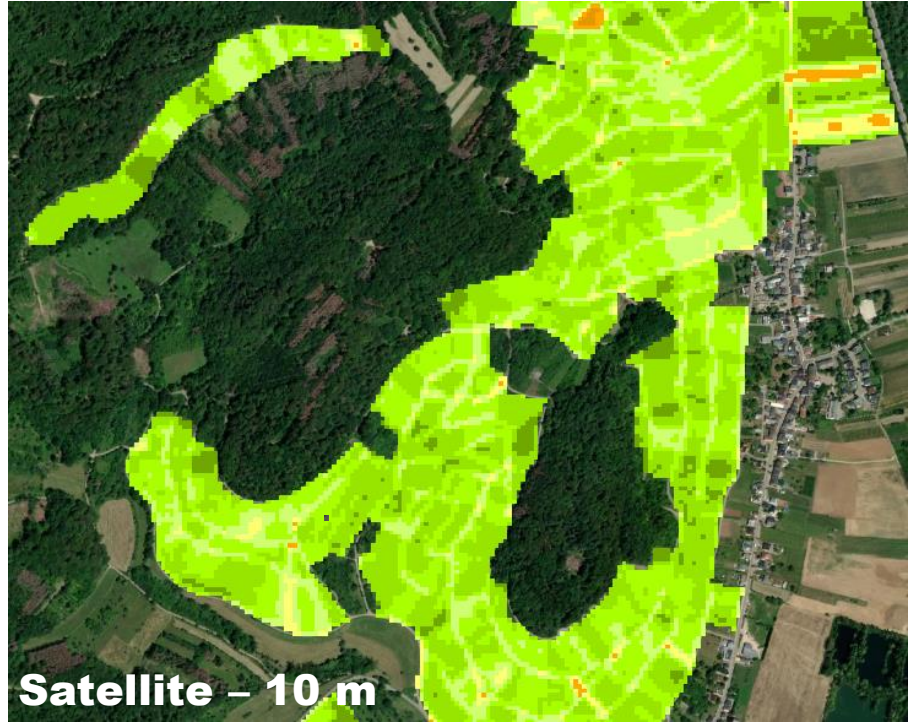
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Image Data



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Image Data



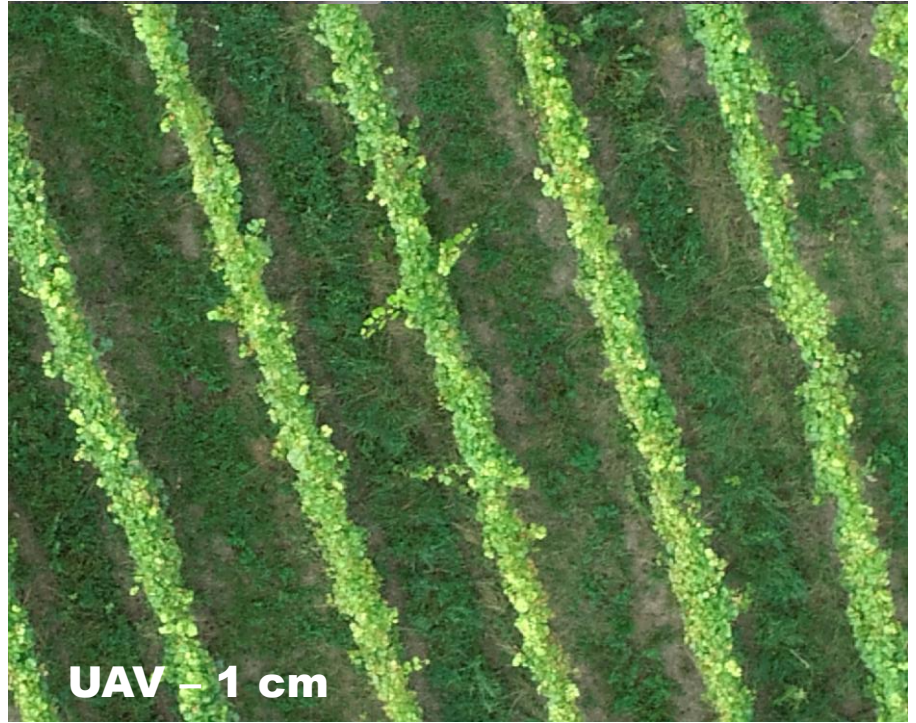
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Image Data



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Image Data



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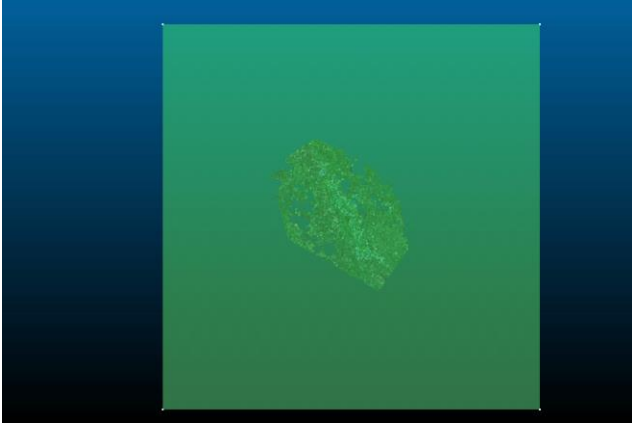
Image Data



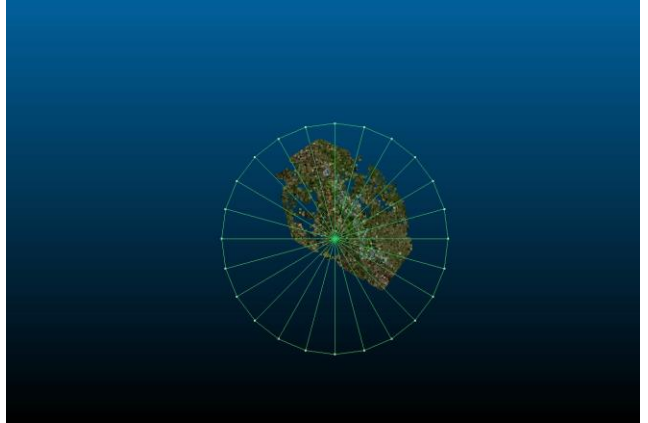
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Geolocation

Sentinel 2 Pixel ~ 10m

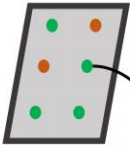


GPS Accuracy ~ 6m

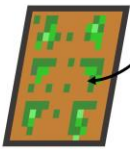


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The Problem



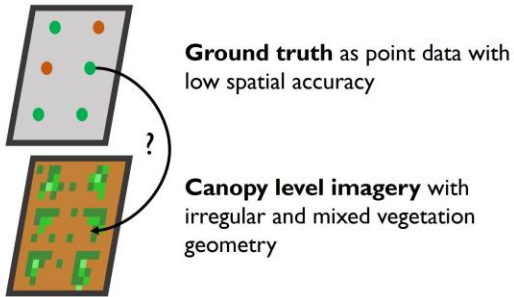
Ground truth as point data with low spatial accuracy



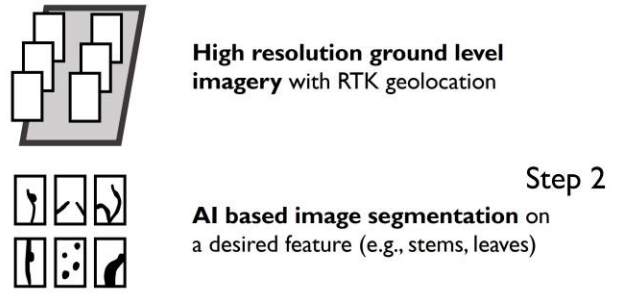
Canopy level imagery with irregular and mixed vegetation geometry

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The Problem



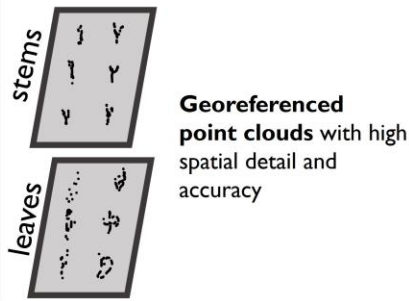
The Solution



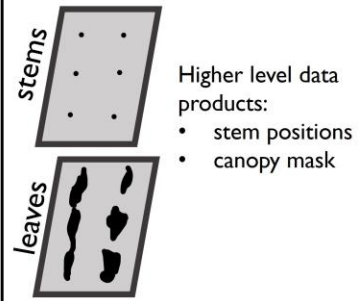
Step 3



Step 4



Step 5



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Step 1: High resolution ground level imagery



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Step 1: High resolution ground level imagery

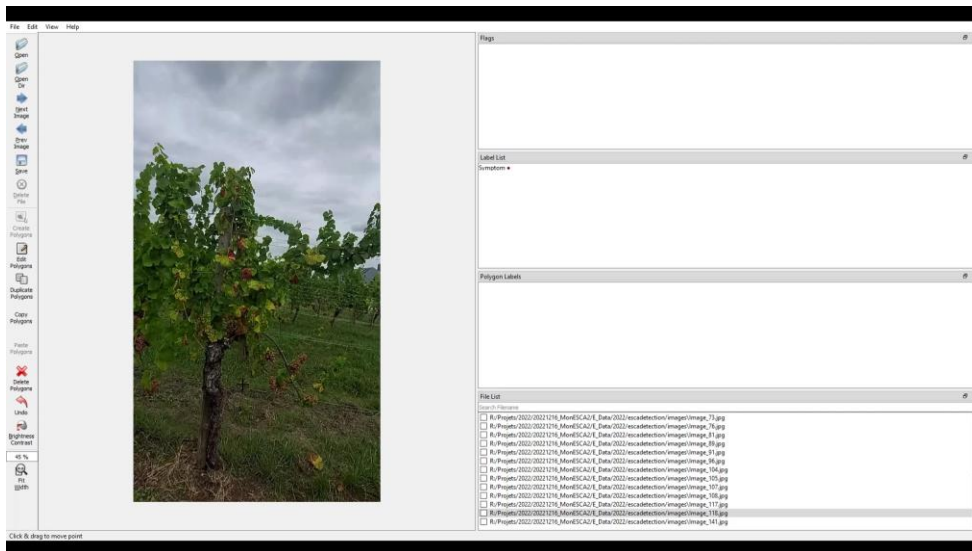
Lots of flexibility in terms of:

- Frequency
- Resolution
- Filming conditions



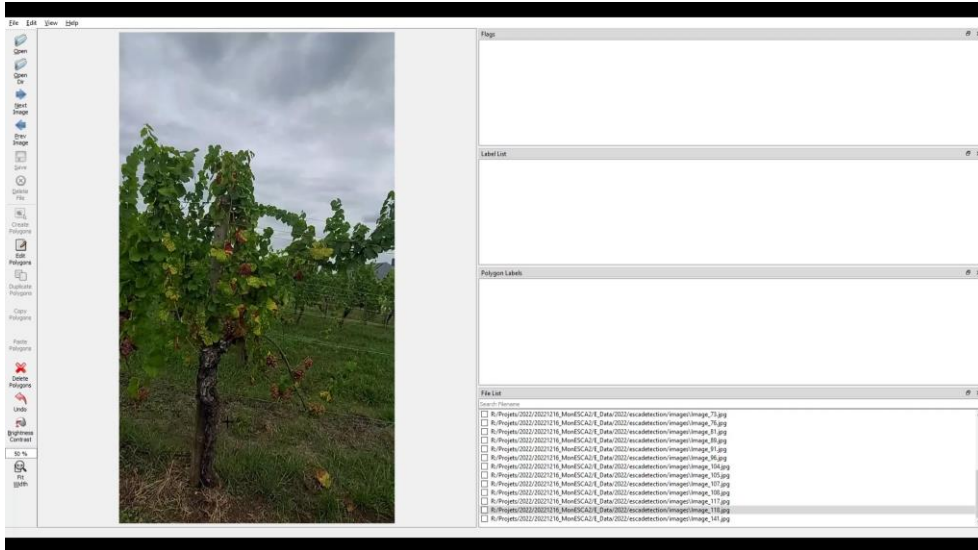
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Step 2: AI based image segmentation



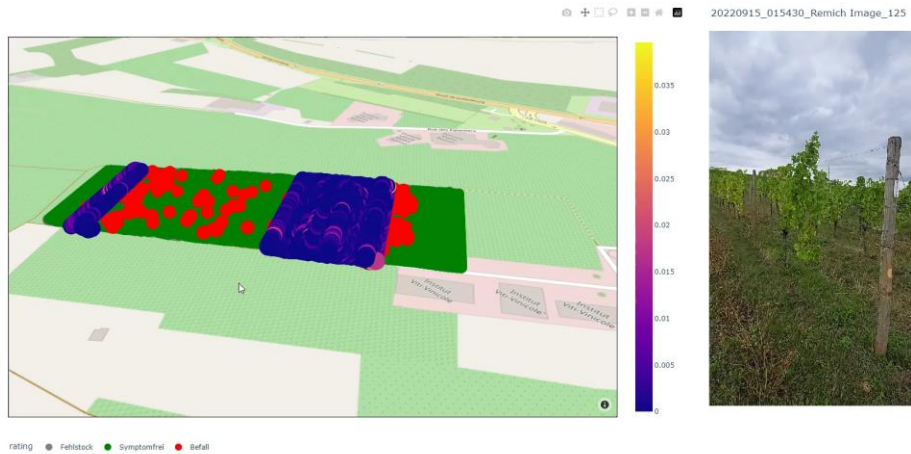
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Step 2: AI based image segmentation



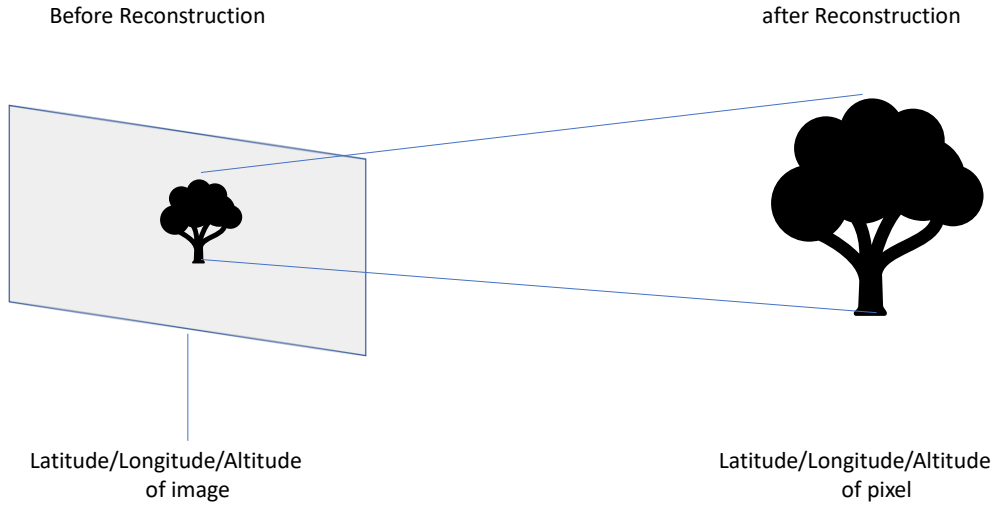
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Step 2: AI based image segmentation



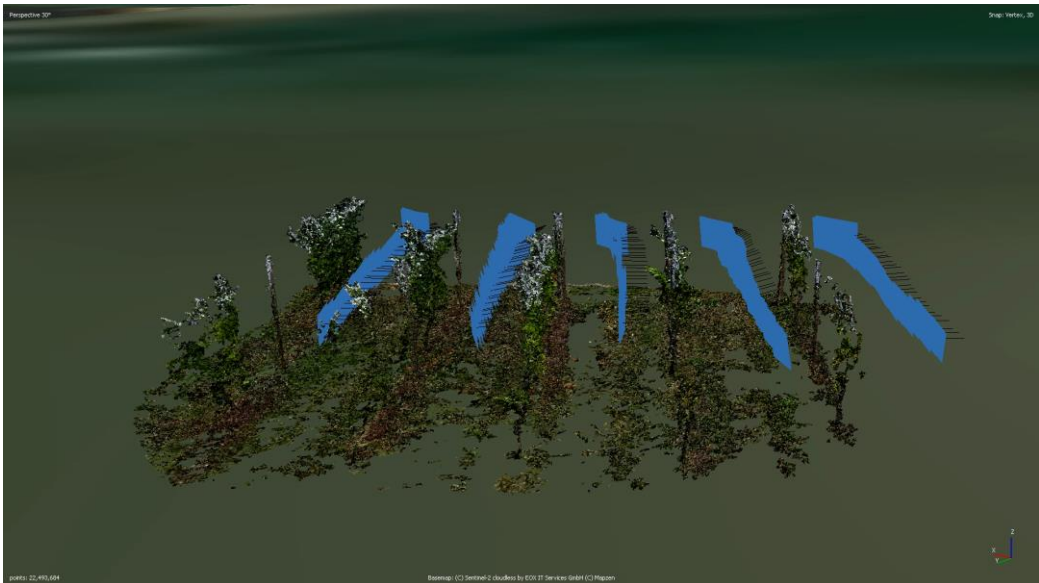
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Step 3: Photogrammetric Reconstruction



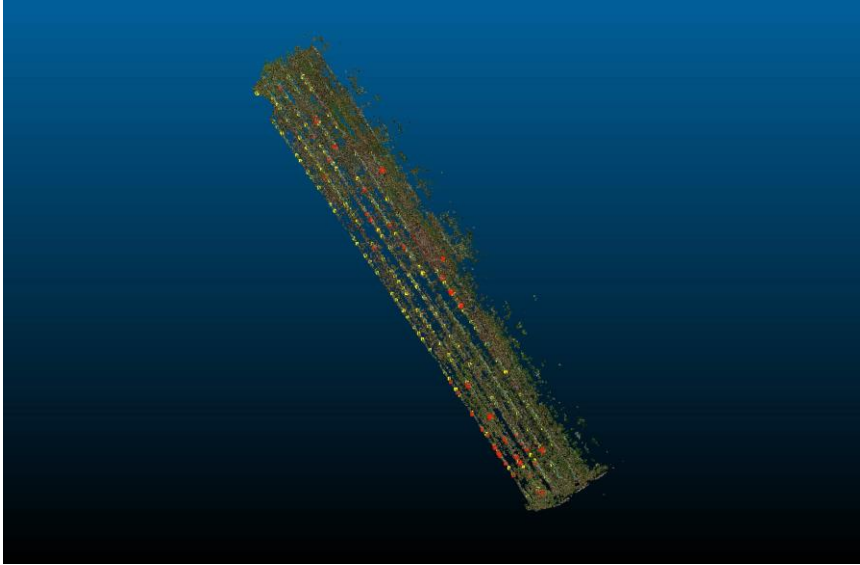
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Step 3: Photogrammetric Reconstruction



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Step 4: Georeferenced Point Clouds



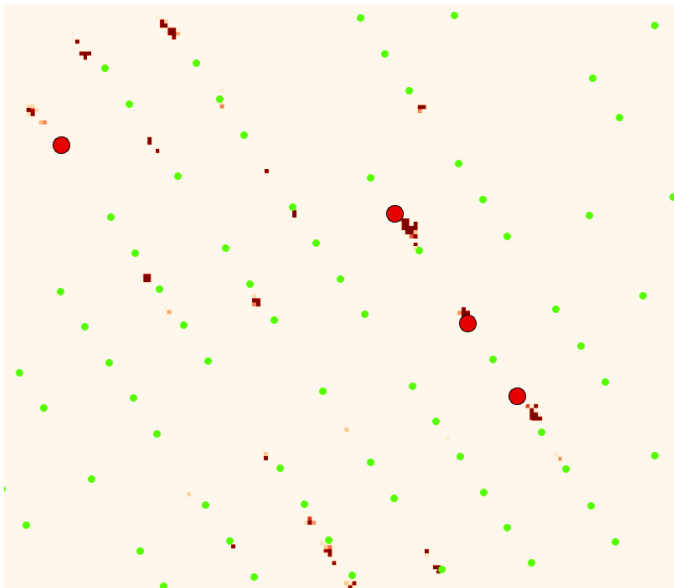
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Step 5: Higher Level Products – Stem Geometry



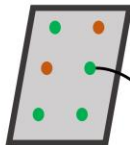
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Step 5: Higher Level Products – Esca Detection

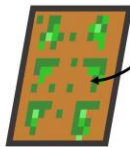


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The Problem

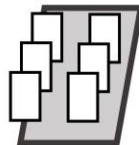


Ground truth as point data with low spatial accuracy



Canopy level irregular and geometry

The Solution



High resolution ground level imagery with RTK geolocation

Connectivity potential:

- Near Realtime Uploading
- Providing higher level products within an hour
- Can be verified/used on the same day

Step 1

Step 2

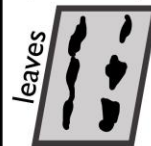
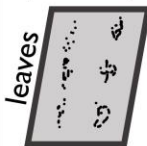
Image segmentation on feature (e.g., stems, leaves)

Step 5



Photogrammetry 3D point cloud construction and projection of detected features

point clouds with high spatial detail and accuracy



Higher level data products:

- stem positions
- canopy mask

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Thanks for your attention!

