1st Open Day and Workshop
14th July 2022

INSTITUTO DE SISTEMAS E ROBÓTICA
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Multimodal Perception for Precision Agriculture

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Introduction

The goal is to improve **precision agriculture** using multimodal data to capture relevant information regarding biological phenomenons in plants that are not captured by the RGB spectrum.

Modalities

- Mutlispectral imagery
- Digital Surface Models (DSM)
- HD RGB

Perception Tasks

- Semantic Segmentation
- Detection
- Cross-modal Learning

Background

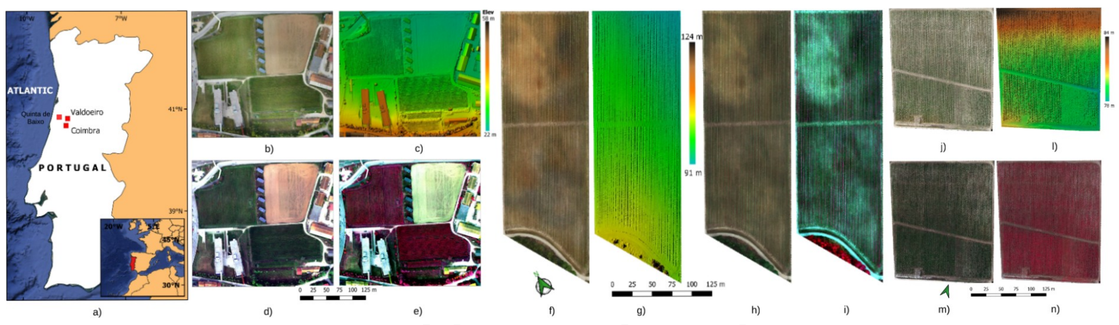
Plants produce **chlorophyll** by converting radiant energy from the sun into **organic energy**.

Chlorophyll has unique **absorption characteristics:**

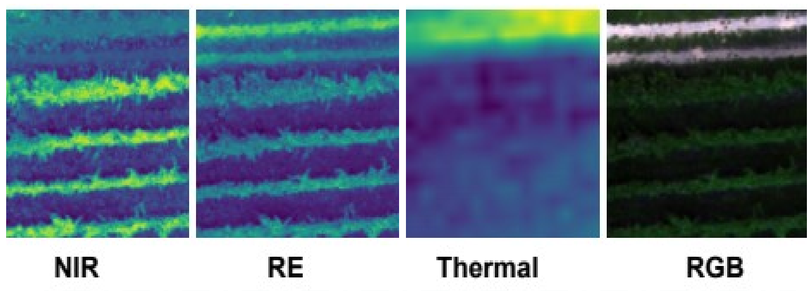
- Absorbs wavelengths around the **visible red band;**
- Transparent to wavelengths in the **near-infrared;**

These characteristics are commonly use to estimate the local vegetation density in satellite or airborne multispectral imagery.

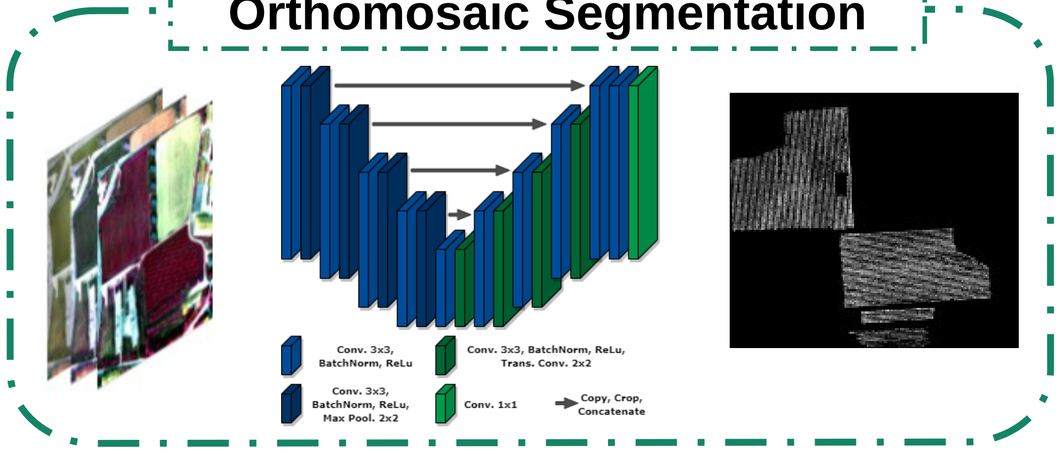
Vineyards [1]



Multispectral Bands



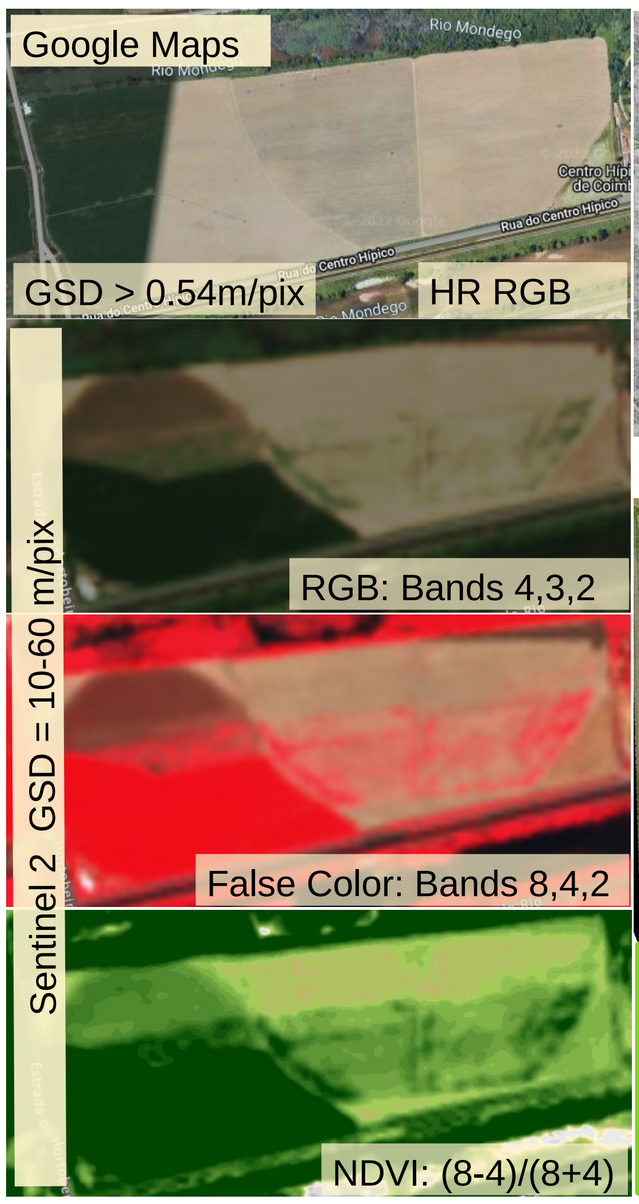
Orthomosaic Segmentation



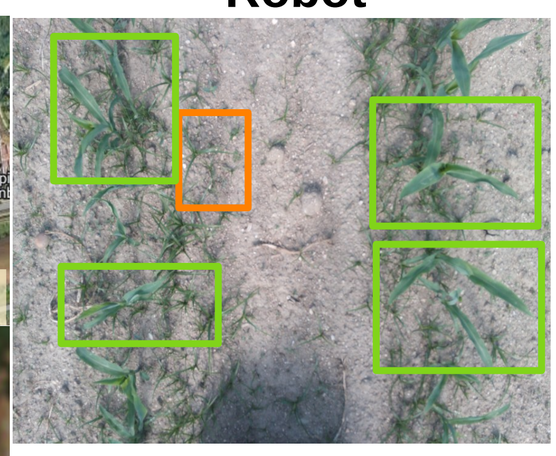
Sensors

Maize

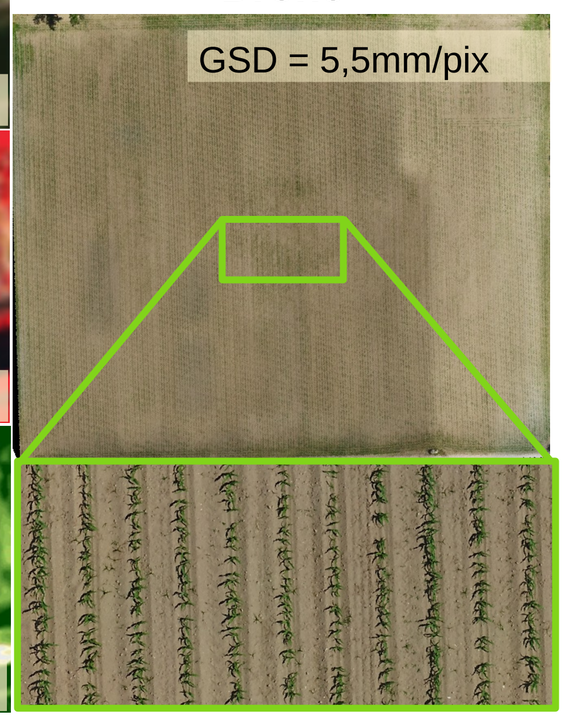
Satellite



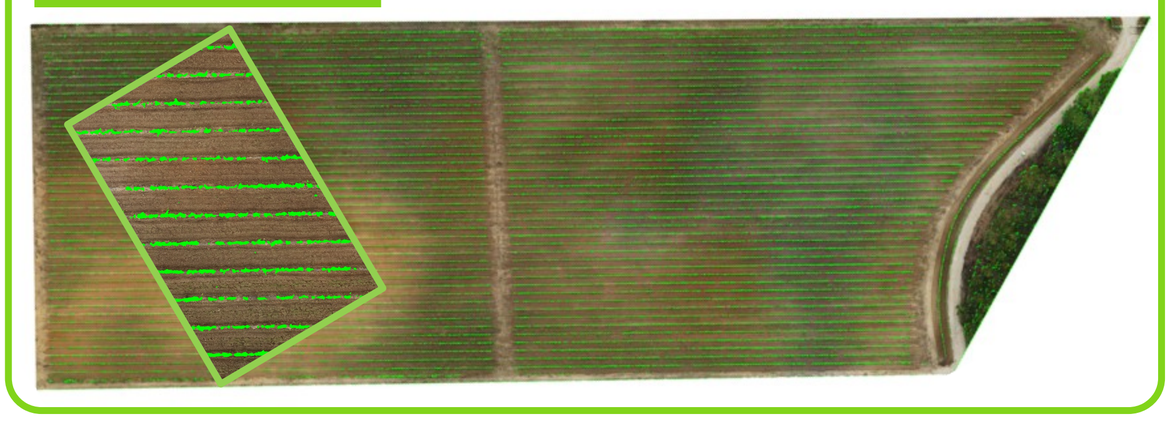
Robot



Drone



Results



References & Acknowledgements

[1] Barros, T., Conde, P., Gonçalves, G., Premebida, C., Monteiro, M.,Ferreira, C. S. S., & Nunes, U. J. (2022). Multispectral vineyard segmentation: A deep learning comparison study. Computers and Electronics in Agriculture, 195, 106782.

These works have been supported by the Portuguese Foundation for Science and Technology (FCT) via the projects AI+Green (MIT-EXPL/TDI/0029/2019) and Agribotics (UIDB/00048/2020), through a PhD grant with the reference 2021.06492.BD, and also by the ISR-UC through the FCT grant UIDB/00048/2020.