



PlantYsense software

Plants as never seen before!



“Dream vineyard”



Grape(vine) diseases turn Dream vineyard to Nightmare

- Grapevine trunk diseases
- **ESCA** is the deadliest
- Damage EUR 8-9 B/y/world
- 5% - 19% of vineyards

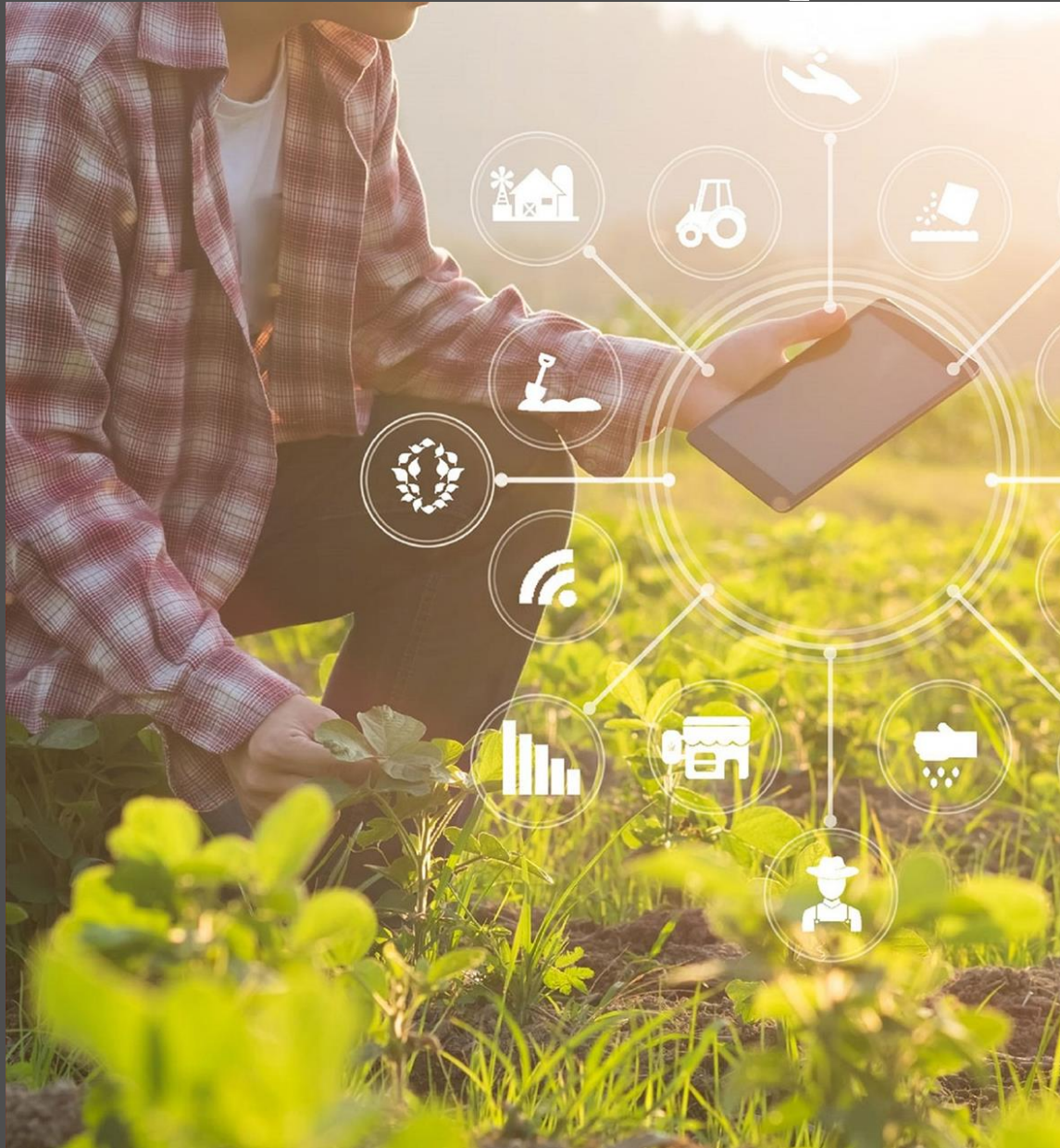


With PlantYsense you get

- **Early ESCA disease detection (saves up to 1.060 EUR/ha)**
- Faster vineyard monitoring (saves time & money)
- Lower dependence on scarce manual labor



This contributes to the problem

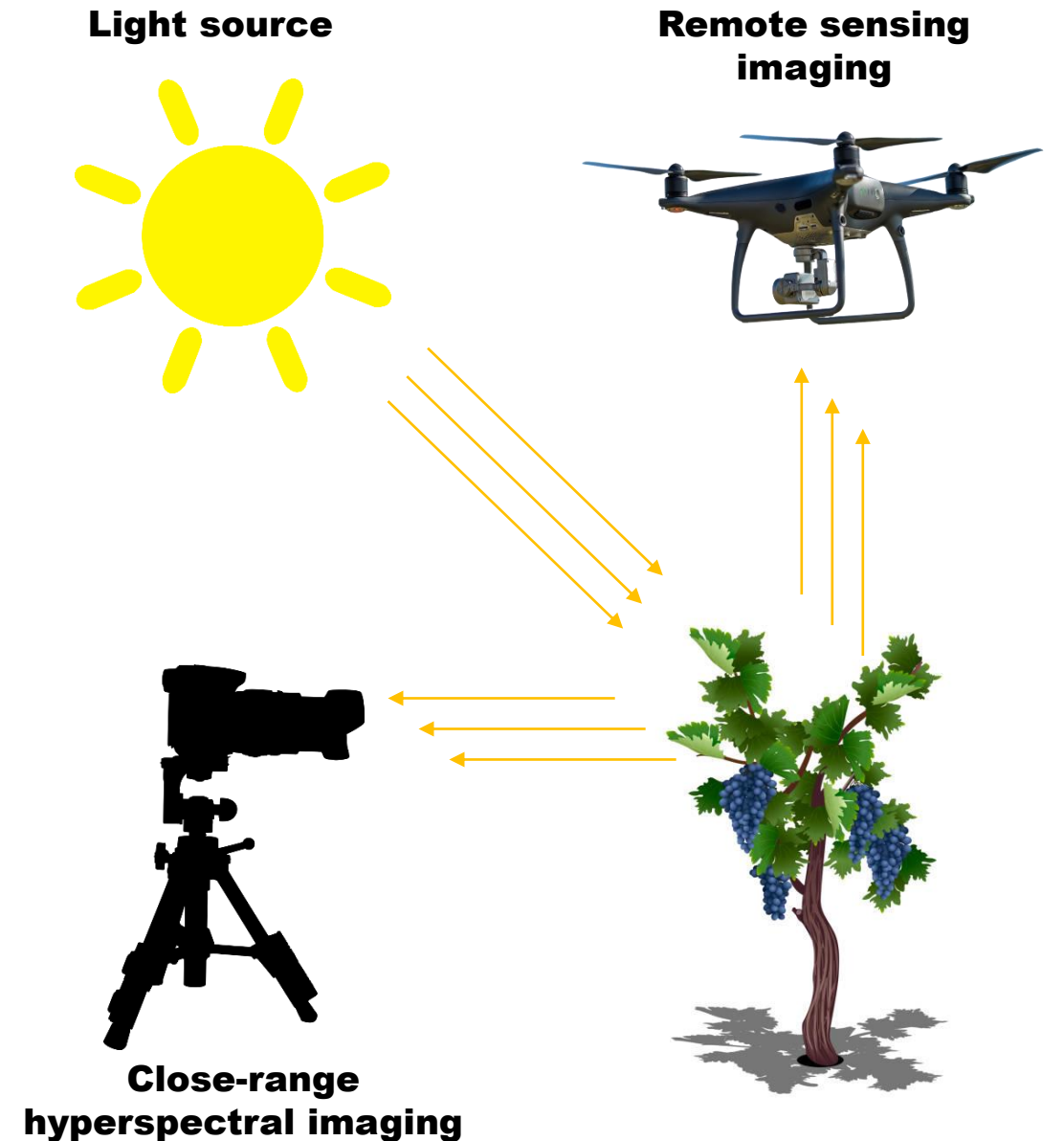


- INCREASE in plant disease outbreaks
- Strategies to reduce the use of chemicals – do not help farmers
- ESCA is also transmitted through the scissors while pruning

Solution - PlantYsense software

ELIMINATES UNCERTAINTY

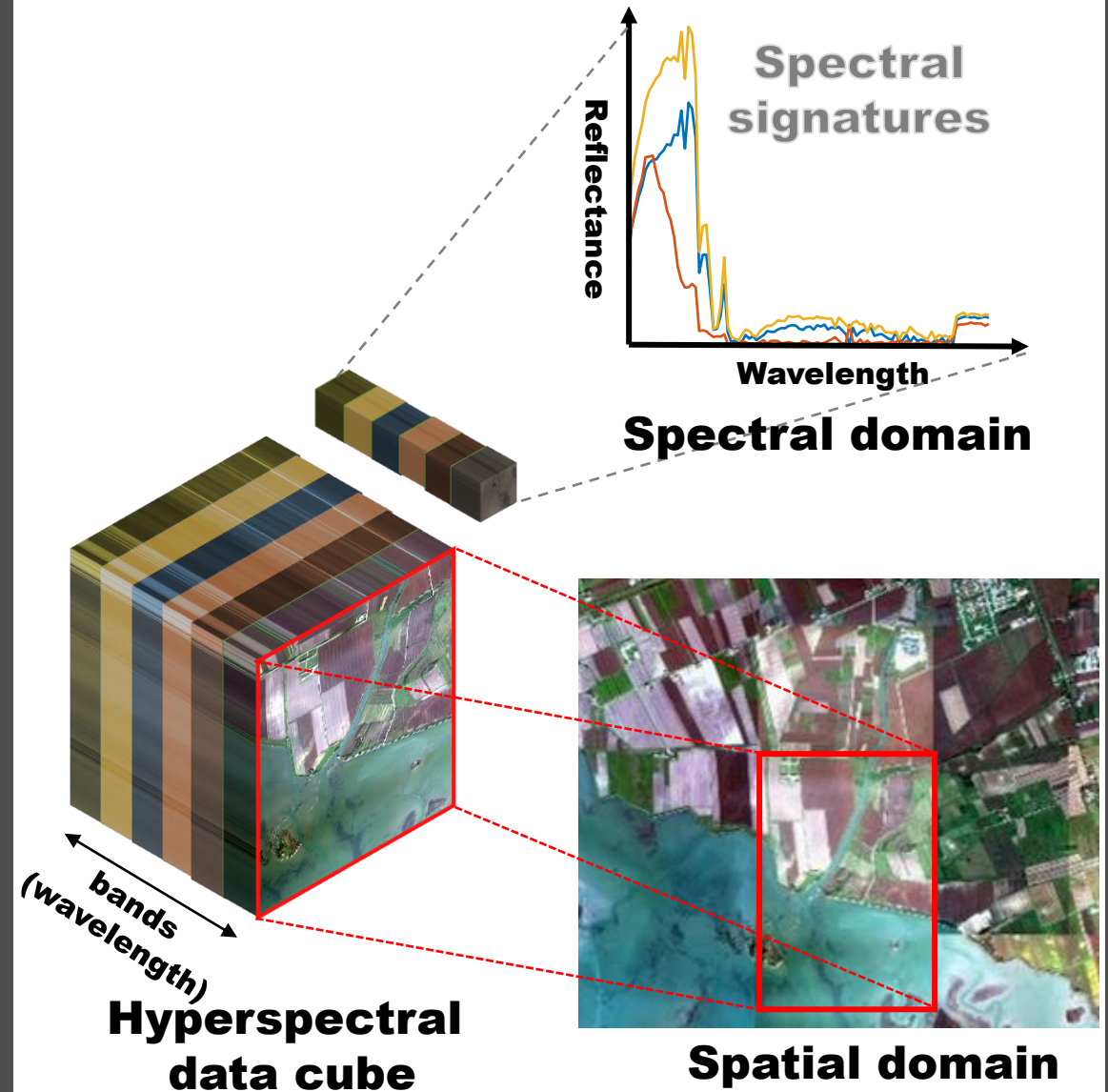
- Combination of REMOTE SENSING and CLOSE-RANGE imaging for EARLY disease detection
- Hyperspectral data from different sources
- **THz imaging**
- Reaching the lower parts of a plant



Remote sensing - satellite



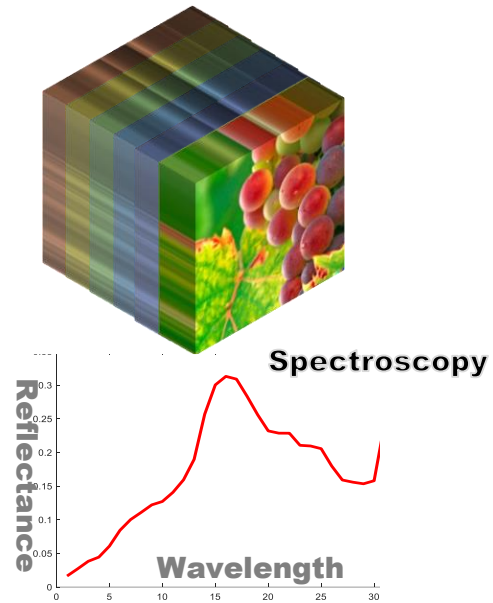
- The cheapest solution
- Good for large surfaces
- Good for seasonal change detection



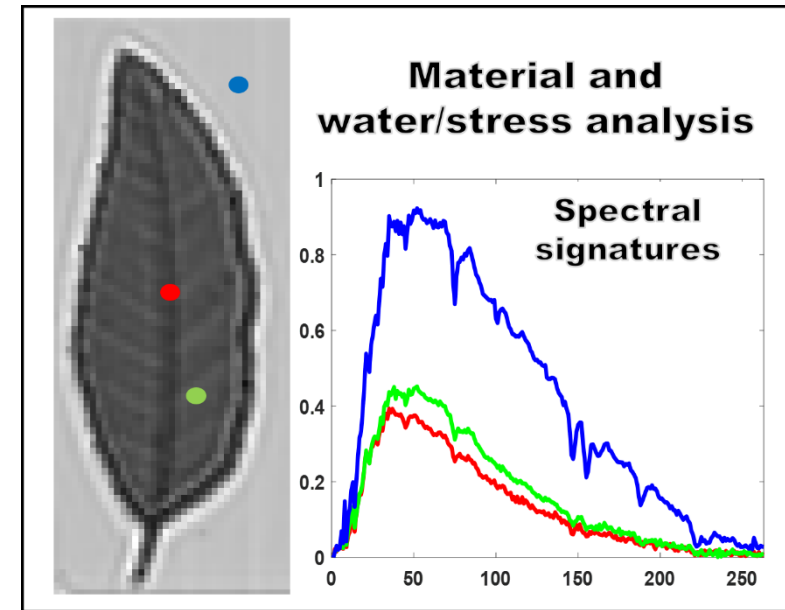
Remote sensing – drone (multispectral camera)

- Protocol for drone mapping: flight height, camera angle, number of flights
- Drone flies as low as possible to take images of lower parts of plants
- More detailed analysis





- More information → improved analysis
- Chlorophyll visible in the NIR spectral region
- Materials classification



- Non-destructive and non-ionizing
- *See-through layered structures*
- High sensitivity to water

Market potential

Crop monitoring SERVICES

Total vineyards area in Serbia: **22.110** ha



Target market in Serbia (vineyards above 2ha):
7.940 ha (36%)

Target wine companies: 800

Crop monitoring LICENSES

World total vineyards area:
7.328.000 ha



World **target market**, EU & USA, (vineyards above 10ha): **2.294.400** ha

Target wine companies: 82.000

Business model & Revenue forecast

- **Direct crop monitoring services** for vineyards in Serbia with our own drone
- Price: 119 EUR/ha/year

- **Crop monitoring licensing** for vineyards in the EU and the USA (with the help of local drone service providers)
- Price: 2.490 – 2.990 EUR/license/year



REVENUE FORECAST

2024	2025	2026	2027	2028	2029	2030
36 K	175 K	710 K	2.1 M	3.5 M	4.9 M	6.5 M

In progress...

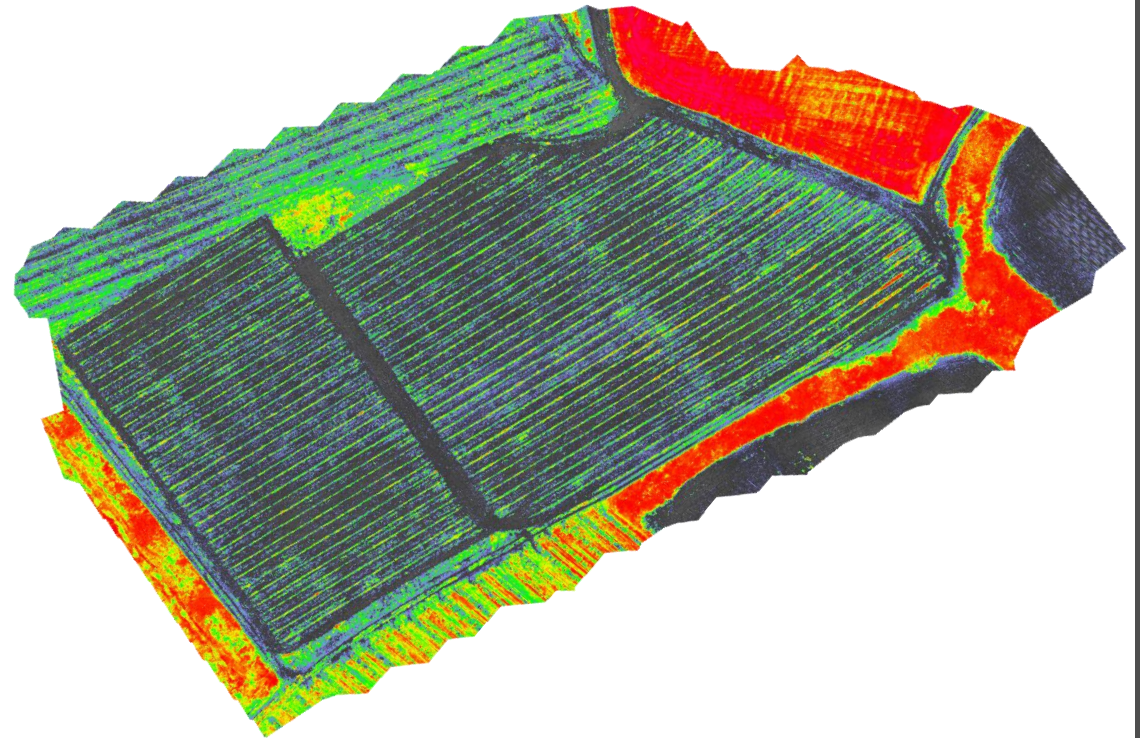
1. Data collection

(Jun '23 – Sep'23)



First drone mission: Vinarija Bajilo, Sremski Karlovci

- Mapping of a vineyard with drone imaging
- Vineyard health assessment with Vegetation Indices



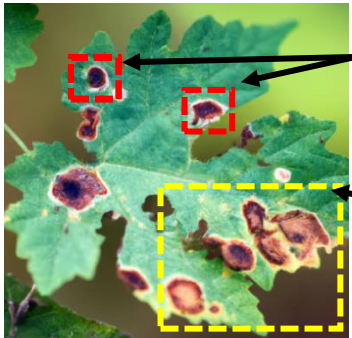
Next steps

Healthy plant



2. Data labeling (Aug '23 – Sep'23)

Plant under stress



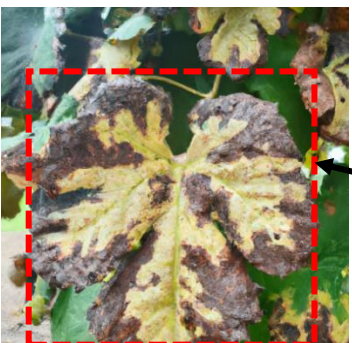
Local labeling

*marked single feature

Semi-global labeling

*grouped several features

Damaged plant



Global labeling

*marked the whole damaged leaf

3. Data augmentation (Oct '23 – Nov '23)



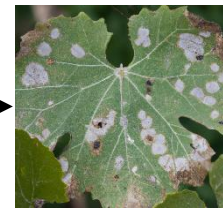
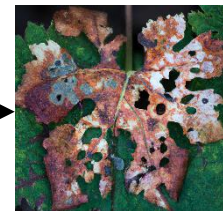
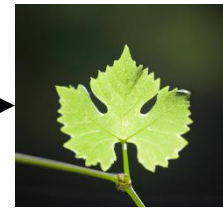
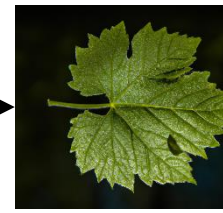
Labeled image

Change of the
orientation,
angle, light

Data augmentation

GAN: Generative Adversarial Networks

Various disease
appearance

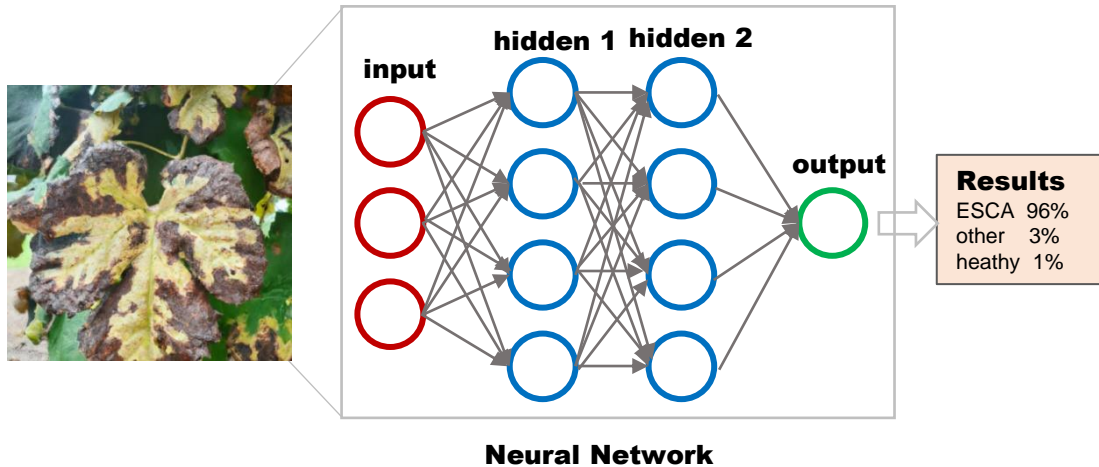


Next steps

4. Data classification

(Nov '23 – Mar '24)

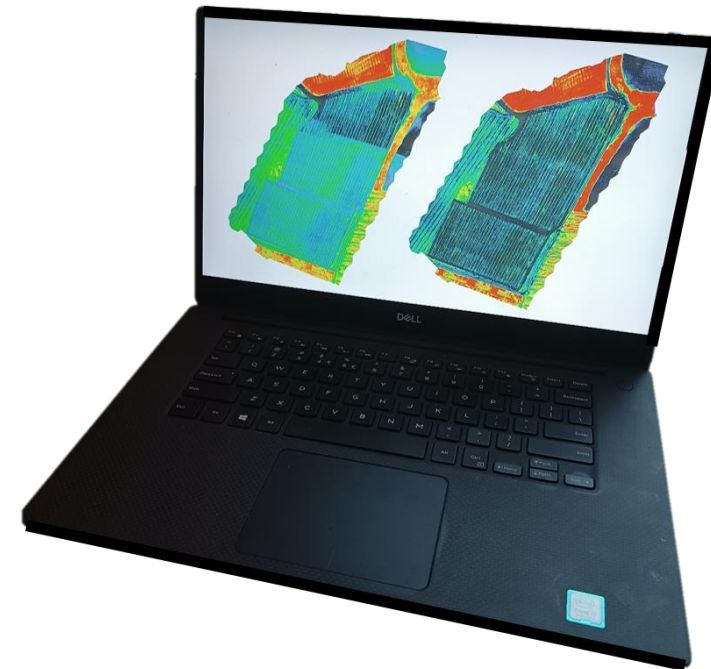
- Core of the PlantYsense software
- Automatic recognition and identification of grape vine diseases
- AI-based solution with neural networks



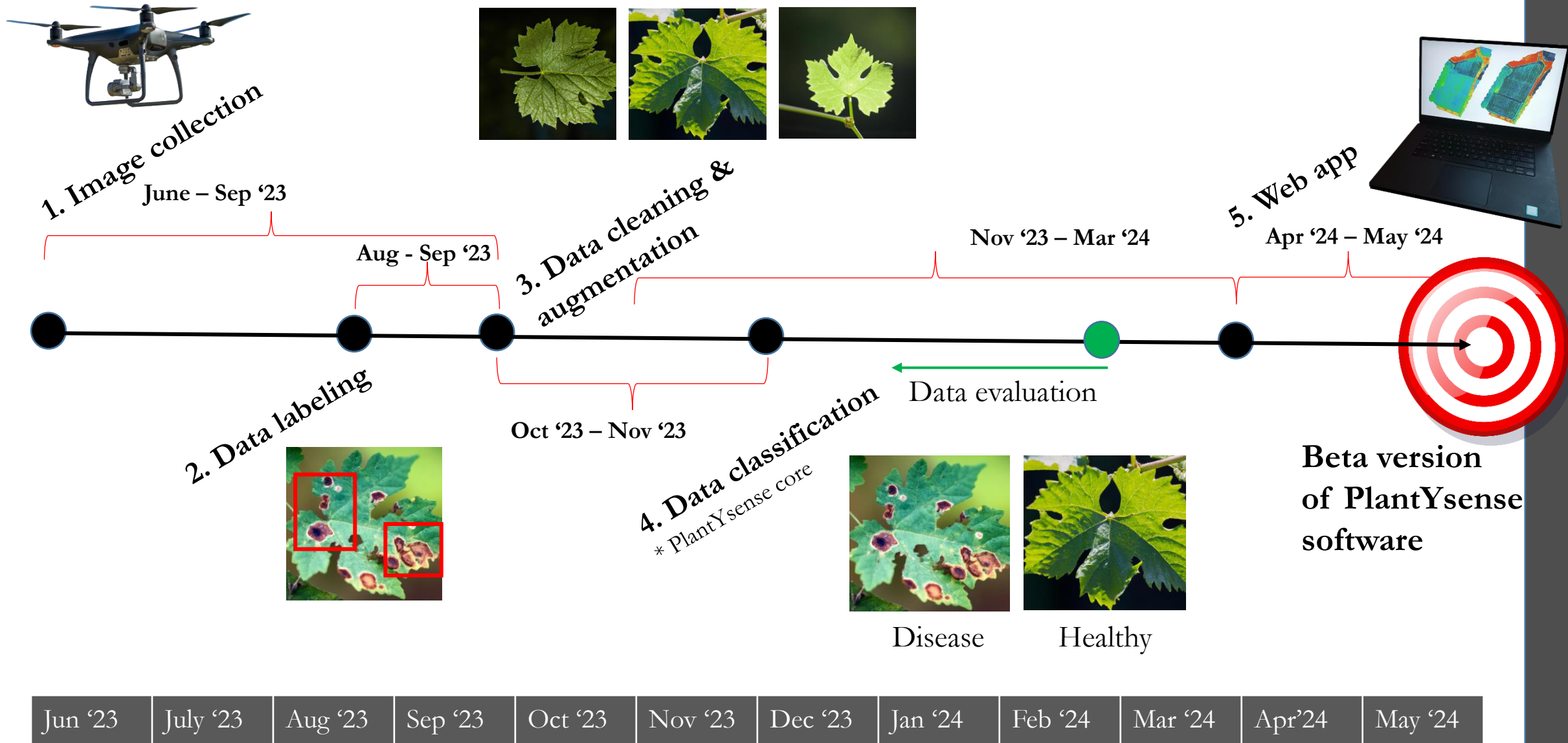
5. Web app development

(Apr '24 – May '24)

- Development of a user-friendly web app with an in-built reporting feature
- Server-stored data



Software development process



Competitors

- Vineview (imaging) – (Veles Sense has a more focused approach)
- Atfield Technologies (sensors) – (Veles Sense has a more precise approach)



TEAM



Marina Ljubenović, PhD
Researcher (Research & Development)



Sara Ferro
Machine learning programmer

TBD – Physicist (spectroscopy expert)

TBD – Front-end developer



Žarko Ljubenović
Economist (Sales & Marketing)



Marijana Ljubenović
Economist (Finance & Project management)



Kristina Ljubenović
Lawyer (Legal matters & operations)



Davide Boscaro, PhD
Agronomist

We already raised **45.000 EUR** (non-equity)

3 business accelerators

We need **355.000 EUR**

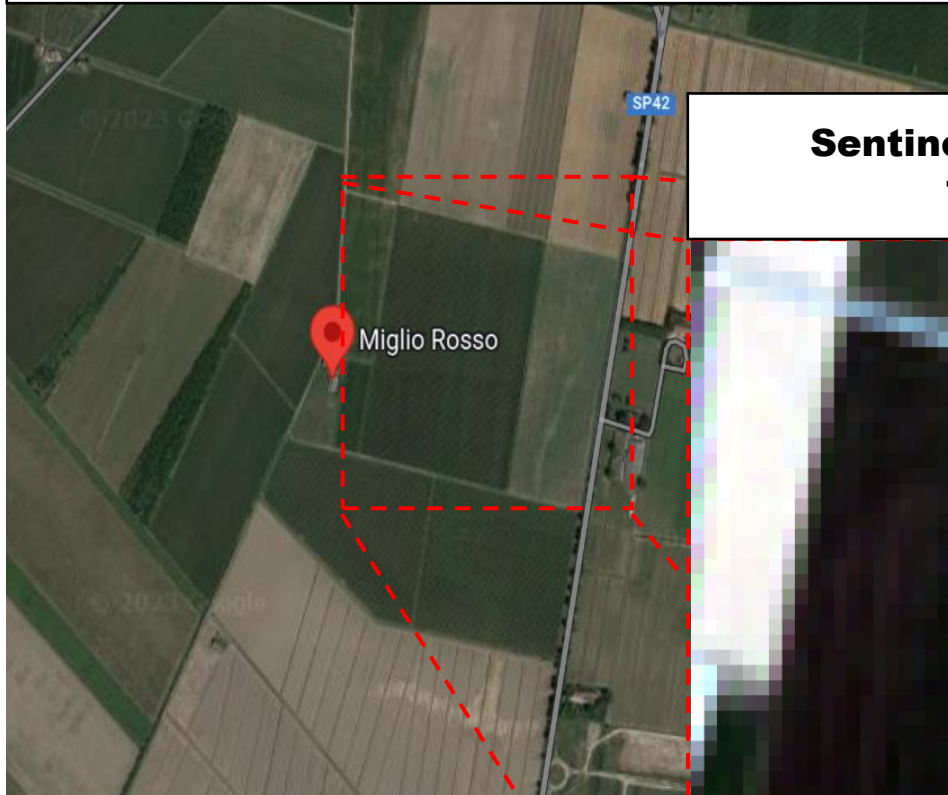
For the costs of software and business
development in the next 2 years.

... and partners are always welcome!

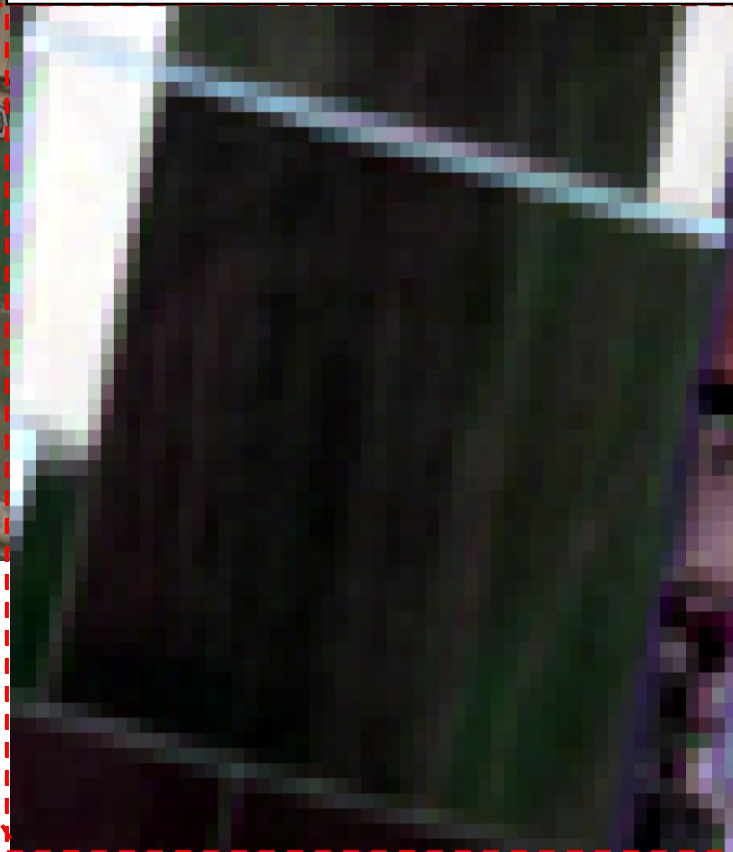
A photograph of a vineyard at sunset. The foreground shows rows of grapevines with green and yellowing leaves. The middle ground features rolling hills under a dramatic sky with orange, yellow, and blue clouds. The text "THANK YOU!" is overlaid in the center in a white, serif font.

THANK YOU!

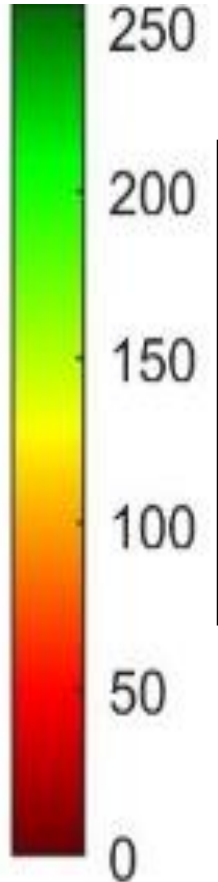
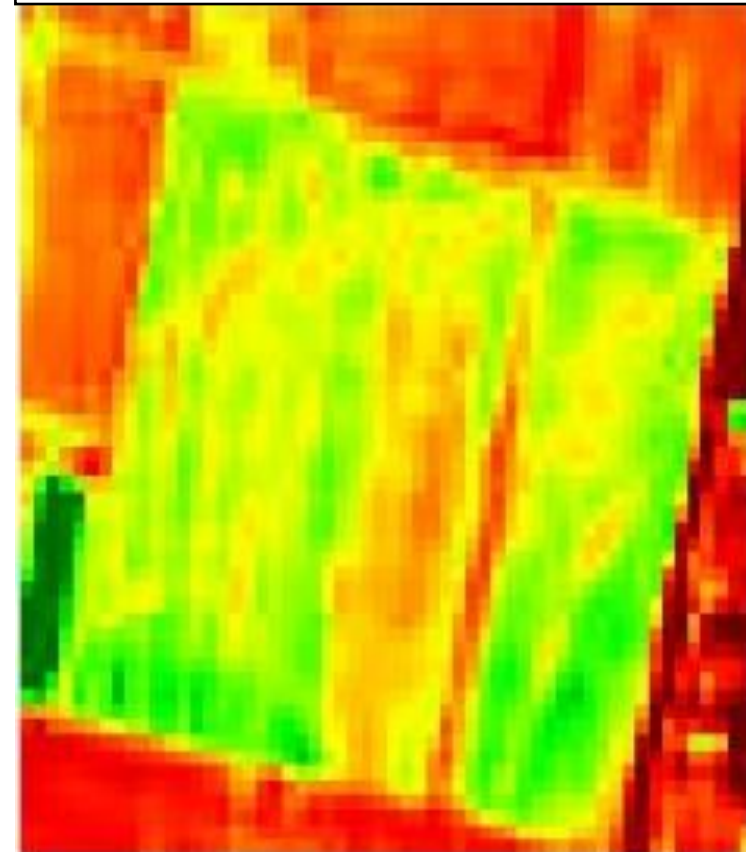
Vineyard Miglio Rosso (~25ha) Jesolo, Italy



Sentinel-2 satellite data 19/06/2022



PlantYsense MSAVI2 Vegetation Index



VITALITY LEVEL