CHAMELEON

ESSENSE

Esca Surveillance and Sensing in Serbian Vineyards

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Sub-project team

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Funded by the European Union

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Goals & Objectives

Evaluate the BC8 bundle

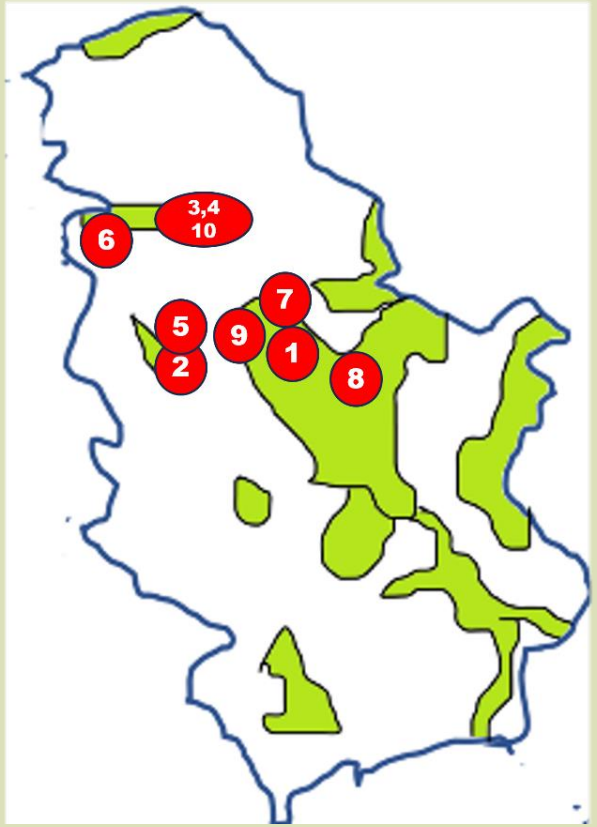
01 Objectives of the ESSENSE project

Objective 1: Select some of Serbia's most renowned and diverse wine regions

Objective 2: Utilize collected data from the 2023 and 2024 seasons for testing the BC8 bundle

Objective 3: Upload the selected data to the CHAMELEON tool for comprehensive analysis

Objective 4: Validate the results through several distinct validation approaches



Data processing

Data acquisition in Serbian vineyards

02 Data acquisition

Pre-seasonal and seasonal data

Data from at least two periods should be used

- **Pre-seasonal data** (February 2025) to facilitate automatic vine detection
- **Seasonal data** (May-August 2024) to facilitate crop growth monitoring process

Equipment: DJI Mavic 3 Multispectral: RGB + multispectral imaging

- ✓ Green (550 +- 16 nm), Red (650 +- 16 nm), RedEdge (730 +- 16 nm), Near-Infrared (860 +- 26 nm)
- ✓ Drone flying altitude: 50 to 100 meters
- ✓ Forward patch overlap: 60% and 70%
- ✓ Side patch overlap: 40%, 50%, and 70%
- ✓ Multispectral camera orientation: NADIR

02 Data acquisition

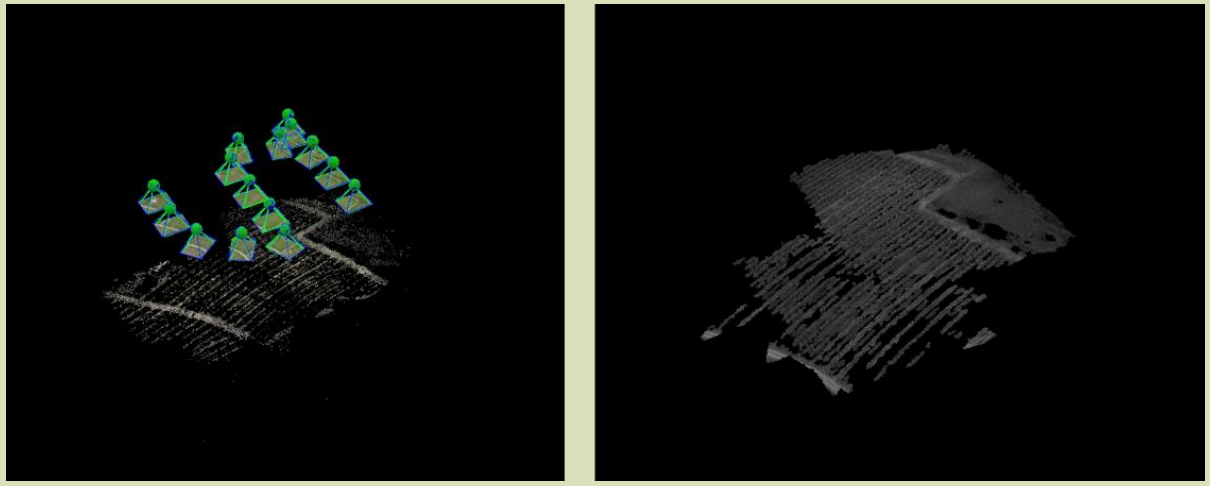
Pre-seasonal and seasonal data

February 2025

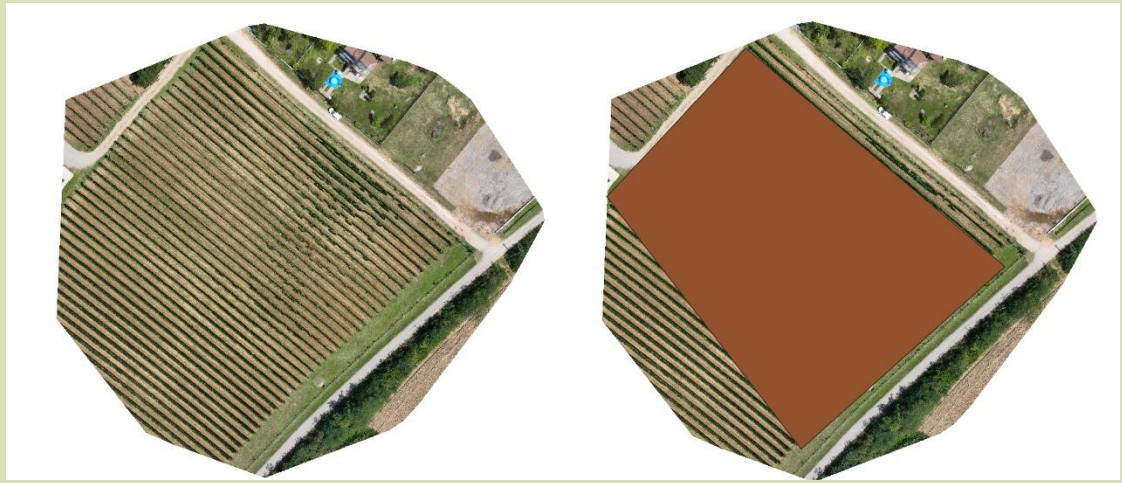
August 2024

02 Data pre-processing

1. Creation of orthophoto and other geospatial products (in Pix4D)
2. Creation of polygon shapefile in GIS software (in QGIS)
3. Extraction of the individual vines



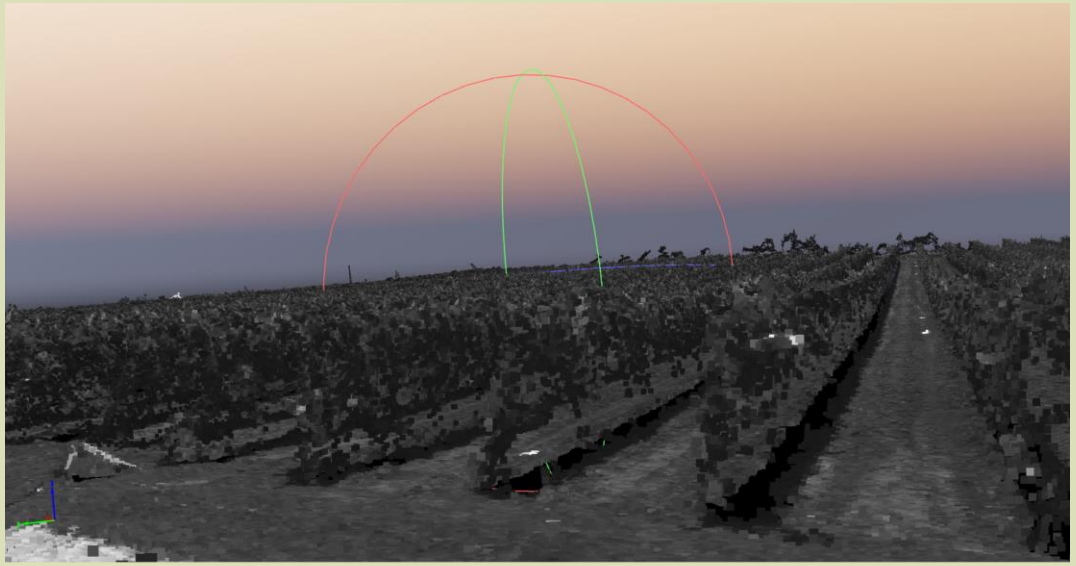
Point clouds

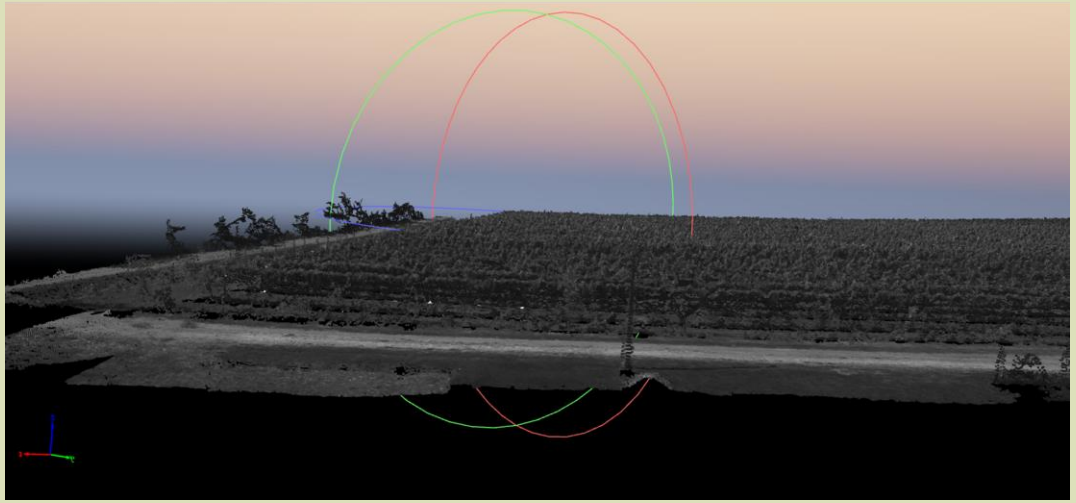


ROI

02 Point clouds

- Generation of point clouds is done in commercial software – Pix4D
- The quality of the point clouds strongly depends on several factors such as
  - camera resolution (higher better),
  - drone flying altitude (lower better),
  - patch overlapping settings (higher better)

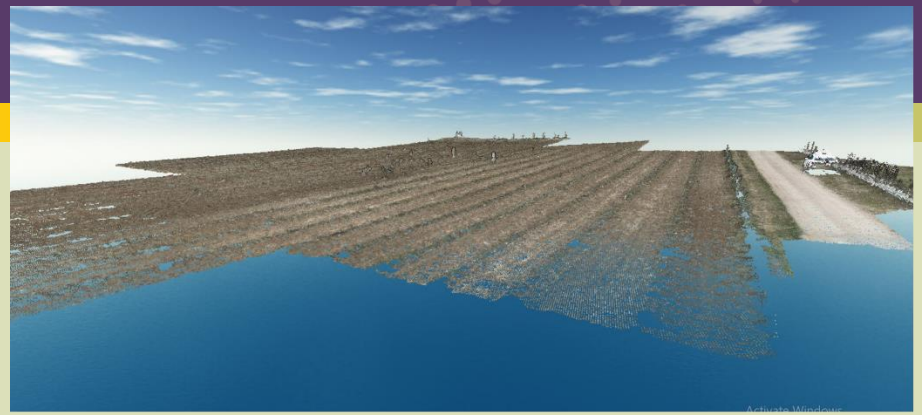


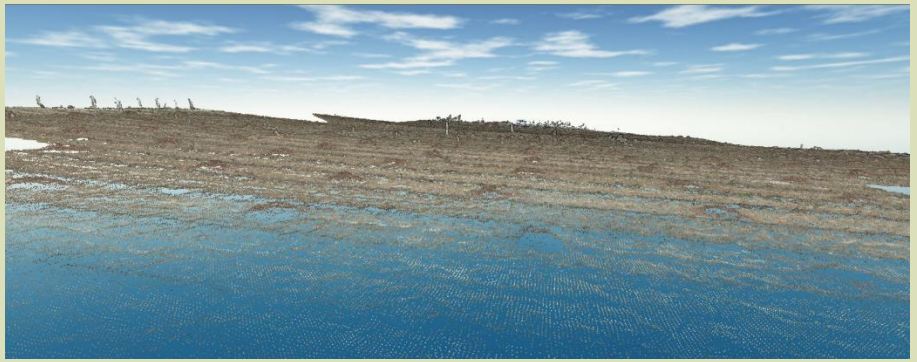


02 Automatic vines detection

With PAFyC Tool

- Automatic vines detection can be done by using PAFyC Tool and pre-seasonal data
- PAFyC is not stand-alone (requires installation of additional tools such as QGIS
- The quality of point clouds from DJI Mavic 3 M is not enough for successful automatic vine detection!





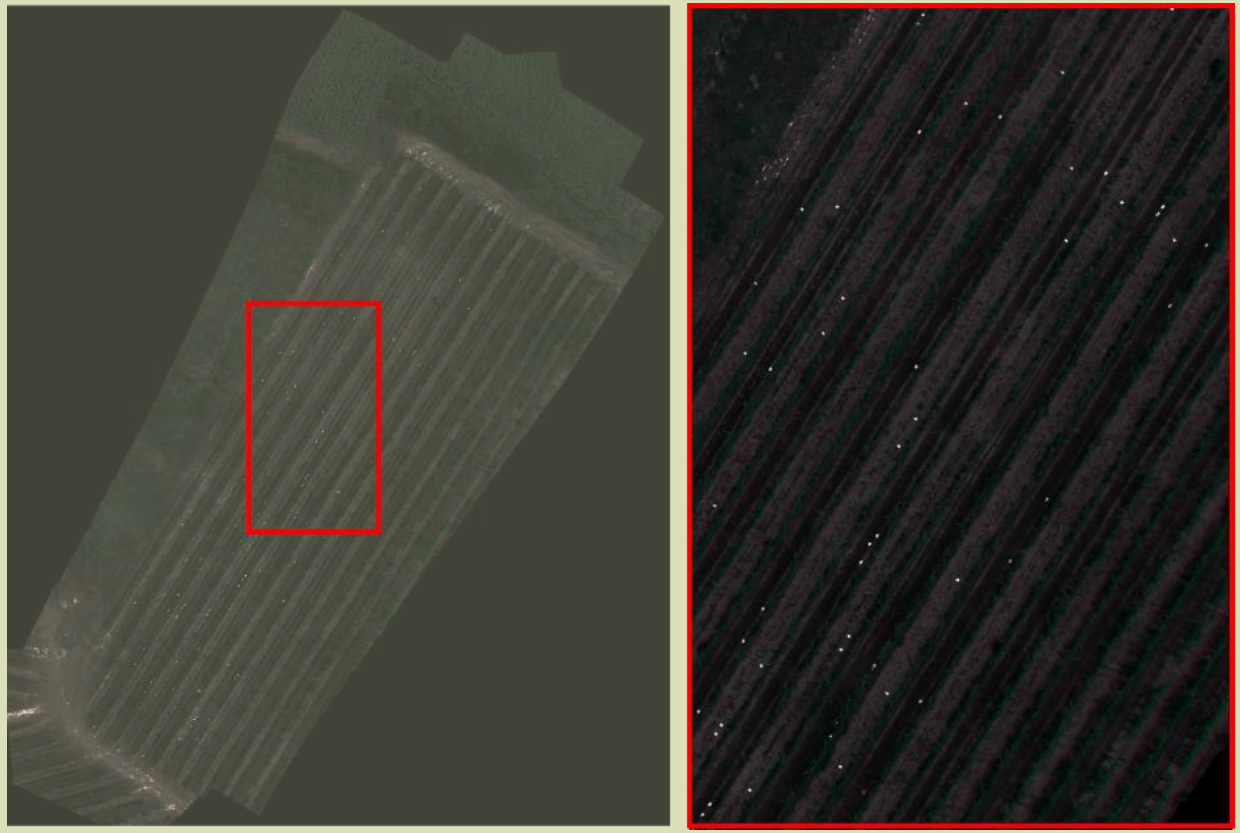
Results evaluation

Ground truth maps and Vegetation Indices

03 Results evaluation

Ground truth maps

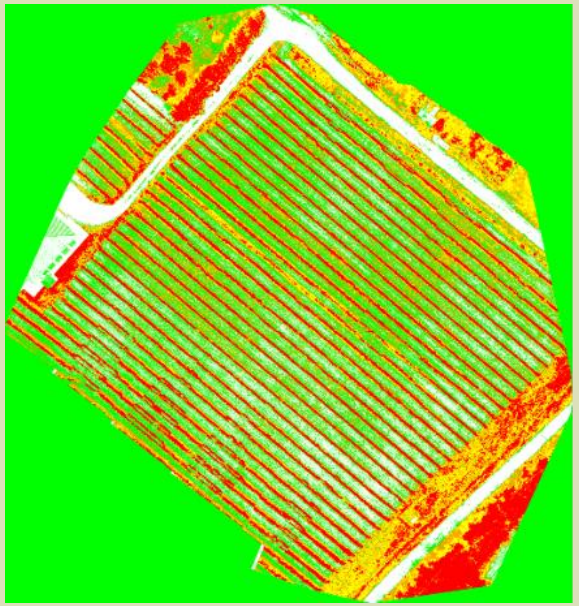
- Developed ground truth maps (and masks) that show the location of vines under stress including
- vines with Esca disease
- suspected Esca
- and other symptoms

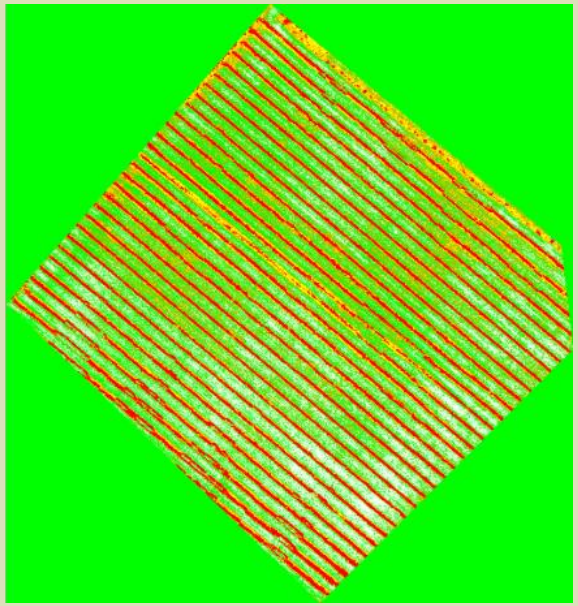


03 Results evaluation

Vegetation Indices

- Vegetation Indices are calculated on the whole map and on selected ROIs
- Python script for ROI selection is developed





03 Risks and Mitigation

- PAFyC tool has hardcoded EPSG codes of the coordinate system

CRS 25830 was chosen by default. In Serbia, CRS 32634 is used which was not provided in the tool available for selection.

- For the proper usage of the tool, the user needs to have additional software installed and access to a commercial software for creation of orthomosaics.
- The point clouds generated from DJI Mavic 3 Multispectral should be of appropriate quality for successful testing of the BC8 boundle.

Communication and dissemination

04 Communication

LinkedIn posts

Veles Sense reposted this

Zarko Ljubenovic • 1st
CEO & Co-founder @ Veles Sense | AI-based solutions for early vine disease detection
2mo •

Veles Sense conducts an ESSENSE project as part of Pilot 3: Forest monitor for potential dangers & Vineyards monitoring within the Chameleon HorizonEU Open Call #2.

As part of our activities, we are validating specific bundles developed within the CHAMELEON project. This season, we've already started by capturing drone footage of two vineyards in Serbia—even before vegetation has started! This early mapping will help us accurately position every individual plant, laying the groundwork for advanced disease detection and precision vineyard management.

The ESSENSE sub-project has indirectly received funding from the Europeon Union's Horizon Europe research and innovation action programme, via the CHAMELEON Open Call #2 issued and executed under the CHAMELEON project (Grant Agreement no. 101060529).

Traditional media

04 Communication

Stakeholder engagement

- ✓ major industry events,
- ✓ trade fairs,
- ✓ symposia, and
- ✓ targeted site visits

04 Dissemination

- ✓ Conference presentation (abstract accepted!)
- ✓ Invited lecture at Aerospace Information Research Institute, Chinese Academy of Sciences, Beijing, China
- ✓ Journal draft to be submitted to open-access journal

Team

Žarko Ljubenović

CEO

Sales & Marketing; Drone pilot

Experience in retail and wholesale

Marina Ljubenović

CTO

Research & Development

18+ years in digital image processing

External colaborators

Zoran Bešlić

full professor of viticulture

Miroslav Dobrosavljević, remote-sensing expert

CHAMELEON

Thank you for your attention!
Do you have any questions?

VELES SENSE
smart farming

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