

# Computer vision in olive fruit detection and yield estimation

Acronym: CoViO

HRZZ IP-2024-05

Kick-off 7th February 2025

# Presentation overview

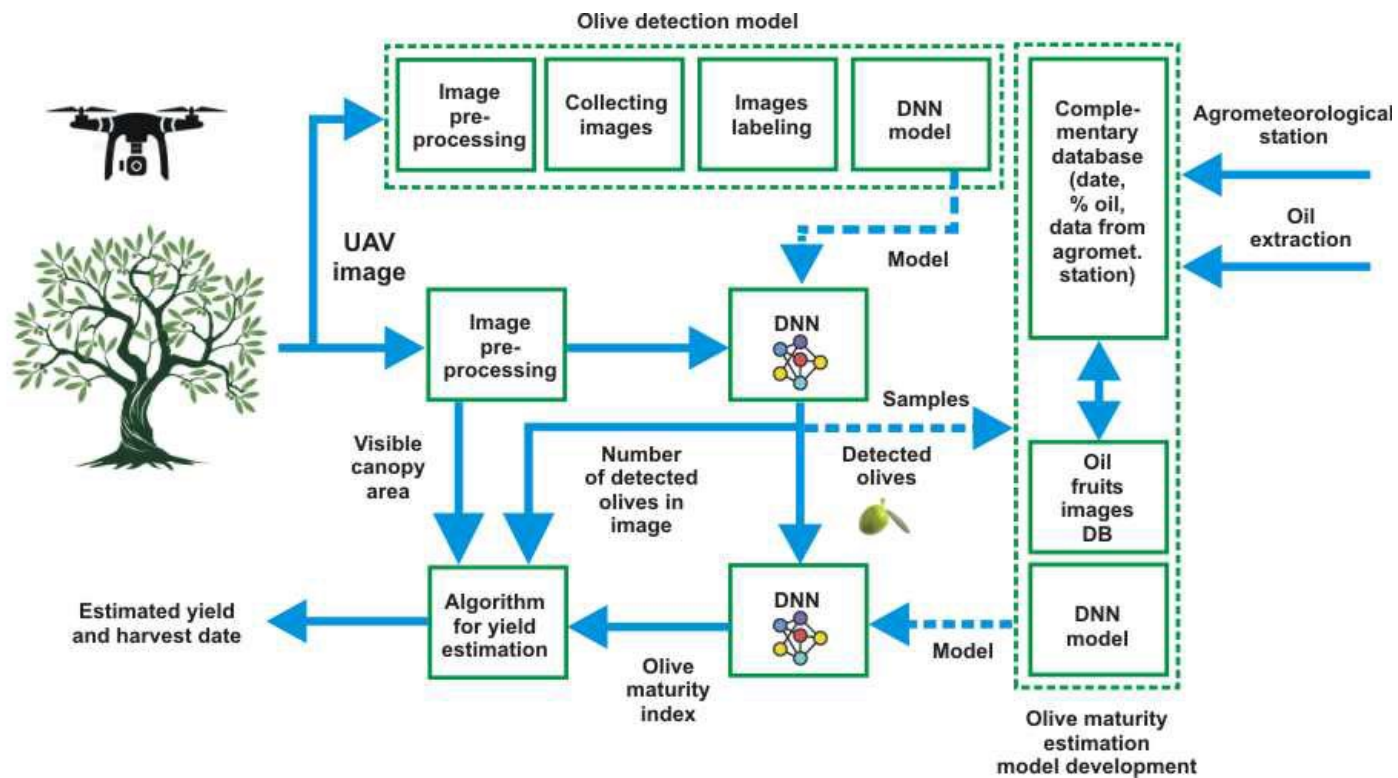
- ▶ Project goals
  - ▶ Methodology
  - ▶ Work plan
  - ▶ Budget
  - ▶ Work done so far (and what should be done soon)
  - ▶ Researchers
- 
- ▶ ... presentation of experimental measurement parameters and procedure

# Project goals

- ▶ **Develop a new method for assessing olive fruit maturity and quantity.**
  - ▶ **New publicly available image sets for use by the wider research community.**
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- ▶ **Project start: 16.12.2024.**
  - ▶ **Project end: 15.12.2027.**

# Methodology

## ► System concept.





# Methodology

- ▶ Defining the characteristics of the input images.
- ▶ Image collection (2 annual cycles)
- ▶ Image labeling (min. 800)
- ▶ Development of an algorithm for fruit detection
- ▶ Estimation of the maturity index and classification of detected fruits
- ▶ Comparison with data obtained by chemical analysis
  - ▶ 3 varieties (Oblica, Leccino and Istarska bjelica) \* 3 trees \* 3 repetitions = 27 samples per inspection, expected 10 inspections per year
  - ▶ Experimental olive grove of the agricultural cooperative "Maslina i vino"
- ▶ Proposed algorithm for estimating the total expected yield



# Work plan

- ▶ WP1: “Development of a new method for assessing fruit maturity and expected yield”
  - ▶ Responsible person: Josip Musić
  - ▶ Researchers: [Frane Strikić](#) and [Josip Gugić](#) - chemical analysis parameters, organization and monitoring of experimental checks, [Mladenka Šarolić](#) - chemical analysis of fruits, [Vassilis Kaburlasos](#) - statistical analysis and algorithm for assessing maturity, [Stanko Kružić](#) - small object detection, [Mirjana Bonković](#) - image segmentation, [Toma Sikora](#) - algorithms for image processing and assessing fruit maturity, [Ivana Marin](#) - statistical analysis and algorithm for assessing maturity, [new postdoctoral fellow](#), [new doctoral fellow](#).
- ▶ WP2: “Formation of publicly available image databases”
  - ▶ Responsible person: [Sven Gotovac](#)
  - ▶ Researchers: [Frane Strikić](#), [Toma Sikora](#), [Vladan Papić](#), [new doctoral fellow](#), [new postdoctoral fellow](#).

# Budget table

## *Research costs*

- ▶ The largest part of the costs under this group is related to field work in the olive grove during 2 annual cycles (2 x 10 + 2 inspections).
- ▶ The collected samples will be analyzed by an external accredited laboratory, and it is planned to take about 540 samples
- ▶ Organization of 3 workshops (one per year)

# Budget table

*Equipment (should be purchased before 01.04.2025.)*

- ▶ UAV with multispectra camera - Mavic 3 multispectral purchased +
- ▶ Software for collecting, analyzing and displaying 2D and 3D terrain maps
- ▶ Agrometeorological station - it is also necessary to monitor local weather parameters during annual cycles. It is also possible to use these measured values as input to a deep neural network that will estimate the maturity and quantity of the crop. - iMETOS IMT 300-USW





# Budget table

## *Training, dissemination, and collaboration costs*

- ▶ It is expected that 10 conference papers will be published, so there are costs associated with their presentation (3 in 2025).
- ▶ It is planned to send two doctoral students to a summer school related to the topic of deep learning (in 2025 at least one).
- ▶ It is also planned to send a doctoral student to Greece (IHU) for training, where he would work directly with [prof. Kaburlasos](#) (not in 2025!).

# Budget table

## *Dissemination*

- ▶ It is planned to publish 4 papers in open access journals (**not in 2025!**).
- ▶ Important note: All papers should have following acknowledgement

**HR:** "Ovaj rad je financirala Hrvatska zaklada za znanost projektom **HRZZ IP-2024-05-6393**".

**ENG:** "This work was supported by the Croatian Science Foundation under the project number **HRZZ IP-2024-05-6393**".

# Budget table

Plan for **this** year:

- ▶ Purchase of equipment ([UAV\\*](#), software, [agrometeorological station](#))
- ▶ [This kick-off meeting](#)
- ▶ [Hiring a senior assistant \(job application call closed on 20th January, no applicants\)](#)
- ▶ 10 visits to the experimental olive grove (2 preparatory, 8 recording and analysis) - [detailed plan needed until 15.02.](#)
  - ▶ Image tagging, algorithm development
- ▶ 1 workshop ([Softcom](#) in October) + invited lecture (image processing)
- ▶ 2 conferences in the Republic of Croatia (2 registration fees and travel each)  
[\(additional conference paper this month in Spain - presentation is following\)](#)
- ▶ [\\* Training at least 2 people to operate the drone - online exam until 01.03.2025.](#)

# Financial and work plan

## Plan for this year:

- ▶ Report on the characteristics of the image database for forming a deep neural network model (label type, recording time, resolution, labeling method) (until 20.2.) (Gotovac, Strikić, Gugić, Papić)
- ▶ Kick-off report (after this meeting) (Papić)
- ▶ Scientific paper at a conference in the Republic of Croatia (description of the methodology for creating an image database) (Softcom in late September 2025, deadline June)
  - ▶ Researchers: (Gotovac, Sikora, Papić)
- ▶ Scientific paper at a conference in the Republic of Croatia (initial results of detection and labeling algorithms) (Softcom in late September 2025, deadline June)
  - ▶ Researchers: (Bonković, Musić, Kružić)
- ▶ Scientific paper at a conference in the Republic of Croatia (ICT in agriculture) (2025)
  - ▶ Researchers: (Strikić, Gugić,...?)
- ▶ Report on the visit of a foreign scientist (after Softcom) (Papić)
- ▶ Report on the first workshop held (after Softcom) (Bonković)

# Researchers

## Contacts:

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## Project web pages:

[covio.fesb.unist.hr](http://covio.fesb.unist.hr)