



Contribution ID: 118

Type: Poster

## ICAERUS project: olive trees health assessment through deep learning technique on multispectral drone camera

Tuesday, 22 October 2024 18:05 (1 hour)

In recent years, olive trees have been increasingly threatened by “Olive Quick Decline Syndrome” (OQDS), a disease caused by the harmful bacterium *Xylella fastidiosa*. This disease poses a significant challenge in Europe, especially in Italy, where olive oil production plays a major economic role. The syndrome harms the plant by thinning the xylem tissue, which disrupts the flow of water inside the plant. This reduction in the plant’s vascular system causes leaf necrosis along the margins or tips, often followed by chlorosis and, in many cases, premature leaf drop. The symptoms usually begin in isolated sections of the foliage but gradually spread until the entire canopy is affected. Early detection of *Xylella fastidiosa* is, therefore, essential to protect local plant life and hopefully prevent the disease from spreading to other plants.

To assess and quantify a plant’s health status, the NDVI (Normalized Difference Vegetation Index) is widely used as a metric. This index is calculated based on the correlation between two spectral bands (red and near-infrared) acquired through a multispectral camera. Recent advancements in technology have made it possible to develop commercially available mobile platforms equipped with multispectral camera systems, ideal for large-scale data acquisition. By utilizing data captured by drone-mounted multispectral cameras, we propose a deep learning approach to identify and classify olive trees in rural landscapes, enabling the assessment of individual plants’ health status. Specifically, data was captured using both RGB and multispectral cameras during drone flights over olive tree fields. Once individual trees were identified, the NDVI index was calculated and combined with deep learning techniques to determine each olive tree’s health status in a single step.

**Primary author:** Dr MARTELLUCCI, Luca (Tor Vergata, Taal s.r.l.)

**Co-authors:** GIURELLI, Flavio (Taal s.r.l.); ALOIA, Giovanni Marcello (Taal s.r.l.)

**Presenter:** Dr MARTELLUCCI, Luca (Tor Vergata, Taal s.r.l.)

**Session Classification:** Poster Session B

**Track Classification:** Environmental Application and Medical Diagnostics