HortiQD

Automated monitoring in horticulture through spectral analysis with quantum dot detectors and high-resolution optical filters

"Advanced imaging and sensing technologies"

Project

The project aims to develop an affordable machine vision system for **precision farming**, specialized in **horticulture**. The sensory system will be used directly on the field, as in-vivo measurement, as either a handheld solution or attached to an autonomously **driving tractor** to allow for intensive monitoring of the crop. The optical filter will allow for **high spectral and spatial resolution**, tunable to specific application requirements by design. The hyperspectral images, recorded in-vivo, will be analyzed by **deep-learning algorithms** in order to identify diseases in an early state and assess the plant health, starting with apples.

Objectives

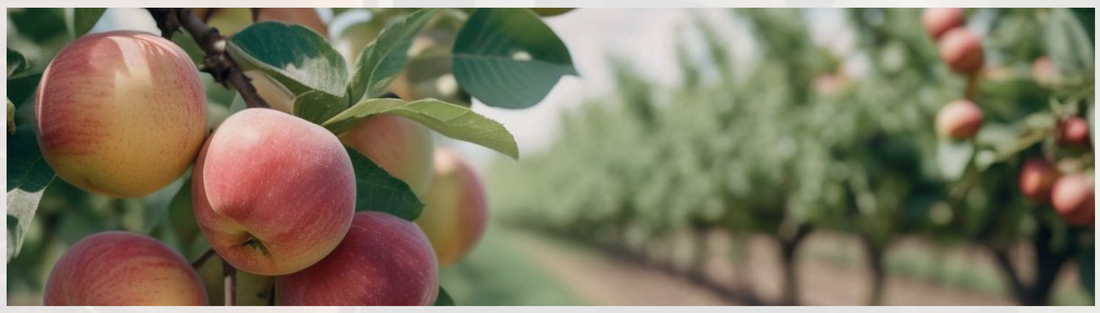
HortiQD will help **to reduce or avoid the usage of pesticides in European orchards**, paving the way towards sustainable farming and increasing food quality. It will scale up the intensity of monitoring by automation, hence, ensure the reliability of European food production. It will help analyze and address the impacts of climate change.

The project aims for a **fully integrated solution**, consisting of several innovative sub components. Each of the developments brings benefit to the industry it addresses and opens up new markets, beyond agriculture and food.

Case Study

The hyperspectral functionality is extended by a specific selection of fixed wavelengths in the visible and near infrared to fully cover the optimal spectral ranges necessary for a profound analysis of plant states and disease detection.

As a first case study the **fruit with highest European impact** will be addressed: the apple. Besides general parameters, such as **irrigation and stress of the plant**, at least two of the most common diseases and pests shall be detected. These include apple scab, fire blight, brown rot, Cydia pomonella, mites and aphids. Furthermore, maturity shall be assessed quantitatively.



The system will be a basis for further investigations on how far the limits of on-field-examinations can be pushed, e.g. regarding sugar and starch content of the fruits. This processed data-set is the basis for **increasing the yield, improving the quality of the harvest and further reducing the use of chemicals in the future**.

Image interpretation of crops disease with AI

HortiQD can add valuable information to the all-encompassing picture of our agri-cultural food production and play a pioneering role in secure and high efficiency fruit production. To do this, AI and problem-adapted data processing and management is used, as well as latest technologies in the field of micro- and nanosystems engineering.

Reinforced European industry leadership across the digital supply chain

The HortiQD system's evaluation units will significantly advance autonomous robotics. It will enable a new level of computing that will be be used in many research areas.

A new perspective for improvement in agricultural production

This project will bring state-of-the-art solutions in robotics, hyperspectral sensing, artificial intelligence, and cloud computing, to European farms, thus increasing the competitiveness of our agricultural sector.

Consortium

Fraunhofer ENAS · University of Technology Chemnitz · InHort Instytut Ogrodnictwa · CEA · Bioobst Görnitz · RESI Empowering Networks · ST life.augmented · Warrant Hub Tinexta Group · ABS Optronics GmbH · SITIA · Rivoira · Agrion Agricoltura ricerca innovazione

Project details

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More info

hortiqd-project.eu

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