



The project

Project overview

This project aims to take a step forward in the adoption of **Precision Agriculture and digital agriculture technologies in fruit growing**. It fits within the thematic areas of a) Agriculture and Agrofood Sciences (CAA), subarea Agriculture and Forestry (AYF), and b) Industrial Production, Civil Engineering and Engineering for Society (PIN), subarea Electrical, Electronic and Automatic Engineering (IEA). The contribution of the project to the thematic areas can suppose an inflection point in the real adoption of Precision Agriculture technologies in fruit production. This would be motivated by the **incorporation of lowcost photonic sensors, algorithms for information extraction and operation protocols for orchard characterization and monitoring**. Furthermore, the results of the project may contribute to the **robotisation of fructiculture** as an alternative to the lack of qualified manpower.

Under the hypothesis that a low-cost orchard monitoring system will favour the digital transition of fructiculture, **the main objective of the present project is to advance in the applicability of RGB-Depth cameras and low-cost LiDAR sensors for orchard monitoring in the framework of Precision Agriculture**.

Objectives

Objective 1: Development of a low-cost orchard monitoring system

Evaluate, select and integrate different photonic sensors (RGB-D, low-cost LiDAR) and complementary devices (GNSS receivers, embedded computers, etc.) to build a low-cost system for fruit orchard monitoring. In addition, develop the algorithms required for 3D reconstruction and for the extraction of canopy geometric parameters from the sensor measurements.

Objective 2: Proof of concept for a Precision Agriculture application

Implement the monitoring system on different mobile platforms to characterize fruit orchards at different moments along the campaign. The goal is to assess canopy growth and yield estimation in orchards subjected to variable-rate, site-specific fertilizer management.