AI and agriculture

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Fondazione Bruno Kessler's projects

Improving product yield and quality, reducing water waste and the use of treatments, to achieve increasingly efficient and sustainable agriculture through innovative applications of artificial intelligence.

Fondazione Bruno Kessler’s decades of experience in AI and its network of local, national and international partners, make for an innovation ecosystem ideal for testing possible solutions. Through long-term collaborations with leading companies in the field, new Data Science and Deep Learning tools, IoT platforms and high quality low cost connected devices have been developed, that are capable of monitoring the life cycle of crops and optimizing their management.

The application of artificial intelligence to environmental and climate data, collected automatically in the field by machines, along with process business data enable the development of solutions that can foster efficiency and productivity, improving yield and sustainability of agricultural practices.

AgrifoodTEF

A concrete example of a relevant project in the field is AgrifoodTEF, coordinated on the European level by FBK and eligible for a total funding of 60 million euros. The goal is to develop testing and experimentation infrastructures to foster the adoption of services and products based on artificial intelligence and robotics in the European agrifood industry. What makes this project internationally relevant is the fact that it involves some of the main European players in the field of digital innovation applied to agrifood production. The Italian node of the project includes universities and research institutions of excellence such as the University of Naples Federico II, the Politecnico di Milano, the University of Milan, the Edmund Mach Foundation and Engineering Informatica.

In the first year, the first validation tests have already been carried out locally in apple orchards in Val di Non, thanks in part to the collaboration with Giorgio Gaiardelli and the Consorzio Irriguo di Tres. In particular, the first customers of the Italian AgrifoodTEF node include the company GeoInference, which leverages artificial intelligence in its Biosmart application, created to assist farmers with real-time apple counting and sizing, taking advantage of a camera mounted on agricultural machinery used during both the growing and harvesting phases. This solution helps, for example, to understand the cause-and-effect relationships between fruit development and crop yield and the interventions made in both treatments and soil fertilization, producing information that supports farms in production efficiency.

The AgrifoodTEF project connects with other agricultural innovation programs, including the IRRITRE project, which aims to optimize water use in agriculture in the province of Trento through data collection and the use of artificial intelligence algorithms in an extensive field trial among apple orchards in the hills around Tres and vineyards in the Adige Valley. The project is being conducted jointly by the Autonomous Province of Trento (Agriculture Department), FBK, FEM and Trentino Digitale.

SAPIENCE

Another project, SAPIENCE, promotes the efficient use of irrigation water, aiming to achieve a significant reduction (30 percent or more) compared to drip irrigation systems. This is achieved through monitoring based on IoT and blockchain technologies coupled with a specific reward system to incentivize virtuous behavior. In particular, in collaboration with CAVIT, FBK has developed a set of algorithms and systems to support winemakers during the fruit development phase up to harvest.

AgriDataSpace

The importance of data collected in the field or available through various applications and information systems is now indisputable, especially as an enabling factor for increasingly accurate artificial intelligence. The AgriDataSpace project, coordinated by the French Agdatahub, aims to lay the groundwork for the creation of systems that facilitate the exchange, processing and analysis of data in a way that is secure, reliable, transparent and respectful of the sovereignty of those who produced or collected this data. The role of Fondazione Bruno Kessler in the project is to coordinate activities dedicated to the development of reference architectures that include the use of the latest technologies created to promote a new “data economy” in agriculture thanks to the possibility of enhancing the value of data collected in various production areas of the agricultural sector. An important and characterizing aspect in this context is the respect of data sovereignty according to the principles also promoted by the European initiative GAIA-X, of which FBK is one of the founders at the national level.

MAIA multispectral camera for drones

FBK, in cooperation with companies Eoptis and Sal Engineering, has developed a multispectral camera that allows for the acquisition of images in numerous spectrum bands from drones. These images, suitably processed and analyzed with different Machine Learning techniques, make it possible to derive indices related to the development and health of vegetation.

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- #agricoltura digitale
- #ai
- #Intelligenza artificiale

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