

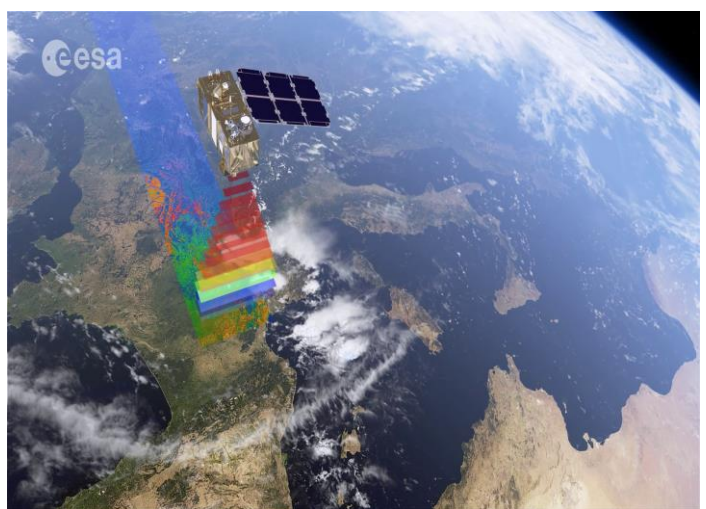
Multiscale Sensing for Disease Monitoring in Vineyard Production

Summary

Sensing and monitoring vineyards in three European countries



Satellite



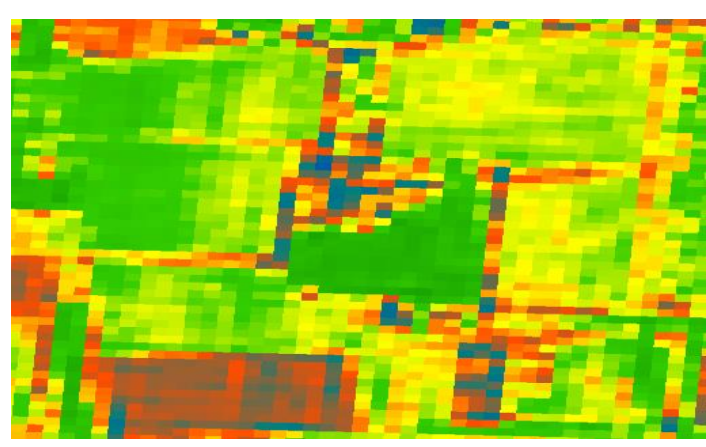
UAV



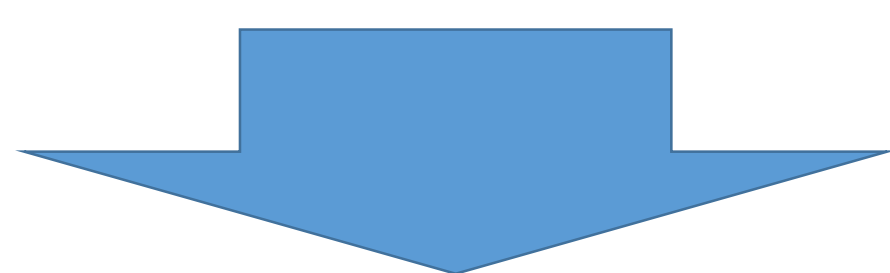
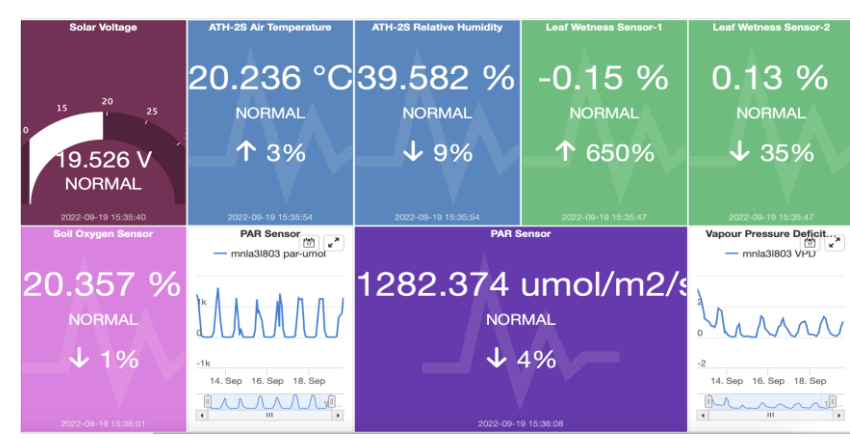
IoT



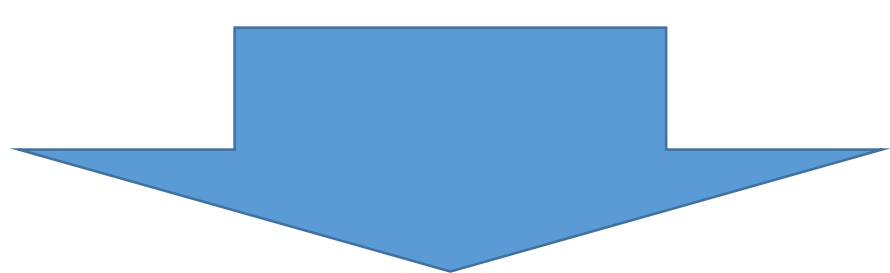
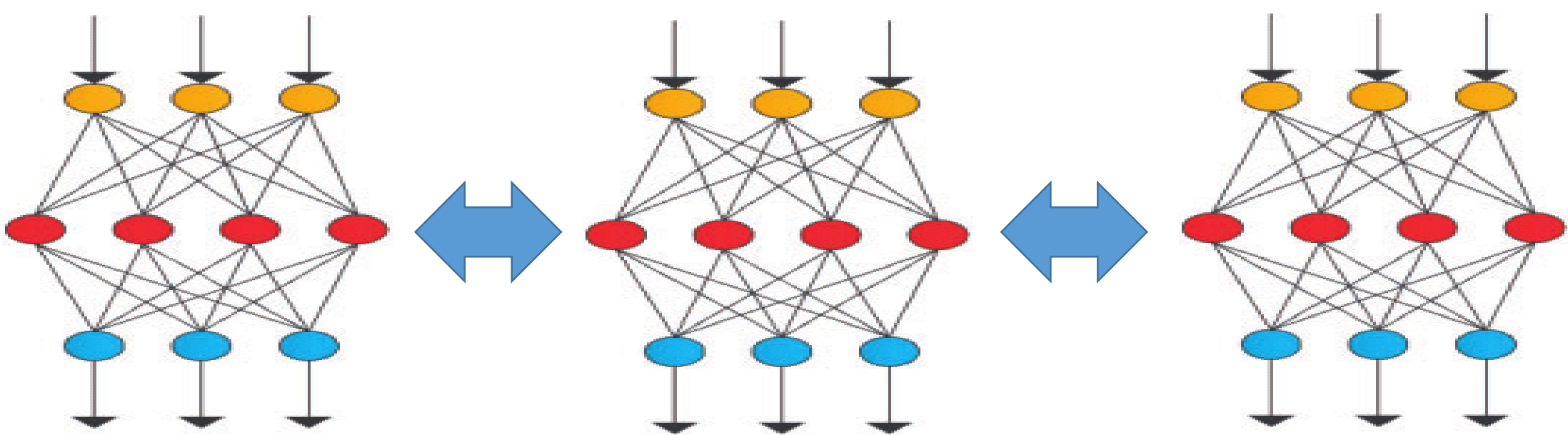
Multispectral images



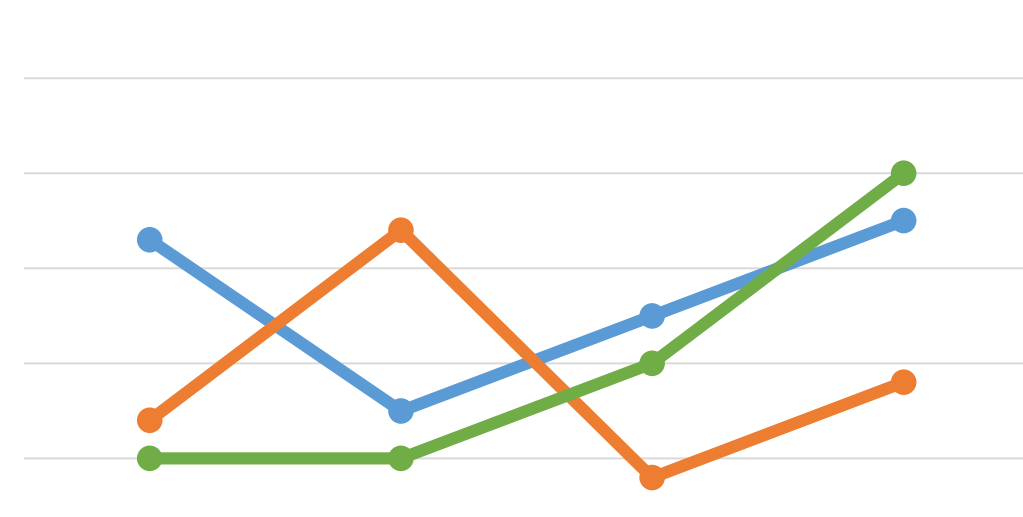
Local climate conditions



Machine learning based fusion and modeling



Disease detection, identification and prediction



Main objective/ research question

- Intelligent acquisition methods and processing of Big Data to improve production efficiency and operating costs.
- Machine Learning approach for finding data patterns enables earlier detection of the vine diseases, and the estimation of yield quality and quantity.
- Earlier disease detection will help winegrowers to reduce phytosanitary chemicals.

Preliminary results

- Data acquisition: implementation of IoT systems on plots in France and Romania. UAV multispectral imaging system.
- Data collection according to the agronomical and microbiological protocols, from vineyards situated in three countries: France, Greece and Romania.
- Data correlation between ground truth and IoT
- Web semantic approach for data storage.
- AI methods for disease identification in images

Preliminary conclusions/ potential impact

- Some vine disease, such as downy mildew, can be automatically identified using IoT and imaging system with machine learning algorithms.
- A new smart technology based on IoT and imaging systems with AI approach, can contribute to new techniques, which are necessary for the development of precision viticulture, to achieve the goal of reducing phytosanitary inputs while maintaining a reasonable production.

Future research activities

- Development of sensors and IoT system, including data security and protection.
- Development of new methods for data fusion and correlation between different sites for earlier disease identification and prediction, evaluation and demonstration.