USEEV1 - Communications for Precision Agriculture and Farming

Mis à jour le 06-10-2025

Code : USEEV1

Unité spécifique de type cours

3 crédits

Responsabilité nationale : EPN05 - Informatique / Stefano SECCI

Présentation

Prérequis

Basic knowledge of wireless, mobile communications and networking.

Objectifs pédagogiques

The purpose of this course is to delve into the most significant communication techniques and protocols available for Precision Agriculture and Farming. It offers an end-to-end understanding of the ecosystem and the appropriate communication and networking options that can be used in different settings and setups based on their specific KPIs and requirements.

Programme

Contenu

The course provides the IoT architectures and communication models that can be used for precision agriculture and farming. It describes the contemporary IoT protocol stack, the networking (including physical and medium access control) and application layer protocols, their pros and cons, their combinations to deliver end-to-end communication, and their suitability for different use cases, systems and device types. In addition, it provides relevant end-to-end examples as well as future trends and directions.

Topics:

- Introduction to IoT for precision agriculture and farming (1-2 hours).
- IoT systems (architectures), devices, communication models and protocol stacks (1-2 hours).
- Radio access and networking protocols for IoT including, RFID, Bluetooth (LE), IEEE 802.15.4 family (ZigBee, WirelessHART, Wi-SUN, etc.), IEEE 802.11, LoRa, SigFox, LTE-M, NB-IoT, 5G (8-10 hours).
- Application layer protocols (MQTT, CoAP, etc.).
- Service composition, virtualization, visualization and digital twins.
- Use cases.
- Future directions and conclusion.

Modalités de validation

- Contrôle continu
- Projet(s)
- Examen final

Description des modalités de validation

Written exam, assignments, and short in-class quizzes. A project assignment to perform after the STC execution will also be evaluated.