OE & Applications

Data Acquisition and Analytics in Smart Agriculture

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Workshop goal

The overall goal is to demonstrate the full data flow from a LoRa network up to a data analysis tool to extract useful information.

In the first part of the workshop, the participants will learn how to remotely acquire data using MQTT communication protocol and APIs.

The goal of the second part of the workshop is to gain knowledge related to the importance of using data properly. Data itself could mean nothing. Data which is collected properly, designed and prepared in the right manner are then convenient to investigate. However, data needs to be analysed afterwards. Nevertheless, the analysis of the data ought to be correctly interpreted.

Consequently, this workshop will consist of practical examples of how to acquire, prepare and organize data, then, how to use a tool for data analysis, and finally, how to present and read the data.

Tools: node RED and Microsoft Power BI–Business data analytics.

To whom is the workshop addressed

PhD and MSc students from Electrical and Computer Engineering; IT professionals.

Knowledge in object-oriented programming and databases is recommended.

Maximum number of attendees: 15.

The Methodology

Scope out your challenge and set out your objectives in order to align the participants with your goals (why to attend and how can they be part of your objectives, trying to use as a motivating process).

Explain how do you intend to plan the activities (and, do not forget to settle more time than used in a face-to-face workshop). Are you planning brainstorming and thinking activities? Please, explain which online tools you will use. How do you plan share the results with all of your participants?

Based on the practical example, workshop attendees will understand and follow the steps of the full data cycle throughout various devices/software. Starting from gathering data from any kind of source (in our example we use LoRa network), processing data in real time, storing the data, and finally reading and analyzing data.

expatWS'21 Thematic Workshop Abstract

Part 1: Data acquisition

The activities will follow a hands-on approach. First, the instructor will describe the Node-RED tool and share examples (flows) with the attendees in Google Drive. These flows have predefined functionalities to access environmental data from a LoRa network, installed in an almond crop. The attendees will follow instructions on how to build an application that acquires real-time data using MQTT communication protocol and APIs. Some of the options to store and present data will be also exemplified. The online tool used is Node-RED, running on the browser localhost (http://127.0.0.1:1880/) of the attendee PC. Node-RED is free and must be previously installed from nodered.org.

Part 2: Data analysis

The exercise will include sharing an excel file with stored data from the API. Furthermore, the process of cleaning the data will be demonstrated, and finally, the information will be extracted from it. All this has the aim of data visualisation, therefore, creating meaningful reports and presenting the data throughout the visualisation reports will conclude the data analysis process.

The workshop attendees will follow the presentation step-by-step and work simultaneously. The workshop will conclude with a Kahoot quiz, to motivate the workshop attendees.

The Workshop duration

The workshop has a planned duration of two hours, divided in two sessions of one hour each.
1st part: Data collection
2nd part: Data analysis.