Section Sciences et Ingénierie de l'environnement
Design Project 2010 (semestre de printemps)

Proposition n° 29

Automatic Calibration Methods for Sensor Networks

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Descriptif du projet

SensorScope S.àr.l. has developed an environmental measurement system capable of producing high temporal and spatial measurements at low cost and requiring a minimal maintenance. This system is based on multiple, solar-powered sensing stations which communicate wirelessly and organize themselves into a sensor network. Sensing stations include several external sensors including air temperature and humidity, surface temperature, incoming solar radiation, wind speed and direction, precipitation, soil moisture and pressure at ground level.

Stations can be easily and rapidly deployed and have already been employed for multiple field experiments, ranging from built environments to alpine glaciers. To ensure an optimal quality of the collected data, every sensor must be precisely calibrated before every deployment. Sensor calibration is a tedious and time-consuming task that consists of comparing every sensor to a high-quality and high-accuracy reference sensor. The aim of the project is to develop an automatic sensor calibration system.

Objectifs et descriptif tâches

The project objectives can be summarized as follows:

- Get familiar with the overall hardware provided (data logger, sensors, etc.);
- Get familiar with the software infrastructure for real-time data collection;
- Implement appropriate routines which are able to analyze the correlation between the reference sensor and all the sensors under test, generate the calibration parameters, and produce a quality index for the sensor.

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Work breakdown: 20% theory, 30% programming, 20% data analysis, 30% deployment and experiments

Prerequisites: Experience using Matlab and a general purpose programming language (C/C++, Java, Python).

Keywords: environmental sensing and sensor networks

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