2018-00555 - [FACTAS] Internship Engineering / Migration and implementation of a power management and optimization algorithm on an Arduino-based prototype.

Contract type: Internship agreement
Level of qualifications required: Master's or equivalent
Function: Internship Engineering

About the research centre or Inria department

The Inria Sophia Antipolis - Méditerranée center counts 37 research teams and 9 support departments. The center's staff (about 600 people including 400 Inria employees) is composed of scientists of different nationalities (250 foreigners of 50 nationalities), engineers, technicians and administrators. 1/3 of the staff are civil servants, the others are contractual. The majority of the research teams at the center are located in Sophia Antipolis and Nice in the Alpes-Maritimes. Six teams are based in Montpellier and a team is hosted by the computer science department of the University of Bologna in Italy. The Center is a member of the University and Institution Community (ComUE) "Université Côte d'Azur (UCA)".

Context

Within the framework of a partnership between FACTAS-Inria and the start-up SKAVENJI, an Arduino based prototype dedicated to power management will be implemented.

Skavenji is an emerging startup based in Nice founded in 2017, and aims to bring easy, free and Do It Yourself (DIY) energy production to the public as part of the transition to a more sustainable development. It is developing a connected device for enabling ultra-localized energy production at the room scale, with the goal of empowering citizens to imagine, make and use their own personal energy production at home. [http://www.skavenji.fr/](http://www.skavenji.fr/)

The power system designed by Skavenji is simple (power sources and consumers, a battery), but the unpredictability of production and consumption profiles does require optimised source and battery management in order to:
- Maintain hardware simplicity and frugality,
- Minimize battery storage size,
- Maximize the power gain / use rate ("taux d’autoconsommation")

The Inria APICS research team is working on the modeling and optimisation potential of these power management issues raised by the Skavenji project. [https://team.inria.fr/apics/](https://team.inria.fr/apics/)

The intern will be earning French minimum wage (SMIC) pay.
Is regular travel foreseen for this post? No

Assignment

The objective of the internship is to transpose to an Arduino based prototype the power management and optimization algorithm designed by the research team FACTAS-Inria.

The prototype will then be tested in real use-case situations and the algorithm's behavior performance (battery management, power loss avoidance) assessed. Algorithm updates and hardware improvements will be jointly devised and implemented by the Inria-Skavenji team.

Main activities

1st - 2nd month:
- Transposing the algorithm and implementing the code.
- Identifying and documenting the use cases.

3rd - 4th month:
- Test campaign, performance assessments.

5-6th month:
- Software and hardware updates if necessary.
- Finalizing documentation.
Skills
Basic electrical power notions, previous Arduino or Open Hardware / microcontroller programming experience.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities