ESR Project title: Edge operational intelligence for critical infrastructure management [ESR13]

Contact names:
Xavier Vilajosana (xvilajosana@uoc.edu),
Ignasi Garcia-Milà (igarciamila@worldsensing.com)

Institution: Worldsensing, Spain

Application deadline: May 31, 2021

ESR Project Description:
The project of this ESR is contextualized in the critical infrastructure operation and management (mines, railroads, dams, …). The project has a dual scientific and industrial focus aiming to create Intellectual Property in this area of expertise.

The first objective is the study of new operational intelligence techniques for the management of industrial assets for the control and operation of critical infrastructures (e.g., mines, railroads). The focus will be on optimizing the operation of such infrastructures through exploiting ML and data fusion from real time heterogeneous data sources (from coexisting subsystems, heterogeneous networks), leveraging fog and edge computing capabilities to minimize backhaul satellite communications, while ensuring ultra-low power operation of battery-powered wireless sensor devices. The techniques will be firstly analysed and evaluated in a laboratory scenario, and then implemented in real hardware (e.g., testbeds and/or prototypes of IoT edge devices).

Expected Results:
- State of the art analysis on energy efficient data fusion schemes
- Develop edge/fog data fusion algorithms exploiting ML techniques, targeting their efficient implementation on embedded IoT devices
- Develop edge computing means for decision making (e.g., maintenance, energy maximization, critical failures estimation) considering distributed information sources
- Targeting knowledge transfer into real products of the company

Supervision and Mobility Program:
Once hired, the candidate will:
- be working at Worldsensing (Barcelona, Spain), performing full-time research within the Innovation team under the supervision of Ignasi Garcia-Milà Vidal.
- will be enrolled in the PhD program at UOC, under the supervision of Prof. Xavier Vilajosana Guillen.
- will additionally pursue two secondments at UNIPD and KUL, for a respective duration of 5 and 5 months.

Required, Preferred and Desired Prerequisites/Skills:[1]

- **Required:** At the time of recruitment, the applicant must not have lived in Spain for more than 12 months in the previous 36 months (3 years).
- **Required:** No more than 4 years spent in research/work activities after the achievement of the MS degree.
- **Required:** A Master's degree in Computer Science, Telecommunications, or equivalent.
- **Preferred:** Very good communication skills in oral and written English.
- **Preferred:** Demonstrable hands-on experience on embedded systems programming.
- **Preferred:** Demonstrable knowledge about LPWAN communications.
- **Preferred:** Open-mindedness, strong integration skills and team spirit.
- **Preferred:** Good command of the Python and C programming languages.
- **Desired:** Good command of Java programming language.
- **Desired:** Previous training MS-level training on machine learning or advanced statistics.

Additional requirements for this position

- Declaration that the obtained MS degree is equivalent to a five-year MS degree in the EU and that it grants access to the Doctoral (PhD) Study Program in the Country where it has been issued.

---

[1] **Required**, means mandatory to pass the eligibility check. **Preferred**, means highly welcome and recommended. **Desired**, means additional, not strictly needed, but still very much appreciated.