Post-Doc position in OR/AI

Title:
Operational Research and Artificial Intelligence for self-adaptation of systems in dynamic environment

Hosting organization:
LAMIH (UMR CNRS 8201) - UPHF (Université Polytechnique Hauts-de-France)

Contact Person:
E. Adam (emmanuel.adam@uphf.fr), A. Ait El Cadi (abdessamad.AitElCadi@uphf.fr)

Duration: 24 months

Application deadline: January 3rd, 2020

Research profile:
Researcher with a recent doctorate in one of the fields: operational research, artificial intelligence. A multidisciplinary experience in these two areas would be an advantage.

Mobility: Occasional journeys abroad (CIRRELT, Canada) are to be expected.

Project & Institute background:
The Université Polytechnique Hauts-de-France (UPHF) with the LAMIH UMR CNRS 8201 (Laboratory of Industrial and Human Automation control, Mechanical engineering and Computer Science) offer a post-doc position within the International Associated Laboratory LIA-ROI-TML ("Operational Research and Computer Science in Transport, Mobility and Logistics") between LAMIH and CIRRELT (Interuniversity Research Center on Enterprise Networks, Logistics, and Transport).

The researcher will work, with an internationally recognized team, on subjects resulting from the collaboration between the two laboratories, in France and Canada. He/ she will also benefit from the large experience of the researchers involved in the ELSAT2020 project (Ecomobility, Logistics, Security and Adaptability in Transport), a project in which LAMIH, the host laboratory, is actively involved.

Position summary:
The research aims at the integration of Operational Research and Artificial Intelligence approaches in order to offer new methods, more effective and more resilient, adapted to the new challenges of the OR approaches. Indeed, the complexity of the encountered problems, in both laboratories, makes the use of OR or AI separately often limited. Thus, classical OR methods reach limits, that some AI methods can help to overstep. The joint contribution of these two approaches in guiding the search for solutions and adapting to changing contexts is more than promising.

The research project intends to develop and evaluate artificial intelligence systems capable of self-adaptation in order to refine solutions obtained from operational research algorithms. The OR-AI relationship will lead to models at the interface of both approaches.

The missions will, therefore, mainly tend to combine OR and AI in order to provide innovative solutions for problems under study in our research areas, and namely in the LIA’s topic: Transport, mobility, and safe and sustainable intelligent urban systems.

Example of applications:
Thus, you may be invited to join the research on subjects in the following themes:

Adaptation and evaluation: on the basis on activities planning, tasks scheduling, resources sharing, computed
with exact or heuristic methods, the objectives are: to allow local adaptation to unforeseen events, like disruptions, context changes, using technics from distributed intelligence (agents, ...); to contribute to the proposal, validation and analysis of metrics, which allow measuring the efficiency of adaptive approaches when compared to classical ones.

**Guidance** : to resolve a problem, the guidance of the meta-heuristic depends on its nature, its context. These two factors are not fully known *a priori* but discovered along the resolution. In order to ‘speed-up’ the resolution in the intensification-diversification cycles, the use of optimization technics, based on learning mechanisms and/or decentralized AI methods could be studied.