

Ref: ELSAT2020 by Cisit / OS n° 4 / Projet n° 1 : ORIO / FP 51

### Context.

The URIA team is involved in the project ELSAT2020 / ORIO (Observing the peRformances of urban Infrastructures and mobility / preventing collisions with vulnerable people using Opportunistic radar). This project focuses on the city, its actors (pedestrians, bicycles, cars, etc.), its means of transport and their interactions. Regarding this field of study, ORIO has two objectives. Firstly, the development of a tool able to assess the quality of the service provided to customers and the possible improvements of the multimodal mobility infrastructures. Secondly, the contribution of road safety by providing a "safety bubble " around vehicles.

Models construction will use "online" and "radar" video data (2D laser, for example), to extract information about the flows, the types of users involved (car, pedestrian, bicycle, Etc.) and the nature of the actions they carry out. These data will be acquired by the VLAD (Light Vehicle for Data Acquisition) platform developed during the ORIO project. The related literature is rich and it will be necessary to select and optimize the most adapted approach (taking advantage of the parallel computing of VLAD) to process the huge volume of collected data. Different methods to model the infrastructures exist : machine learning, graphs, dynamic hybrid systems and/or multi-agents system. The ORIO project will propose approaches to facilitate the combination of these methods.

### Mission

This postdoctoral position is open as soon as possible for 12 months.

The postdoctoral researcher will have to develop a multi-agent system able : to simulate road traffic and to reproduce the different modes of interaction between means of transport (individual cars, public transport, pedestrians, two-wheelers, etc.) This multi-agent system will be used for analysis and modeling purposes. A "data-driven" approach (allowing to extract high-level information, such as trajectories, the nature of perceived "objects", etc.) will be used to learn behavior of « vulnerable people » (pedestrians, motorcyclist) on the one hand and vehicles on the other. The initial databases could be man-made or reused from the literature (the ambition at the end of the mission is to be able to directly exploit a data-base acquired by the VLAD). As such, a contribution to the implementation of VLAD is expected.

**Candidate profile :** PhD in data sciences and/or automated learning. Strong skills in agent-based simulation and programming is required.

**Application:** Candidates should send by e-mail a CV and a letter of motivation at the addresses below :

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