Post-Doc position Computer Sciences, networks and wireless communications
(12 months) – IFSTTAR- Villeneuve d'Ascq (59)

Performance Analysis of an ITS-G5 / Cellular and 5G Hybrid Network for a Cooperative ITS

Key words: cooperative ITS, ITS-G5, 3GPP LTE, 5G NR, hybridization.
Localisation : IFSTTAR, Lille, France
Starting date : 01 November 2019

Context
The position is proposed in the framework of the European project C-ROAD (www.c-roads.eu) which deals with the deployment of C-ITS in Europe. Co-operative Intelligent Transportation Systems (Cooperative ITS) are based on communications and information sharing between vehicles, road infrastructure and communication infrastructure to provide services that enhance the safety and comfort of users. The actors involved in the automotive world are now working on the development of a set of services to increase user comfort. These services are realized through computer applications that have heterogeneous needs in terms of communication performance (throughput, crossing time, data loss rate…. The ETSI ITS-G5 communication technology (a European adaptation of the IEEE 802.11p and WAVE standard) is the reference today for setting up communication architectures for cooperative intelligent transport systems in Europe. Cellular technologies such as 3GPP LTE and future 5G NR technology are proposed as possible alternatives to extend coverage of C-ITS services.

In this context, the idea of deploying network architectures offering hybrid wireless access combining ETSI ITS-G5 technology and cellular technology for C-ITS is becoming increasingly important. The performance that such deployment can offer to ITS applications and in particular for services that are critical for road safety remains to be evaluated.

Missions
The work will consist in proposing a performance evaluation via simulations of different ITS-G5 / 5G NR hybridization solutions for a C-ITS communication architecture. A study on hybridization solutions being defined for 5G NR as well as existing proposals for ITS-G5 / LTE hybridization and their evaluations will have to be carried out. The idea will be to reach a comparative study of the different solutions for hybridization ITS-G5 / 4G, LTE-V2X and 5G NR. Then, an evaluation of the performances of the most promising solutions will have to be carried out by simulation and by analytical modeling. The work will be done within the framework of the NR 5G Technology Impact Working Group on the technologies deployed from the C-ROADS project. The candidate will have to take part in the group meetings.

Skills : PhD in computer sciences and networks, wireless technologies (802.11), cellular technologies (3GPP LTE, 5G NR), performance evaluation of networks, discreet event simulation, analytical modelling, experience on collaborative team and projects, English

Know-how: Autonomy sens of initiative, scientific curiosity, dynamism. Travels in France and in Europe are foreseen

Raw monthly salary : ~2699 €

Recruitment procedure : interview, send detailed CV + motivation letter + references at marion.berbineau@ifsttar.fr et mohamed.kassab@ifsttar.fr