2018-00373 - PhD position at IFP Energies nouvelles (IFPEN) in Electrical Engineering, specialization in Automation

Level of qualifications required : Graduate degree or equivalent
Other valued qualifications : University Master degree in Electrical Engineering, Automation Engineering
Fonction : PhD Position

About the research centre or Inria department
Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Context
Within the framework of a partnership (you can choose between)
Partnership between Gipsa Lab and IFPEN

The objective of this thesis is to define a macroscopic traffic model, based on variables such as vehicles flow and density, which can be measured or estimated, that is able to depict the main phenomena having an impact on energy consumption and polluting emissions. In particular the model should be able to track the evolution of congestion and queues within the road network, and represent the different traffic states with their respective speed.

Assignment
Assignments:
With the help of Carlos Canudas De Wit, the thesis director the recruited person will be in charge of defining a macroscopic traffic model

In particular the model should be able to track the evolution of congestion and queues within the road network, and represent the different traffic states with their respective speed. Such a model will be particularly suited for estimating traffic energy consumption and emissions, and for optimizing them in real time at a large scale by acting on standard actuators such as speed limits and traffic lights. To achieve real-time capabilities, the proposed modeling and control strategy are required to be computationally light and fast without sacrificing accuracy. The modeling solution developed during the thesis will be validated and compared against well-established macroscopic traffic models in order to assess its precision. The optimization techniques will be evaluated in a microscopic traffic simulator, a tool largely used by traffic engineers to verify control strategies before deployment.

Main activities
Main activities:
traffic modeling, energy consumption estimation, traffic optimization

Skills
Fluency in English, fluency in French or willingness to learn French is a plus
Other requirements: Good programming skills, Matlab/Python

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