Optimization of Flexible and Adaptive Mobility

Internship

Context

Automated vehicles (AVs) will soon disrupt urban transportation. Many studies have measured the efficiency gain when replacing human-driven vehicles with AVs in current transportation services. However, the impact of AVs will go far beyond these efficiency gains and will revolutionize the entire transportation ecosystem. While automated ride sharing systems are mostly considered as competitors to public transit, we envision a scenario in which AVs are integrated in the public transportation offer, thus breaking the classic equation "public transit = mass transit", allowing transit to be flexible and to dynamically adapt to travelers' demand, instead of always following pre-determining fixed routes. The goal of the internship is to find the optimal structure of future transit systems, which integrates flexible and fixed (traditional) modes, choosing one or another depending on time of the day and geographical area and redesigning the current routes accordingly. The optimization objective is the minimization of the social cost.

Internship description

The intern will devise and implement simple parametric models of future public transit, e.g., graphs or continuous approximation models. He/she will study the relation between the parameters of the model and the social cost, analytically (if possible) and numerically. He/she will devise and implement optimization heuristics to find the optimal sets of parameters, corresponding to the optimal transit structures. He/she will critically analyze the properties of such structures and the differences with respect to current transit systems.

The internship will take place at Télécom SudParis, one of the top French engineering schools, member of Insitut-Mines Télécom, a French leading institute of technology, which combines high academic and scientific legitimacy with a practical proximity to business. Télécom SudParis is also founding member of Institut Polytechnique de Paris.

Profile

Internship at the end of an engineering cycle, Master of Science or Master 2.

Skills

Programming skills (Matlab or Python).

Other information

- **Duration**: 6 months
- **Starting date**: flexible
- **Scholarship**: 577.50 € / month
- **Supervisors**: Assoc. Prof. Vincent Gauthier and Assoc. Prof. Andrea Araldo
- **Contact**: andrea.araldo@telecom-sudparis.eu; Please send a CV, the grades of last years of study and a motivation letter (1 page max).