

JOB OFFER

Update : August 2019

Job Title : Postdoctoral Researcher

Location : Evry

Department : Télécom SudParis / Réseaux et Service de Télécommunication (RST)

Point of contact : Assoc. Prof. Andrea Araldo, Assoc. Prof. Vincent Gauthier

Category of the candidate : II – T/R/P

Catégorie et métier du poste : II - P

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The work will be performed together with École Normale Supérieure Paris-Saclay (ENS-PS), member of Université Paris-Saclay, in collaboration with Prof. André de Palma.

MISSIONS :

The Postdoctoral Researcher will design and test algorithms for carpooling systems integrated into future public transit systems.

Carpooling is a system in which car owners (drivers) may accept to add some limited detours to their habitual trips (or just additional stops) in order to pick-up and drop-off other passengers. It is expected to reduce congestion, and thus pollution and risk.

Carpooling needs intelligent algorithms to match drivers and passengers and to propose routes convenient for both. We intend carpooling as an extension of public transit, under the philosophy of Mobility as a Service (MaaS), that can be used to solve the “Last Mile” problem in a metropolitan area. While recent literature exists on algorithms for carpooling [1], there has not been any integration with mass transit schedules, with few exceptions.

The Postdoctoral Researcher will devise and test algorithms to jointly optimize (i) allocation of meeting points, where pick-ups and drop-offs can occur and (ii) multi-modal routes, which include both classic transit and carpooling. The costs experienced by users (e.g, in terms of delay, schedule delay, monetary cost and comfort) will be modeled via economic and behavioral models [2] and their impact on user choices considered.

ACTIVITIES :

The postdoctoral researcher will apply tools from Operations Research, using models based on attraction and repulsion, successfully applied in Facility Location problems [3].

Heuristics based on the betweenness centrality will be devised [4]. The solutions proposed will be evaluated in simulation [5,6,7].

FORMATION ET COMPETENCES :

Education level and/or required experience :

- PhD in Computer Science, Mathematics, Transportation Engineering or any related fields

Required skills, knowledge and experiences :

- Simulation, algorithm design, analysis and testing, optimization
- Proficiency in programming languages (preferably Python and/or C++ and/or Matlab)

Preferred skills, knowledge and experiences:

- Knowledge of transportation systems. Knowledge of models of human choices

Technical and personal skills :

- Open-mindedness, autonomy and self-evaluation ability
- Ability to integrate multi-disciplinary knowledge to solve complex research problems, impacting society and economy
- Good interpersonal skills

To candidate:

- Please send an email to andrea.araldo@telecom-sudparis.eu
- Please provide the following elements: CV, complete list of publications (separating journals and conferences), 5 “best” publications, motivation letter, research statement related to the research subject, references or directly recommendation letters, all the marks of higher education.

Information du candidat sur le traitement des données personnelles :

<https://bit.ly/2QeOZhl>

References

- [1] Stiglic M. et al., The benefits of meeting points in ride-sharing systems, Transp. Res. Part B, 2015
- [2] Ben-Akiva M. & S. Lerman, Discrete Choice Analysis: theory and application to travel demand, MIT Press 1985
- [3] Jourani, A., C. Michelot, & M. Ndiaye, Efficiency for continuous facility location problems with attraction and repulsion, Annals of Operations Research, 2009
- [4] Barthélemy, M. The structure and dynamics of cities : urban data analysis and theoretical modeling. Cambridge University Press (2016).
- [5] Basu, Araldo et Al., Implementation and Policy Applications of AMoD in multi-modal activity-driven agent-based urban simulator SimMobility, Transp. Research Records, 2018
- [6] A. Di Maria, A. Araldo, G. Morana, A. Di Stefano, “AMoDSim: An Efficient and Modular Simulation Framework for Autonomous Mobility on Demand”, Internet of Vehicles (IoV) 2018
- [7] de Palma, A., F. Marchal & Yu. Nesterov, METROPOLIS: Modular System for Dynamic Traffic Simulation, Journal of the Transportation Research Board, 1607, 178-184, 1997.