

Post-doctoral position “Data science for the analysis of mobility behaviors” at LVMT in relation to the Geolytics research project

Background

The LVMT – Laboratory on City, Mobility and Transport – is a joint research unit at Université Paris-Est, shared by Ecole des Ponts ParisTech (ENPC), IFSTTAR and UPEM. It is an interdisciplinary laboratory dedicated to the holistic understanding of territorial systems, their population as a society and their mobility. Its research projects associate Human and Social Sciences (geography, sociology and economics) to Engineering Sciences (traffic physics, behavioral and economic modeling, complex system modeling and simulation).

The Geolytics project is an R&D project that started in end 2016 and will be concluded in early 2019. The research consortium encompasses two start-ups (IT4PME and Milanamos), two more established yet still innovating companies (Coyote, SFR), the standardization body W3C and two research and education bodies, namely the Telecom ParisTech team specialized in data science and the ENPC-LVMT team specialized in mobility modeling.

The research aim is to analyze detailed and continued passenger tracking (based on smartphone geolocalization) in order to depict individual profiles of mobility-making as well as the usage of places and the multimodal conditions of access to and from them – both in real time and off-line. This involves massive data collection and their analysis using Artificial Intelligence algorithms, including the design and software development of specific functions.

This post-doctoral position will be integrated in a scientific team that also involves several mobility analysts and other researchers with strong quantitative background.

Missions

The candidate will apply existing statistical models of mobility and contribute to the development of innovative models, by using methods such as statistical analysis, machine learning, stochastic modeling, agent-based modeling.

More in detail:

- 1/ Structuring and semantization of massive geolocalized data obtained from continued passenger tracking, so as to allow for dynamic exploration of the resulting database.
- 2/ Design and implementation of inference methods to predict travel demand in a given territory, possibly using activity based models framework.
- 3/ Contribution to the four case studies in the project, in relation with another post-doc specialized in mobility analysis: by focusing on the calibration / validation aspects of the models.

Outputs

- One paper of literature review, as project goes forward.
- At least one paper in a peer-reviewed international journal about the scientific contributions of the post-doc.
- Several technical reports.

Profile

PhD in Computer Science or Applied Mathematics or Physics or Geography, with demonstrated skills in the design and analysis of computer programs.

Expected areas of expertise: agent-based modeling, advanced statistical methods (including Bayesian analysis), complex model architectures, computational complexity assessment.

Organization

Throughout the project: Literature review and benchmark of methods

M1 to M9: data processing of « timeline » and inference of activity schedule, in strong relation with the other post-doctoral position

M10 to M12: metrology of mobility, confidence intervals of the estimations

M13 to M18: contribution to the development of modeling tool to infer travel demand from geolocalized data.

Working environment

18 month position to begin in June or July 2017

Location at LVMT, Building Bienvenue, 16-18 Avenue Newton, Cité Descartes, Champs-sur-Marne, 77455 Marne la Vallée

Wages in relation to professional experience (reference level at about 1,800 euros just after PhD defending)

Candidature expected April 30th, 2017

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