
Computational methods in industrial mathematics II

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JACEK FILIPOWSKI, SGH Warsaw School of Economics

Urban traffic optimization via cost incentivisation through a dynamic mutual payments between vehicle commuters

co-authors: Przemyslaw Szufel, Bogumil Kaminski, Atefeh Mashatan, Pawel Pralat

We consider the problem of incentivizing vehicle users in urban area to select the efficient routes based on their personal preferences regarding the time-money trade-off. Heterogeneous travelers differently assess value of time spent in congestion, hence it is presumably viable to reduce traffic in the most congested streets by introducing direct payments between commuters to encourage part of them to choose a different route. A multiagent model representing commuter behavior has been built. The simulation experiments outcome allow to compare Pareto-optimality of different routing decision scenarios.

ANDREI RAIGORODSKII, Moscow Institute of Physics and Technology, Russia

Moscow Institute of Physics and Technology and Yandex: an overview of joint projects

Object detection and recognition in the dynamic environment is one of the main objective for self-driving perception system. However for safe navigation and motion planing objects motion state estimation and prediction is also a crucial task.

In this talk an overview of optimization algorithms in application for self-driving perception and prediction tasks will be given.

In particular, 3D flow estimation as energy minimization problem and message passing algorithms will be discussed.

Also an overview of random finite set and particle filter approaches will be given in application to motion parameters estimation task.

PRZEMYSŁAW SZUFEL, SGH Warsaw School of Economics

Unsupervised machine learning methods for anomaly detection software-as-a-service application network traffic logs

co-authors: Jacek Dziwisz, Bogumil Kaminski, Pawel Pralat

In a typical software-as-a-service (SaaS) web-based product a significant amount of user activity is being collected. A typical challenge in such system is to provide a pro-active security monitoring where abnormal user activities can be quickly discovered and mitigated. The goal of this research is to present how machine learning and unsupervised learning algorithms can be applied to such user activate data to classify user behavior patterns and detect abnormal behavior in a real-word use case scenario.