Feature-variant clustering methods for tolling zone definition and their impact on distance-based toll optimization

Abstract: Distance- or usage-based road pricing is viewed as an effective alternative to traditional facility-, cordon- and area-based pricing that typically rely on fixed infrastructure. I will present our work on the use of feature-variant clustering methods, OPTICS and HDBSCAN*, as a systematic approach for tolling zone definition, as well as the utilization of DynaMIT2.0, a framework for predictive distance-based toll optimization to evaluate network performance for the various tolling zone definitions derived from the aforementioned feature-variant clustering methods. For the evaluation of network performance we make use of the real-world Expressway and Major Arterials network of Singapore and were able to demonstrate improved effectiveness of distance-based toll optimization given tolling zone definitions derived from feature-variant clustering, compared to fixed cordon-based pricing, adaptive cordon-based pricing, as well as distance-based pricing with a tolling zone definition derived in an ad-hoc manner.

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Antonis F. Lentzakis is a Postdoctoral Research Associate in the Future Urban Mobility IRG, part of Singapore-MIT Alliance for Research and Technology (S.M.A.R.T.). His current research focuses on the extension and enhancement of DynaMIT2.0, a system that employs simulation-based Dynamic Traffic Assignment (DTA), for traffic estimation, prediction, and control, developed by the MIT Intelligent Transportation Systems Lab. He holds a Ph.D. in Electrical and Electronic Engineering from Nanyang Technological University, a MSc in Operations Research and Production Engineering & Management from the Technical University of Crete. Further information on his background, and academic research can be found at https://www.researchgate.net/profile/Antonis_F_Lentzakis

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11:30 am
SMART-FM Seminar Space @ Level 9