



KIOS Seminar Series



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Estimating the Origin-Destination Matrix using link count observations from Unmanned Aerial Vehicles

SEMINAR ABSTRACT

Efficient estimation of the origin-destination (OD) matrix, defined as the travel demand between origin and destination nodes of a particular network, is a crucial requirement for traffic monitoring, planning and management. The OD matrix estimation problem has received significant attention over the past decades and various approaches using traffic counts from fixed location sensors have been developed and tested. In this work we present a novel methodology for static OD matrix estimation using traffic flow dynamics and link count observations collected from a swarm of Unmanned Aerial Vehicles (UAVs) deployed over the network under study. We employ a path-based cell transmission model and the problem is formulated in an optimisation framework for which we propose a solution approach when (i) fixed location sensor and (ii) UAV data are obtained. The main difference of the two types of data is that UAVs are mobile, observing different links at different time-steps, whereas fixed location sensors measure links at specific locations over time. We compare estimation results using both types of data and show that estimating OD matrices using measurements collected from UAVs results in significantly better performance compared to measurements collected from fixed location sensors, even when the number of measurements per time-step with the UAV swarm is smaller.

BRIEF BIO

Yiolanda Englezou is a postdoctoral researcher at KIOS Research and Innovation Centre of Excellence, University of Cyprus since 2018. In 2020 she was awarded a prestigious Marie Skłodowska Curie (MSCA) Widening Fellowship to work with Professor Christos Panayiotou on the project "BITS" (https:// www2.kios.ucy.ac.cy/BITS). She received her PhD in Statistics from the University of Southampton in 2018. Her research was within the field of design of experiments, focusing on the development of methods for designing experiments for the calibration of physical and computational models, for example models derived from underlying scientific knowledge. She has also completed a degree in Applied Mathematics and Physical Sciences from the National Technical University of Athens in 2014, where she studied Mathematics, Physics and Computer Science, specializing in the areas of Applied Mathematics and Statistics.



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