

Thursday 21 Dey 1396, 10:00 AM

IPM' Farmanieh Building, Lavasani St.
The New Building, 2nd Floor, Class C

Air Pollution Modeling for Smart Cities

Targeting the problem of generating high-resolution air pollution maps for cities, we designed and deployed a mobile sensor network anchored to the public buses of city of Lausanne (Switzerland). While presenting briefly the challenges of mobile sensor network deployment in the cities, this talk mainly focuses on how to design data-driven models and use difference sources of data to generate useful high resolution air pollution maps for the cities.

Four different sources of data are used in this work: (i) in-situ air quality measurements produced by our mobile sensor network deployed on public transportation vehicles, (ii) explanatory air-quality and meteorological variables obtained from two static monitoring stations, (iii) land-use data of the city, and (iv) traffic statistics.

Two data-driven novel modelling approaches has been proposed for estimating the targeted pollutant level at desired time-location pairs, extending also to areas of the city that are beyond the coverage of our mobile sensor network. The first is a log-linear regression model which is built over a virtual dependency graph based on land-use data. The second is a simple deep learning framework that automatically captures the dependencies of the data based on autoencoders. Using more than 45 million real measurements in the models, the evaluation results show consistently superior performance in respect to the canonical techniques.



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Ali Marjovi is a postdoctoral researcher at Distributed Intelligent Systems and Algorithms Laboratory, EPFL, Switzerland. He completed his Ph.D. at the Institute of Systems and Robotics, University of Coimbra, Portugal in the field of olfactory robotics. He received his Master's degree in Computer Architecture Engineering from Sharif University of Technology, Iran and his B.Eng. from University of Isfahan, Iran, in the same field. His research interests lie in the field of distributed sensing systems, environmental data analysis, multi-robot search and exploration, and swarm robotic olfaction.