Multi-Agent Map-Building: Kalman Filtering Meets Machine Learning

Prof. Luca Schenato
Department of Information Engineering
University of Padova
Italy

Donnerstag, 20. April 2017, 16:00 Uhr
IST-Seminarraum 2.268 - Pfaffenwaldring 9 - Campus Stuttgart-Vaihingen

Abstract

The proliferation of large scale smart multi-agent systems, also known as Internet-of-Things, Networked Control Systems, Wireless sensor and actuator networks, Cyber-physical Systems, etc., are providing us with a wealth of data with unprecedented time-space resolution which can trigger the next technological revolution. However, this trend is also posing a formidable challenge, often referred as Data Tsunami, which requires the analysis of a large scale correlated time-series. In this talk, I will address the problem of estimating a map, first in a static scenario and later in a dynamic scenarios, based on noisy measurements collected by a large number of sensors in the presence of unreliable communication. In particular I will explore the pros and cons of parametric and non-parametric estimation approaches and I will propose some strategies that aim to merge ideas from control theory such as Gauss-Markov estimators and Kalman Filtering, and from Machine Learning such as Gaussian regression and Karhunen-Loève kernel expansions.

Biographical Information

Luca Schenato received the Dr. Eng. degree in electrical engineering from the University of Padova in 1999 and the Ph.D. degree in Electrical Engineering and Computer Sciences from the UC Berkeley, in 2003. He held a post-doctoral position in 2004 and a Visiting Professor position in 2013-2014 at U.C. Berkeley. Currently, he is Associate Professor at the Information Engineering Department at the University of Padova. His interests include networked control systems, multi-agent systems, cyber-physical systems, smart grids and cooperative robotics. Luca Schenato has been awarded the 2004 Researchers Mobility Fellowship by the Italian Ministry of Education, University and Research (MIUR), the 2004 Marie Curie International Reintegration Grant, the 2006 Eli Jury Award in U.C. Berkeley, and the EUCA European Control Award in 2014. He served as Associate Editor for IEEE Trans. on Automatic Control (2010 to 2014) and IEEE Trans. on Control of Network Systems (2016-current), and he is Fellow of IEEE since 2017.

URL: http://automatica.dei.unipd.it/people/schenato.html