



DSSC SEMINAR: MACHINE LEARNING

1 March 2016, 11.00-12.00, Room 5412.0020 (Duisenberg Building)

Network Reconstruction: the Contribution of Challenges in Machine Learning

Keynote Speaker: Prof. Dr. Isabelle Guyon
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Abstract

Networks of influence are found at all levels of physical, biological, and societal systems: climate networks, gene networks, neural networks, and social networks are a few examples. These networks are not just descriptive of the “State of Nature”, they allow us to make predictions such as forecasting disruptive weather patterns, evaluating the possible effect of a drug, locating the focus of a neural seizure, and predicting the propagation of epidemics. This, in turns, allows us to device adequate interventions or change in policies to obtain desired outcomes: evacuate people before a region is hit by a hurricane, administer treatment, vaccinate, etc. But knowing the network structure is a prerequisite, and this structure may be very hard and costly to obtain with traditional means. For example, the medical community relies on clinical trials, which cost millions of dollars; the neuroscience community engages in connection tracing with electron microscopy, which take years before establishing the connectivity of 100 neurons (the brain contains billions).

This presentation will review recent progresses that have been made in network reconstruction methods based solely on observational data. Great advances have been recently made using machine learning. We will analyze the results of several challenges we organized, which point us to new simple and practical methodologies.

Biography

Isabelle Guyon is chaired professor in “big data” at the Université Paris-Saclay, specialized in statistical data analysis, pattern recognition and machine learning. Her areas of expertise include computer vision and bioinformatics. Her recent interest is in applications of machine learning to the discovery of causal relationships. Prior to joining Paris-Saclay she worked as an independent consultant and was a researcher at AT&T Bell Laboratories, where she pioneered applications of neural networks to pen computer interfaces and co-invented Support Vector Machines (SVM), a machine learning technique, which has become a textbook method. She is also the primary inventor of SVM-RFE, a variable selection technique based on SVM. The corresponding papers on feature selection have received thousands of citations. She organized many challenges in Machine Learning since 2003 supported by the EU network Pascal2, NSF, and DARPA, with prizes sponsored by Microsoft, Google, Facebook, Amazon, Disney Research, and Texas Instrument. Isabelle Guyon holds a Ph.D. degree in Physical Sciences of the University Pierre and Marie Curie, Paris, France. She is president of ChaLearn, a non-profit dedicated to organizing challenges, vice-president of the Unipen foundation, adjunct professor at New-York University, action editor of the Journal of Machine Learning Research, editor of the Challenges in Machine Learning book series of Microtome, and program chair of the upcoming NIPS 2016 conference.

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