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Dissertation press release 30.01.2020

Fundamental limits of machine learning for networked data

Title of the dissertation	Machine Learning for Networked Data
Contents of the dissertation	Data in many applications, such as social networks, biological systems, and the Internet, has intrinsic network structure, and thus, is referred to as networked data. Given the labels of few data points, one can apply (semi-supervised) machine learning methods to predict the labels of unlabeled nodes by exploiting the network structure. However, in some applications, the network structure might not be provided and has to be learned in a data-driven fashion. While the learning methods for these problems are well-studied, guaranteeing the accuracy of the methods is a less explored topic. In this dissertation, we provide sufficient conditions such that accurate learning is possible for the learning problems within networked data. In particular, we introduce the network compatibility conditions, the conditions on the location of labeled nodes concerning the network structure, which guarantees that network lasso methods can accurately learn the networked predictive model. Besides, we derive the bounds on the number of samples such that a conditional independence graph can be learned accurately.
Field of the dissertation	Computer Science, Machine learning
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Time of the defence	10.02.2020 at 12
Place of the defence	Aalto University School of Science, lecture hall T2, Konemiehentie 2, Espoo
Opponent	Professor Joakim Jalden, KTH Royal Institute of Technology, Sweden
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Electronic dissertation	*http://urn.fi/URN:ISBN:978-952-60-8918-8*
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