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CS-Colloquium

The Value of Sets

mit Dr. Sebastian Tschiatschek (Microsoft Research)

Wann?   12. März, 09:00
Wo?   Seminarraum 9 (SR9), Fakultät für Informatik
                   Währinger Straße 29
                   1090 Wien

Abstract

In many machine learning problems we face the challenge of selecting sets of objects with specific properties. For instance, in image collection summarization one aims to select sets of images that cover the relevant aspects of an image collection while simultaneously being diverse, and in product recommendation one aims to propose sets of items a customer is likely to buy. To approach this challenge, we require models that (1) can value sets of objects by identifying and understanding their complex dependencies, and (2) allow for efficient inference by leveraging their mathematical properties. In this talk, I will discuss approaches for learning models that value sets of objects from data and show how these models can be used in a wide range of applications. A crucial assumption for tractability of learning and inference in such models is that of submodularity. I will first present approaches for learning mixture models of submodular component functions for valuing summaries of image collections. Then, I will introduce a probabilistic log-submodular model for encouraging diversity of objects in recommendation applications, and illustrate how this model can be efficiently learned from data. This model can be naturally extended to include both submodular and supermodular properties, allowing us to reason about preferences over sets with substitutes and complements. Furthermore, I will highlight approaches which allow us to learn set-valued models from approximate maximizers of unknown set-valued functions and enable efficient discovery of dynamic information. Finally, I will discuss directions for future research.