

Schedule:

- 8: 50—9: 00: Opening address
- 9: 00—10: 00: Zhangyang (Atlas) Wang, Task-Specific and Interpretable Feature Learning
- 10: 00—10: 30: Tea Break
- 10: 30—11: 30: 田永鸿, Multi-task learning for precise object search from massive surveillance videos
- 11: 30—13: 30: Lunch Break
- 13: 30—14: 30: 孙栩, A brief introduction to methods and theories for large-scale structured learning
- 14: 30—15: 30: 贾金柱, Sparse linear models
- 15: 30—16: 00: Tea Break
- 16: 00—17: 00: 林伟, Correlated Proportions to Correlated Counts
- 17: 00—18: 00: 王冉冉, 大数据技术在金融行业的应用
- 18: 00— : Dinner

题目: Task-Specific and Interpretable Feature Learning

演讲人: Zhangyang (Atlas) Wang, Assistant Professor, Computer Science and Engineering (CSE) Department, Texas A&M University (TAMU)

摘要: Deep learning models have had tremendous impacts over the recent years, in a variety of machine learning and artificial intelligence applications. Meanwhile, a questions has been raised by many: is deep learning just a triumph of empiricism? There has been emerging interests in reducing the gap, between the theoretical soundness and interpretability, and the empirical success of deep models. In this talk, I will introduce my research on bridging traditional learning models that emphasize problem-specific reasoning, and deep models that allow for larger learning capacity. The overall goal is to devise the next-generation deep architectures that are: 1) Task-specific, namely, being optimized for the

specific task by fully exploiting available prior knowledge and problem structures, rather than applying generic data-driven models as "black-boxes"; and 2) Interpretable, namely, being able to learn a representation which consists of disentangled and semantically sensible latent variables, and to display more predictable behaviors. I will present a few concrete model examples, to reveal how the analytic tools in the classical optimization problems can be translated to guide the architecture design and performance analysis of deep models. As a result, those models demonstrate improved performance, intuitive interpretation, as well as efficient parameter initialization. I will then show how my developed feature learning models are widely applied, to classical topics such as image enhancement, classification, clustering and object recognition, and in novel domains such as style recognition, aesthetics assessment, and healthcare. Finally, I will conclude this talk by discussing several interesting future directions, ranging from theoretical and algorithmic research prospects, to newly-emerging interdisciplinary applications.

题目： Multi-task learning for precise object search from massive surveillance videos

演讲人： 田永鸿教授，北京大学信息科学技术学院， 数字视频编解码技术国家工程实验室

摘要： Precise object search from large-scale camera networks is an important yet very challenging task in the field of computer vision. Different with the traditional visual object search task that aims to find visually similar objects from a collection, precise object search is to find exactly the different occurrences of the given object in large-scale surveillance networks by elaborately distinguishing the visually similar but non-identical objects. Technologically, person re-identification (Re-ID) can be viewed as a special solution of precise object search on a small scale dataset. However, most existing person re-identification approaches follow a supervised learning framework, in which a large number of labelled matching pairs are required for training. This severely limits their scalability in real-world applications. To address this limitation, we formulate precise object search as a multi-task learning task that should solve both recognition (i.e., object re-identification) and search (i.e., fine-grain object retrieval) problems simultaneously in one framework. In this talk, I will firstly discuss several technological challenges for precise object search, and then present several recent developments on multi-task learning to tackle with these challenges. Moreover, I will also introduce a large-scale vehicle image database captured by different real-world cameras in a city, which can be used to evaluate the algorithmic performance for precise object search.

题目： A brief introduction to methods and theories for large-scale structured learning

演讲人： 孙栩教授，北京大学信息学院， 计算语言学教育部重点实验室

摘要： Structured learning is of critical importance for real-world applications. Take natural language processing for example, many core NLP tasks are usually casted as structured learning problems, which try to predict certain forms of structured output (e.g., tag sequences, syntactic parse trees, entity

relationship graphs, etc.) from the input. When implement a structured learning method, the following challenges may be of your interest:

1. Among various models/algorithms with different characteristics, which one should we choose for structured prediction given a specific task?
2. Structured prediction is often too slow for large-scale problems. How to make it as fast as possible?
3. To predict structures rather than a single tag, it is often likely to suffer from overfitting. In particular, there are some types of overfitting from structures themselves in structured prediction. How to deal with this problem?

This talk will introduce recent advances of methods and theories to address the above questions.

题目： Sparse linear models.

演讲人： 贾金柱教授，北京大学数学科学学院，统计科学中心

摘要： In this talk, I will talk about the recent developments of sparse linear models. I will discuss when sparse model works and when it does not work and also discuss what shall we do when it does not work. Robust estimators will be discussed for misspecified models.

题目： From Correlated Proportions to Correlated Counts

演讲人： 林伟教授，北京大学数学科学学院，统计科学中心

摘要： In this talk I will first review a series of our recent work on the statistical modeling and analysis of high-dimensional compositional data, which consist of positive proportions that sum to one. The key is to honor the unique features of compositional data due to the simplex constraint. Variable selection, large covariance estimation, and two-sample testing problems will be discussed. Scalable algorithms and theoretical guarantees will be emphasized. To avoid ad hoc methods for handling zero proportions, we further consider some proposals for modeling correlated counts directly. The methodology is motivated and illustrated by examples from microbiome, text, and bibliometric data analysis.

标题： 大数据技术在金融行业的应用

演讲人： 王冉冉 普林科技 金融事业部 总经理

摘要： 介绍大数据云计算技术在金融行业的发展现状。尤其是数据挖掘，机器学习算法，自然语言处理等技术在信贷风控，反欺诈，精准营销，量化投资等领域的应用，案例，以及面临的问题。