HeteroNAM: International Workshop on Heterogeneous Networks Analysis and Mining

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ABSTRACT

The first International Workshop on Heterogeneous Networks Analysis and Mining is held in Los Angeles, California, USA on February 9th, 2018 and is co-located with the 11th ACM International Conference on Web Search and Data Mining. The goal of this workshop is to bring together computing researchers and practitioners to address challenges in the mining and analysis of real-world heterogeneous networks. This workshop has an exciting program that spans a number of subareas including: graph mining, learning from structured data, statistical relational learning, and network science in general. The program includes six invited speakers, lively discussion on emerging topics, and presentations of several original research papers.

KEYWORDS

Graph Mining, Heterogeneous Information Networks, Multi-Relational Data, Signed Networks, Attributed Networks, Aligned Networks, Multigraphs, Multidimensional Networks, Multilayer Networks, Complex Networks, Multimodal Networks

1 INTRODUCTION

Graphs naturally represent a host of processes, including interactions between people on social or communication networks, links between web-pages on the World Wide Web, protein interactions in biological networks, movement in transportation networks, electricity delivery in smart energy grids, relations in bibliographic data, and many others. In such scenarios, graphs that model real-world networks are typically heterogeneous, multi-modal, and multi-relational. In the era of big data, as more varieties of interconnected structured and semi-structured data are becoming available, the

importance of leveraging this heterogeneous and multi-relational nature of networks in being able to effectively mine and learn this kind of data is becoming more evident. The objective of this workshop is to bring together researchers from a variety of related areas, and discuss commonalities and differences in challenges faced, survey some of the different approaches, and provide a forum to present and learn about some of the most cutting-edge research in this area. As an outcome, we expect participants to walk away with a better sense of the variety of different methods and tools available for heterogeneous network mining and analysis, and an appreciation for some of the interesting emerging applications, as well as the challenges that accompany these applications There are many challenges involved in effectively mining and learning from this kind of data, including:

- Understanding different techniques applicable, including heterogeneous graph mining algorithms, graphical models, latent variable models, matrix factorization methods and more.
- Representing and dealing with the heterogeneity of the data.
- The common need for information integration and alignment.
- Handling dynamic and changing data.
- Addressing each of these issues at scale.

Traditionally, a number of subareas have contributed to this space: communities in graph mining, learning from structured data, statistical relational learning, and, moving beyond sub-disciplines in computer science, social network analysis, and, more broadly network science.

2 OBJECTIVE AND TOPICS OF INTEREST

This workshop is a forum for exchanging ideas and methods for heterogeneous networks analysis and mining, developing new common understandings of the problems at hand, sharing of data sets where applicable, and leveraging existing knowledge from different disciplines. The goal is to bring together researchers from academia, industry, and government, to create a forum for discussing recent advances in this area. In doing so, we aim to better understand the overarching principles and the limitations of our current methods and to inspire research on new algorithms and techniques for heterogeneous networks analysis and mining.

To reflect the broad scope of work on heterogeneous networks analysis and mining, we encourage submissions that span the spectrum from theoretical analysis to algorithms and implementation, to applications and empirical studies is various domains. The need

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for analysis and learning methods that go beyond mining simple graphs is emerging in many disciplines and are referred to with different names depending on the type of data augmenting the simple graph.

Topics of interest include, but are not limited to:

- Heterogeneous Information Networks
- Multi-Relational Data
- Signed Networks
- Attributed Networks
- Aligned Networks
- Multigraphs
- Multidimensional Networks
- Multilayer Networks
- Complex Networks
- Multimodal Networks

Heterogeneous networks are becoming the key component in many emerging applications and data-mining and graph-mining related tasks. Some of the related research areas and tasks related to heterogeneous networks include:

- Link and relationship strength prediction
- Clustering and community detection and formation modeling
- Learning to rank in information networks
- Similarity measures and relationship extraction
- Applications to modeling of weblogs, social media, social networks, medical networks, and the semantic web
- Statistical relational learning
- Tensor factorization
- Network-based classification
- Hybrid recommender systems
- Network embedding Information fusion
- Network evolution and dynamic networks

3 WORKSHOP ORGANIZATION AND PROGRAM

3.1 Organizers

Shobeir Fakhraei is a research (computer) scientist at Information Science Institute, University of Southern California. He received his Ph.D. from the Department of Computer Science, University of Maryland College Park (UMD). Shobeir's research interests include Machine Learning, Statistical Relational Learning, Multi-Relational Link Prediction and Graph Mining, Networked Data, Collective Classification, Recommender Systems, and Biomedical and Health Informatics. He has worked in several research groups including at Microsoft Research and Yahoo! Labs.

Yanen Li leads the Data Mining area at Snap Research. Yanen has led the effort in building the machine learning based personalized Discover Ranking platform, and has also built the relecance modeling library SnapRec, which is used throughout Snap Inc. He is also leading the personalized Lens Ranking that personalizes snapchatter.

Yizhou Sun is an assistant professor in the Department of Computer Science, University of California, Los Angeles. Her principal research interest is in mining information and social networks, and more generally in data mining, machine learning, and network

science, with a focus on modeling novel problems and proposing scalable algorithms for large-scale, real-world applications. She is a pioneer researcher in mining heterogeneous information networks, and has given many tutorials on this topic in several premier conferences. She has received 2012 SIGKDD Best Student Paper Award, 2013 SIGKDD Doctoral Dissertation Award, 2013 Yahoo Academic Career Enhancement Award, 2015 NSF CAREER Award, and 2016 CS@ILLINOIS Distinguished Educator Award.

Tim Weninger is an assistant professor at the University of Notre Dame. He has authored over 50 research publications in the areas of data mining, machine learning and network science. The key application of his research is to identify how humans generate, curate and search for information in the pursuit of knowledge. He is a recipient of the NSF CAREER award, the Army Research Office Young Faculty Award, and has received research grants from the Air Force Office of Scientific Research, DARPA, and the John Templeton Foundation. He is an inaugural member of the ACM's Future of Computing Academy and serves on numerous scientific program committees.

3.2 Contributed Papers and Reviews

We have received ten submissions. Each paper will receive reviews from at least three members of the program committee. Accepted papers will be presented at the workshop and be hosted on the workshop Website: http://www.heteronam.org/2018/

3.3 Program Committee

Nesreen Ahmed (Intel Research Labs), Yuxiao Dong (Microsoft Research), Srijan Kumar (Stanford University), Julian McAuley (University of California, San Diego), Fred Morstatter (University of Southern California), Maximilian Nickel (Facebook AI Research), Evangelos Papalexakis (University of California Riverside), Ali Pinar (Sandia National Laboratories), Arti Ramesh (Binghamton University), Neil Shah (Carnegie Mellon University), Chuan Shi (Beijing Uni. of Posts & Telecommunications), Jiliang Tang (Michigan State University), Elena Zheleva (University of Illinois at Chicago)

3.4 Invited Speakers

- Leman Akoglu, Assistant Professor at Carnegie Mellon University
- Nitesh Chawla, Professor at University of Notre Dame
- Jiawei Han, Professor at University of Illinois at Urbana-Champaign
- Kristina Lerman, Associate Professor at Information Sciences Institute at University of Southern California
- Julian McAuley, Assistant Professor as University of California San Diego
- Jiliang Tang, Assistant Professor at Michigan State University

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