

Yike Liu

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My primary research focus is on deep learning and reinforcement learning, especially the application of it on traffic data. Before that I have worked on graph-based machine learning and data mining, particularly graph summarization and graph clustering where I developed graph mining algorithms that help better understand the underlying graph organization and making sense of it. Generally I'm interested in large-scale data science projects that help the end users make sense of large amounts of data, such as finding interesting patterns, detecting anomalies, and visualizing important connections in real-world data.

RESEARCH INTERESTS

Data mining, deep learning, reinforcement learning, applied machine learning

EDUCATION

University of Michigan, Ann Arbor, USA 09/2013-present
PhD student in Physics
- Research Area: Machine learning & Data mining
- Advisor: Professor Jieping Ye

M.S. student in Computer Science and Engineering

University of Science and Technology of China, Hefei, China 09/2009-06/2013
School for the Gifted Young
B.S. in Applied Physics

PUBLICATIONS [Yike Liu](#), Linhong Zhu, Pedro Szekely, Aram Galstyan, Danai Koutra. *Collective Time-Series Clustering in Networks*. Submitted to SDM, 2017.

[Yike Liu](#), Tara Safavi, Neil Shah, Danai Koutra. *Reducing Large Graphs to Small Supergraphs: A Unified Approach*. Under revision for resubmission to SNAM, 2017.

[Yike Liu](#), Abhilash Dighe, Tara Safavi, Danai Koutra. *A Graph Summarization: A Survey*. Under Revision for resubmission to ACM Survey, 2016.

[Yike Liu](#), Tara Safavi, Neil Shah, Danai Koutra. *Reducing Million-Node Graphs to a Few Structural Patterns: A Unified Approach*. Workshop on Mining and Learning with Graphs, KDD 2016

[Yike Liu](#), Neil Shah, Danai Koutra. *An Empirical Comparison of the Summarization Power of Graph Clustering Methods*. Workshop on Networks in the Social and Information Sciences, NIPS, 2015.

Bokui Chen, Chuanfei Dong, [Yike Liu](#), Wei Tong, Wenyao Zhang, Jie Liu, Binghong Wang. *Real-time information feedback based on a sharp decay weighted function*. Computational Physics Communications, 2012.

Bokui Chen, [Yike Liu](#), Binghong Wang. *Application of Exp-function method to KdV-Burgers-Kuramoto equation and Kuramoto-Sivashinsky equation*. Chinese Quarterly Journal of Mathematics, 2012.

POSTERS

Yike Liu, Tara Safavi, Neil Shah, Danai Koutra. *Reducing Million-Node Graphs to a Few Structural Patterns: A Unified Approach*. Workshop on Mining and Learning with Graphs, KDD 2016

Yike Liu, Neil Shah, Danai Koutra. *On the Summarization Power of Graph Clustering*. Poster in CRA-W Graduate Cohort Workshop, 2016.

Yike Liu, Neil Shah, Danai Koutra. *An Empirical Comparison of the Summarization Power of Graph Clustering Methods*. Poster in Workshop on Networks in the Social and Information Sciences, NIPS, 2015.

TALKS

Introduction to Reinforcement Learning

Didi Chuxing 8/2017

A Genetic-Algorithm-Based Approach to Solve Carpool Service Problems in Cloud Computing

Department of Computational Medicine and Bioinformatics, University of Michigan
11/2016

Understanding and Modeling Temporal Patterns in Human Trafficking Data

Intelligent Systems Division, Information Science Institute, University of Southern California
08/2016

Graph Summarization: A Unified Approach

Intelligent Systems Division, Information Science Institute, University of Southern California
06/2016

Structural Graphical Lasso for Learning Mouse Brain Connectivity

Computer Science and Engineering, EECS, University of Michigan
03/2016

VEGAS: Visual influence Graph Summarization on Citation Networks

Computer Science and Engineering, EECS, University of Michigan
02/2016

Overlapping Community Detection at Scale

Computer Science and Engineering, EECS, University of Michigan
01/2016

On the Summarization Power of Graph Clustering Methods

NIPS, Montreal, Canada
12/2015

On the Summarization Power of Graph Clustering Methods

Physics, University of Michigan
12/2015

Finding and evaluating community structure in networks

Computer Science and Engineering, EECS, University of Michigan
10/2015

SKILLS

Programming Languages

Python, MATLAB, C, Java

Softwares

Hadoop, Tensorflow, Caffe

RELEVANT

COURSEWORK

Machine Learning (EECS545)

Special Topic: Graph Mining and Exploration at Scale (EECS598)

Special Topic: Theoretical Foundations of Machine Learning (EECS598)

Database Management Systems (EECS484)

Computer Vision (EECS442)

RECENT PROJECTS

Recurrent deep learning games

05/2017-present

- Design a simultaneous multi-player game for the training of RNNs.
- Prove the equivalence between the global optimum and Nash equilibrium.

- Develop algorithms for finding the Nash equilibrium of the game hence the optimum of the recurrent network.

Collective time series clustering on human trafficking data

06/2016-02/2017

- Perform graph-based analytics on human trafficking data of millions of web-pages.
- Design algorithms for collective clustering on time series and graph structure of data.

A unified approach for graph summarization

09/2015-06/2016

- Use VoG-OVERLAP as a summarization-based evaluation of clustering methods.
- Apply a newly-introduced k-core-based clustering for graph decomposition and summarization.
- Compare the summarization power of seven clustering techniques on large real graphs.
- Develop multiple heuristics with their parallelization for summary generation

Pixel-wise age related macular degeneration quantification using fully convolutional network

05/2015-08/2015

- Conduct pixel-wise multi-labeled classification on a medical dataset of retina images to extract features for macular degeneration.
- Apply the method of fully convolutional network to discover and predict features of vessel, optical disk, hyperfluorescence, hypofluorescence and abnormal regions.
- Use Caffe as a deep learning framework and apply the partition technique to improve efficiency.

Other projects

- High dimensional data clustering
- Mining permission enforcement flaws in the Android framework

WORK EXPERIENCE

Algorithm Engineer Intern 03/2017-present
Didi Chuxing

Graduate Student Research Assistant 01/2016-present
Department of EECS, University of Michigan

Graduate Student Instructor 09/2016-present
Special Topics: Mining Large-scale Graph Data, Department of EECS, University of Michigan

Visiting Research Assistant 06/2016-08/2016
University of Southern California - Information Sciences Institute

Graduate Student Instructor 09/2013-12/2015
Life Sciences Lab and Elementary Laboratory, Department of Physics, University of Michigan

SERVICES	Subreviewer KDD, AAAI, SDM, WWW	
HONORS & AWARDS	BPDM Scholarship Award, Broadening Participation in Data Mining Workshop	2016
	Student Travel Award, KDD	2016
	Rackham Travel Grant, University of Michigan	2015
	Department Fellowship, University of Michigan	2013
	Outstanding Student Scholarship	2012
	First Prize in the Physics Experiment Contest of USTC	2011
	Guanghua Education Scholarship	2011
	USTC Overseas Alumni Foundation Outstanding Student Scholarship	2009
INVITED WOSHOPS & SYMPOSIA	CRA-W Graduate Cohort Workshop, Washington, D.C.	04/2016
	Broadening Participation in Data Mining Workshop, San Francisco, CA.	08/2016
	CRA-W Graduate Cohort Workshop, San Diego, CA.	04/2016