

Shen Wang (Charles)

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RESEARCH INTERESTS

- Deep Learning
- Data Mining
- Computer Vision
- Mathematics and Statistics

PROFESSIONAL EXPERIENCE AND PROJECT **Research Assistant** @ Big Data and Social Computing Lab Aug 2015 to Present
University of Illinois at Chicago
Supervisor: Philip S. Yu, Ph.D

- **Project:** Deep learning from graph data
 - Proposed a novel graph neural network model to learn the representation of directed heterogeneous graph (SDM 2019, Submitted to WWW 2019)
 - Proposed a novel graph neural network model using recurrent neural aggregation (Under preparation for ICML 2019)
 - Proposed a novel CNN based model to learn the representation of the brain network (KDD 2017)
- **Project:** Deep learning from sequential data
 - Proposed a new type of recurrent neural network (under preparation for ICML 2019)
 - Proposed a new CNN-RNN based model to learn co-investment pattern among pairwise of stocks for market analysis (BigData 2018, ICDM 2018)
- **Project:** Deep learning application in computer vision
 - Designed multi-way kernel models for neuroimaging classification (CVPR 17 and ICML 17)
 - Proposed a multi-view multi-task neural factorization machine for neuroimaging classification
 - Proposed a CNN based eye fixation map learning model for eye gaze tracking without calibration (ETRA 2016)

Research Intern @ NEC Laboratories America, Inc. May 2018 to Present
Supervisors: Zhengzhang Chen, Ph.D & Lu-An Tang, Ph.D

- **Project:** Intrusion detection via graph neural networks
Keywords: Graph Neural Network, Intrusion Detection.
Accomplishments: 1) Developed a deep graph neural network model for intrusion detection in IT/OT network with hundreds of hosts and thousands of programs.
2) Developed and deployed an online system to detect unexpected program instances in the execution environment of web services and outperformed the state-of-art method by reducing 50% false positives while keeping zero false negatives.
3) Developed a program reidentification system to verify the program's identity based on its system behaviors, which is robust to the normal dynamic changes.
4) Proposed an attentional multi-channel graph neural network model to learn the node and graph embedding jointly for heterogeneous directed graph.

Research Intern @ Didi AI Lab May 2017 to Aug 2017
Supervisors: Jieping Ye, Ph.D

- **Project:** User profile mining and recommendation with recurrent neural network
Keywords: Recommendation System, User Portrait, Recurrent Neural Network,

Big Data.

Accomplishments: 1) Proposed a deep recurrent neural network for user portrait analysis on passenger data with millions of users and high dimensional feature within a year.

2) Developed and deployed a deep recurrent neural network based recommendation system for coupon delivery and achieved 25% improvement on CTR compared with previous method.

- **Project:** Traffic prediction with spatio-temporal recurrent neural network
Keywords: Mining the spatiotemporal data, Recurrent Neural Network, Convolutional Neural Network, Graph Mining.

Accomplishments: 1) Developed a convolution recurrent neural network for traffic forecasting that incorporates both spatial and temporal dependency in the traffic flow.

2) Evaluated on Beijing's one-year road data and improved the baseline method by 10%.

Research Assistant @ Machine Learning Group Sep. 2012 to Sep. 2014

Electrical Engineering and Computer Science Department
University of Michigan

Supervisors: [Honglak Lee](#), Ph.D & [Silvio Savarese](#), Ph.D

- **Project:** Deep learning application for computer vision
 - Proposed a saliency enhanced joint representation learning model for RGB-D based object detection
 - Proposed a CNN based objective detection model in RGB-D world with clutter-free foreground mask

EDUCATION

University of Illinois at Chicago, IL, USA Aug. 2014 to Present

- Ph.D in Computer Science: Machine Learning and Data Mining
- Supervisor: Philip S. Yu, Ph.D GPA: 4.0/4.0

University of Michigan at Ann Arbor, MI, USA Sep. 2011 to Apr. 2014

- M.S. in Electrical Engineering System: Machine Learning and Signal Processing
- GPA: 3.5/4.0

University of California at Berkeley, CA, USA Jun. 2009 to Aug. 2009

- Exchange Student
- GPA: 4.0/4.0

University of Essex, Colchester, UK Sep. 2009 to Jun. 2011

- B.E. in Electronic Engineering with Honors Class I (Second degree)
- GPA: 4.0/4.0

Nanjing University, Jiangsu, China Sep. 2007 to Jun. 2011

- B.E. in Electronic Engineering
- GPA: 3.5/4.0

PAPER UNDER PREPARATION AND REVIEW

1. **Shen Wang**, Philip S. Yu. "Detecting Unexpected Programs in Execution Environment of Web Services via Deep Graph Neural Networks" Submitted to WWW 2019.
2. **Shen Wang**, Philip S. Yu. "Representation Learning from Large Network Via Recurrent Aggregation Network." Under preparation for *SIGKDD 2019*
3. **Shen Wang**, Philip S. Yu and Jieping Ye. "Deep Coupon Recommendation via Long Time Passenger Behaviour Analysis." Under preparation for *SIGKDD 2019*

SELECTED PUBLICATIONS

1. **Shen Wang**, Zhengzhang Chen, Lu-An Tang, Ding Li, Jingchao Ni, Zhichun Li, Junghwan Rhee, Haifeng Chen, Philip S. Yu. "Deep Program Reidentification: A Graph Neural Network Solution" *SIAM International Conference on Data Mining (SDM 2019)*.

2. Yue Wang, **Shen Wang**, Chenwei Zhang, Philip S. Yu, Lu Bai and Lixin Cui “Market Abnormality Period Detection via Co-movement Attention Model.” *IEEE International Conference on Big Data (Big Data 2018)*
3. Yue Wang, **Shen Wang**, Chenwei Zhang, Philip S. Yu, Lu Bai and Lixin Cui “Deep Co-investment Network Learning for Financial Assets.” *IEEE International Conference on Data Mining Workshop (ICDM 2018)*
4. **Shen Wang**, Chun-Ta Lu, Lifang He, Bokai Cao, Philip S. Yu and Ann Ragin. “Dual-Heterogeneity Preserving Neural Factorization Machine for HIV Neuroimaging Analysis.” *arXiv 2018*
5. **Shen Wang**, Lifang He, Bokai Cao, Chun-Ta Lu, Philip S. Yu and Ann Ragin. “Structural Deep Brain Network Mining.” *ACM Conference on Knowledge Discovery and Data Mining (SIGKDD 2017)* (Oral presentation, acceptance 8.56%)
6. Lifang He, **Shen Wang**, Chun-Ta Lu, Guixiang Ma, Linlin Shen, Philip S. Yu, and Ann B. Ragin. “Kernelized Tensor Factorization Machines with Applications to Neuromimaging.” *International Conference on Machine Learning (ICML 2017)*
7. Lifang He, **Shen Wang**, Chun-Ta Lu, Hao Ding, Linlin Shen, Philip S. Yu and Ann B. Ragin “Multi-way Multi-level Kernel Modeling for Neuroimaging Classification.” *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2017)*.
8. **Shen Wang**, Kang Wang, Qiang Ji. “Deep eye fixation map learning for calibration-free eye gaze tracking.” *ACM Symposium on Eye Tracking Research & Applications, 2016*
9. **Shen Wang**, Yong Peng, Bao-Liang Lu. “Marginalized Denoising Autoencoder via Graph Regularization for Domain Adaptation.” *International Conference on Neural Information Processing (ICONIP2013)*, November 3-7, Dargu, Korea. (*Oral Presentation*).
10. Yong Peng, **Shen Wang**, Suhang Wang, Bao-Liang Lu. “Structure Preserving Low-rank Representation for Semi-supervised Face Recognition.” *International Conference on Neural Information Processing (ICONIP2013)*, November 3-7, Dargu, Korea. (*Oral Presentation*).

TECHNICAL
REPORT

1. “Model the Entity Relations in knowledge bases with High Order Neural Network.”
May 2015
2. “Robust Supervised Trace Lasso via Half-Quadratic Optimization for Face Recognition.”
May 2014

SKILLS

- Language: Native Chinese, Fluent English(GRE 1600 +4.0, IELTS 7.5)
- Programming: Python, C/C++, Java, Scala, C, MATLAB, SQL, L^AT_EX
- Big Data: Apache Hadoop, Spark
- Machine Learning: TensorFlow, Keras, PyTorch, Caffe, Scikit-learn, Weka

AWARDS

- Student Travel Award (SDM 2019, KDD 2017, ICML 2017, CVPR 2017)
- UIC Student Presenter Award (2016, 2017)
- First-Class Scholarship (2008-2011)

PROFESSIONAL
SERVICE

Journal Reviewer:

- ACM Transactions on Knowledge Discovery from Data, TKDD 2016-Present
- IEEE Transactions on Knowledge Discovery from Data, TKDD 2017-Present

Conference External Reviewer:

- IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2015
- SIAM International Conference on Data Mining, SDM 2016, 2017
- SIAM International Conference on Data Mining

PROFESSIONAL
SERVICE

Philip S. Yu, Ph.D

UIC Distinguished Professor and Wexler Chair in Information Technology

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Jieping Ye, Ph.D

VP of Didi Research, Didi Fellow

Didi Chuxing

Associate Professor

Computational Medicine and Bioinformatics, Medical School

Electrical and Computer Engineering, College of Engineering

University of Michigan, Ann Arbor

Email: jpye@umich.edu

Honglak Lee, Ph.D

Research Scientist

Google Brain

Sloan Research Fellow, Associate Professor

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University of Michigan, Ann Arbor

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Zhengzhang Chen, Ph.D

Researcher

Data Science Systems Research

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