Curriculum Vitae (last updated: 12/2020)

Yanbang Wang

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Education

Stanford University | Master of Science in Computer Science 09/2019 – 06/2021

***Research track**: fully covered by RA-ship; **GPA:** 3.98; **Advisor:** Prof. Jure Leskovec, Prof. Jiawei Han (UIUC)*

Hong Kong University of Science and Technology | Bachelor of Science in Computer Science 09/2015 – 06/2019

***Double majors:** Computer Science, Mathematics, **GPA:** 3.96, Summa Cum Laude (Top 1%); **Advisor:** Prof. Huamin Qu*

Research Interest

My research focuses on machine learning and data mining algorithms for understanding large-scale graph-structured data. I work with rich-labeled relational structures that model real-world complex interconnected systems in both static and dynamic nature. The applications involve many interdisciplinary topics such as computational social science, psychology, quantitative history analysis *etc*. I also work on theoretical foundations that characterize and enhance the structural expressiveness of graph neural algorithms.

Research Experience

[08/2019 – present] Stanford Social Network Analysis Group **Advisor: Prof. Jure Leskovec, Prof. Pan Li**

Neural Modeling of Behavior Patterns in Dynamic Social Interaction Networks **(WWW'21, KDD MLG'21)**

- Designed the Temporal Graph-Diffusion Convolutional Network to model human's facc-to-face communication patterns
- Our framework is the current SOTA of identifying lying behaviors, nervousness, and dominance in face-to-face interactions
- The study also yields many interesting insights into human's behavior patterns when they lie or feel nervous

Design Provably More Powerful GNNs for Structural Representation **(NeurIPS'20, AAAI DLG'21)**

- Proposed "Distance Encoding" (DE) to assist GNNs in representing any set of nodes in a static graph
- Proved that DE endows general GNNs with strictly more expressive power than the 1-Weisfeiler-Lehman test
- Distance Encoding GNNs are the current SOTA of link prediction and triplet prediction tasks in static graphs

Inductive Representation Learning in Temporal Networks **(ICLR'21)**

- Proposed "Causal Anonymous Walks" (CAW) to inductively model temporal networks
- Rigorously characterized and proved expressive power of CAW; Paired CAW with a sampling algorithm that is provably faster
- CAW-based neural models are the current SOTA of both transductive and inductive link prediction tasks in temporal networks

[06/2020 - 10/2020] UIUC Data Mining Group **Advisor: Prof. Jiawei Han**

Collective Text Classification Using Topic-enhanced Latent Textual Links (manuscript in submission)

- Proposed topic-enhanced textual links to formulate latent semantic relationships among documents
- Design a generative text GNN to generate the latent semantic relationships cooperatively with document classification training
- The novel framework achieves SOTA on text classification tasks where the pregiven links are relatively weak or absent

[06/2018 - 10/2018] MIT CSAIL Any-scale Learning for All Group **Advisor: Prof. Una-May O'Reilly**

Pattern Mining of Online User's Learning Behaviors in Massive Open Online Courses **(LAK'19)**

- Created a data organization, "Detailed Access Trajectory", for efficient mining of user's learning footprints in MOOCs
- Extensively analyzed co-occurrence and interaction between learning patterns that are indicative of dropping out behaviors

Transfer Learning for Dropping Out Prediction in Massive Open Online Courses **(LAK'19)**

- Developed two transfer learning frameworks to predict dropping out behaviors in MOOCs
- One framework uses a passive approach via transductive PCA, the other uses an active approach via correlation alignment
- Created the state-of-the-art frameworks for the task; the framework was deployed in edX MOOC platform

[05/2018 - 1/2019] HKUST Lee-Campbell Group **Advisor: Prof. Cameron Campbell**

Large-scale Civil Mobility Analysis in Chinese Qing Dynasty, 17 -19 AD **(SSHA' 20)**

- Studied 3M civil appointment records, reconstructed civil servants' mobility network among 6k counties in history
- Proposed PosRank, a specialized graph ranking algorithm that integrates history factors to compute a heatmap of civil promotion
- Yielded the first piece of quantitative evidence that confirms the existence of "Stepping-stone Positions" in Chinese history

[09/2016 - 05/2018] HKUST Visual Analytics and Data Lab **Advisor: Prof. Huamin Qu**

Emotion Analysis System for Classroom Videos **(TVCG'20, VIS'21)**

- Designed a computer-vision-based platform to visualize and analyze student's emotions in classroom videos
- Developed a pipeline to extract emotions from videos using face detection, recognition, and expression recognition
- Proposed an optimal matching algorithm to significantly improves the accuracy of one-shot face recognition

Publications & Works

[1] **Yanbang Wang,** Pan Li, Chongyang Bai, Jure Leskovec. TEDIC: Neural Modeling of Behavioral Patterns in Dynamic Social Interaction Networks. The Web Conference 2021 (**WWW'21**). (to appear, with unanimous acceptance)
[project] [preprint]

[2] **Yanbang Wang**, Yen-Yu Chang, Yunyu Liu, Jure Leskovec, Pan Li, Inductive Representation Learning in Temporal Networks via Causal Anonymous Walks. International Conference on Learning Representations 2021 (**ICLR'21**). high review scores, likely acceptance).
[project] [preprint]

[3] Pan Li, **Yanbang Wang**, Hongwei Wang, Jure Leskovec, Distance Encoding: Design Provably More Powerful Neural Networks for Graph Representation Learning. Neural Information Processing Systems 2020 (**NeurIPS'20**).
[project] [paper] [slides]

[4] **Yanbang Wang**, Pan Li, Chongyang Bai, V.S. Subrahmanian, Jure Leskovec, Generic Representation Learning for Dynamic Social Interaction, KDD Machine learning on Graph Workshop 2020 (**KDD MLG'20**). *Spotlight.*
[paper] [demo]

[5] **Yanbang Wang,** Nancy Law, Erik Hemberg, and Una-May O'Reilly. Using Detailed Access Trajectories for Learning Behavior Analysis. International Conference on Learning Analytics & Knowledge 2019 (**LAK'19**). *Oral.*
[project][paper] [slides]

[6] **Yanbang Wang,** Carl Yang, Weixin Liang, Pan Li, Jiawei Han. Collective Text Classification Using Topic-enhanced Latent Textual Links. (under review)
[manuscript]

[7] Mucong Ding, **Yanbang Wang,** Erik Hemberg, and Una-May O'Reilly. Transfer Learning using Representation Learning in Massive Online Open Courses, International Conference on Learning Analytics & Knowledge 2019 (**LAK'19**). *Oral.*
[project][paper]

[8] **Yanbang Wang,** Bijia Chen, Cameron Campbell, A Graph-based Method for Estimating Potential for Career Advancement from Incomplete Data, Social Science History Association Annual Meeting 2020 (**SSHA'20**).
[paper]

[9] Haoteng Yin, **Yanbang Wang**, Pan Li, Revisit Graph Neural Networks and Distance Encoding in a Practical View, AAAI Deep Learning on Graph Workshop 2021 (**AAAI DLG'21**).
[paper]

[10] Haipeng Zeng, Xinhuan Shu, **Yanbang Wang,** Yong Wang, Ting-Chuen Pong, Huamin Qu, EmotionCues: Emotion-Oriented Visual Summarization of Classroom Videos, IEEE Transactions on Visualization and Computer Graphics 2019. Jointly in IEEE Visualization Conference 2020 (**TVCG'20, VIS'21**).
[project] [paper] [media coverage]

Academic Services

Program Committee: **IJCAI**
Reviewer: **IJCAI, KDD, WSDM**

Invited Talks

- [08/2020] Generic Representation Learning for Dynamic Social Interaction, KDD'20 Machine Learning on Graph Workshop
- [08/2020] Collective Text Classification Using Semantic Links, UIUC Data Mining Group Meeting
- [06/2020] A Network-based Method for Estimating Potential for Career Advancement from Incomplete Data, Social Science and History Association Annual Meeting. Washington D.C., US
- [08/2019] *(Keynote)* Graphical Modeling of Chinese History Data. Central China Normal University, Wuhan, China
- [03/2019] Machine Learning Techniques in MOOCs. International Learning Analytics & Knowledge Conference. Phoenix, US
- [08/2018] AI-powered Analytics for Learning Behaviors. MIT (CSAIL) ALFA Group Meeting

Selected Honors and Awards

- HKUST Academic Achievement Medal 2019 (top 1% GPA) [website]
- HKUST Outstanding Graduate, the Class of 2015
- University's Scholarship for Undergraduate, top tier (1%) for twice (~15,000 USD)
- MIT Research Exchange Program, top 2 undergraduate students for MIT CSAIL placement
- Undergraduate Research Travel Grant (4/2500)
- Hong Kong SAR Government Reaching Out Award, awarding rate: 2%
- All-Semester Dean's Lists, 7 times in total except one semester for exchange (2015-2019)
- HKMA IT Management Club Scholarship
- 1st Prize, National Mathematical Olympiad, Guangdong, China
- 1st Prize, National Physics Olympiad, Guangdong, China

Research-related Courses (all A / A+)

Graph Theory, Stochastics Modeling, Matrix Computation, Deep Learning, Real Analysis, Linear Algebra, Deep Learning for NLP, Probability, Statistics, Statistical Machine Learning, Mathematics for Machine Learning, Computer Graphics, Algorithm Analysis & Design, Discrete Mathematics, Computer Network, Data Manipulation

Skills

- Language: English (TOEFL: 114), Chinese (Mandarin, Cantonese)
- Programming Language: Python, C/C++, Shell, R, Java, MATLAB
- Deep Learning Libraries: PyTorch, Torch Geometric, Tensorflow

Extracurricular Activities

- Member of HKUST Basketball Team (2015-2016), Table Tennis Team (2016-2017)
- President of High School Student Union of the Class of 2015 (2012-2015)