

Xian Teng

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Research Interest

I am interested in data science, network science and machine learning. My work has focused on large-scale heterogeneous behavioral and network data, I use computational approaches such as network analysis and modeling, text mining and deep learning methods, to study dynamic patterns, to identify anomalous phenomena and to forecast future progression etc.

Education

University of Pittsburgh

PH.D. IN INFORMATION SCIENCE

- Advisor: Dr. Yu-Ru Lin, PITT Computational Social Dynamics Lab
- Cum. GPA: 3.94/4.00

Pittsburgh, USA

May 2016 – Apr 2021

Beihang University (BUAA)

MASTER IN MATHEMATICS, BACHELOR IN AUTOMATION SCIENCE

- Advisor: Dr. Zhiming Zheng, School of Mathematics and System Sciences
- Cum. Master GPA: 3.78/4.00, Cum. Bachelor GPA: 3.70/4.00

Beijing, China

Sep 2008 – Jun 2015

Experience

Facebook, Inc.

SOFTWARE ENGINEERING

- Supervisor: David Vickrey
- Project: Understanding the Patterns of Page Popularity Dynamics in Facebook Platform
- Study the dynamic patterns of pages' popularity (described by viewport views) from both system level and individual level; Understand the relationship between page popularity and page quality signals, which can be used for fighting against low-quality pages (spams, clickbait etc).

Menlo Park, USA

May 2019 – Aug 2019

Samsung Research America

RESEARCH INTERN

- Mentor: Rui Chen, Samsung Pay Data Science Group
- Project: Detection, Tracking and Prediction of User Intent by Mining Online Browsing Data

Mountain View, USA

May 2018 – Aug 2018

City College of New York

RESEARCH INTERN

- Advisor: Hernan Makse, Complex Networks and Data Science Lab, Levich Institute
- Project: Identifying Influential Spreaders in Spreading Dynamics in Large-Scale Networks

New York City, USA

Jun 2015 – Apr 2016

Research Project

Battling COVID-19 Misinformation via Characterizing Susceptible Users

PITT COMPUTATIONAL SOCIAL DYNAMICS LAB

- Using a 6-month longitudinal user panel on Twitter collected from a geopolitically diverse context in US, we distinguish different types of users, ranging from social bots to humans with various level of engagement with COVID-related misinformation;
- Identify users' online features that correlate with their susceptibility to COVID-19 misinformation;
- Using an interpretable deep learning model, we demonstrate a feasible solution to efficiently predict users' transient susceptibility solely based on their short-term news consumption and exposure from their networks.

Pittsburgh, USA

Apr 2020 – Dec 2020

Disease Progression Modeling and Forecasting

Pittsburgh, USA

PITT COMPUTATIONAL SOCIAL DYNAMICS LAB

Dec 2017 – Dec 2018

- Model sequential medical data of patients to provide early and accurate prognosis for progressive diseases, including Alzheimer's disease and Parkinson's disease;
- Proposed a novel approach that captures the temporal uncertainties in patients' disease progressions and offers multiple predictions about a patient's future health with a certain level of confidence.

Anomaly Discovery in Dynamic Networks

Pittsburgh, UAS

PITT COMPUTATIONAL SOCIAL DYNAMICS LAB

Nov 2016 – Dec 2017

- Identify anomalous situations in complex networked systems that are composed of lots of interdependent and time-varying components;
- Develop novel unsupervised machine learning methods, which not only deliver warning signals about anomalous situations, but also provide transparency about how the anomalies deviate from normalcy for designing timely and appropriate intervention.

Identification of Influential Spreaders in Networks

New York City, USA

LEVICH INSTITUTE, CITY COLLEGE OF NEW YORK

Jun 2015 – Apr 2016

- Find the most influential entities in a network whose elimination can induce network collapse, or whose activation might promote maximal spread of information, namely optimal Collective Influence (CI);
- Conduct social media data analysis to validate CI's efficiency against several heuristic algorithms e.g., PageRank, adaptive high-degree, K-shell method.

Collective Behaviors & Social Wealth in Public Goods Games

Beijing, China

SCHOOL OF MATHEMATICS AND SYSTEMS SCIENCE, BEIHANG UNIVERSITY

Sep 2012 – Sep 2013

- Investigate individuals' competitive and cooperation behaviors in public goods games when they are set in structured networks to indicate their limited relationships with neighbors;
- Study the wealth distribution of structured population and reduce social inequality.

Alpha Magnetic Spectrometer 02 Experiment

Genève, Switzerland

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (CERN)

Mar 2012 – Jun 2012

- Develop computational and statistical techniques for particle discrimination, i.e. to distinguish positrons against protons with relatively low deviations.

Publication

CONFERENCE

Xian Teng, Muheng Yan, Ali Mert Ertugrul, Yu-Ru Lin. "Deep into Hypersphere: Robust and Unsupervised Anomaly Discovery in Dynamic Networks." Proceeding of the 27th International Joint Conference on Artificial Intelligence (**IJCAI 2018**) [accept rate 20%].

Xian Teng, Yu-Ru Lin, Xidao Wen. "Anomaly Detection in Dynamic Networks using Multi-view Time-series Hypersphere Learning." ACM International Conference on Information and Knowledge Management (**CIKM 2017**) [accept rate 20%].

Nan Cao, Chaoguang Lin, Qiuhan Zhu, Yu-Ru Lin, **Xian Teng**, Xidao Wen. "Voila: Visual Anomaly Detection and Monitoring with Streaming Spatiotemporal Data." IEEE Symposium on Visual Analytics Science and Technology (**VAST 2017**).

JOURNAL

Sen Pei, **Xian Teng**, Paul Lewis, Jeffrey Shaman. "Optimizing Respiratory Virus Surveillance Networks using Uncertainty Propagation." Nature Communication 2020.

Xian Teng, Sen Pei, Yu-Ru Lin. "STOCast: Stochastic Disease Forecasting with Progression Uncertainty." IEEE Journal of Biomedical and Health Informatics 2020.

Sen Pei, **Xian Teng**, Jeffrey Shaman, Flaviano Morone, Hernan A Makse. "Efficient Collective Influence Maximization in Cascading Processes with First-order Transitions." Scientific Reports 7, 45240 (2017).

Xian Teng, Sen Pei, Flaviano Morone, Hernan A Makse. "Collective Influence of Multiple Spreaders Evaluated by Tracing Real Information Flow in Large-Scale Social Networks." Scientific Reports 6, 36043 (2016).

Shaoting Tang, **Xian Teng**, Sen Pei, Shu Yan, Zhiming Zheng. "Identification of Highly Susceptible Individuals in Complex Networks." Physica A: Statistical Mechanics and its Applications 432, 363-372 (2015).

Xian Teng, Shu Yan, Shaoting Tang, Sen Pei, Weihua Li, Zhiming Zheng. “Individual Behavior and Social Wealth in the Spatial Public Goods Game.” *Physica A: Statistical Mechanics and its Applications* 402, 141-149 (2014).

Weihua Li, Shaoting Tang, Sen Pei, Shu Yan, Shaoting Jiang, **Xian Teng**, Zhiming Zheng. “The Rumor Diffusion Process with Emerging Independent Spreaders in Complex Networks.” *Physica A: Statistical Mechanics and its Applications* 397, 121-128 (2014).

POSTER & OTHERS

Xian Teng, Sen Pei, Yu-Ru Lin. “Stochastic Progression Forecasting for Alzheimer’s and Parkinson’s Diseases.” Modeling the World’s Systems 2019, DC, USA, May 2019 (Poster Section).

Xian Teng, Yu-Ru Lin, Xidao Wen. “Anomaly Detection in Dynamic Networks using Multi-view Time-series Hypersphere Learning.” SIAM Workshop on Network Science, Pittsburgh, USA, July 2017 (Poster Section).

Shu Yan, Shaoting Tang, Sen Pei, Shijin Jiang, Weihua Li, **Xian Teng**, Zhiming Zheng. “Resilience to Intentional Attacks of Complex Networks.” *Applied Mechanics and Materials* 421, 647-651 (2013).

Shijin Jiang, Shaoting Tang, Sen Pei, Shu Yan, Weihua Li, **Xian Teng**, Zhiming Zheng. “Multi-State Coupling Entropy of Interactive Dynamic Process on Scale-Free Network.” *Applied Mechanics and Materials* 421, 711-716 (2013).

Talks & Presentations

2020 *Characterizing User Susceptibility to COVID-19 Misinformation on Twitter* Politics and Computational Social Science and Political Networks Conference 2020 (PaCSS & PolNet 2020), Virtual Event, August 10-14, 2020.

2019 *Stochastic Progression Forecasting for Alzheimer’s and Parkinson’s Diseases*. Modeling the World’s Systems Conference, Washington D.C., USA, May 13-15, 2019.

2018 *Deep into Hypersphere: Robust and Unsupervised Anomaly Discovery in Dynamic Networks*. International Joint Conference on Artificial Intelligence & European Conference on Artificial Intelligence (IJCAI-ECAI), Stockholm, Sweden, July 13-19, 2018.

2018 *Anomaly Detection in Dynamic Networked Systems*. Sky Talks Series, School of Computing and Information, University of Pittsburgh, Pittsburgh, USA, March 21, 2018

2017 *Anomaly Detection in Dynamic Networks using Multi-View Time-Series Hypersphere Learning*. International Conference on Information and Knowledge Management (CIKM), Singapore, November 6-10, 2017.

2017 *Anomaly Detection in Dynamic Networks*. Dalian University of Technology, Dalian, China, June 16, 2017.

Honors & Awards

2018 Grace Hopper Celebration (GHC) Scholarship

2018 Graduate Student Travel Award, University of Pittsburgh

2017 US NSF and SIGWEB Travel Award

2017 SIGIR Student Travel Grant

2017 Graduate Student Travel Award, University of Pittsburgh

2014 National Scholarship for Graduate Students, Beihang University (Top 2%)

2012 First Prize Scholarship for Graduate Students, Beihang University (Top 5%)

Academic Services

REVIEWER

- Palgrave Communication
- Neural Computing and Application
- Journal of Statistical Mechanics: Theory and Experiment
- Physica A: Statistical Mechanics and its Applications
- International Conference on Information and Knowledge Management
- Jordadian Journal of Computers and Information Technology

PROGRAM COMMITTEE

- International Conference on Social Informatics (SocInfo'19, SocInfo'18, SocInfo'17)
- Annual International Conference on Computational Social Science (IC2S2'18)

Skills

DOMAINS: Machine Learning • Data Mining • Network Science • Deep Learning

PROGRAMMING: Python • C/C++ • Java • Matlab • R • JavaScript • MySQL • CSS • D3

OPEN SOURCES: TensorFlow • Pyspark • Pandas • Keras • Numpy • scikit-learn