Xian Teng

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Research Interest

My research lies in the fields of data science, network science, computational social science, and machine learning. I am motivated to understand dynamics and heterogeneity in complex social systems, and to support data-driven decisions for social good. I use methods including network analysis and modeling, statistical analysis and causal inference, data mining and machine learning techniques.

Education

University of Pittsburgh   *Pittsburgh, USA*
PH.D. IN INFORMATION SCIENCE   *May 2016 – Now*
- Advisor: Dr. Yu-Ru Lin, PITT Computational Social Dynamics Lab
- Cum. GPA: 3.94/4.00

Beihang University (BUAA)   *Beijing, China*
MASTER IN MATHEMATICS, BACHELOR IN AUTOMATION SCIENCE   *Sep 2008 - Jun 2015*
- Advisor: Dr. Zhiming Zheng, School of Mathematics and System Sciences
- Cum. Master GPA: 3.78/4.00, Cum. Bachelor GPA: 3.70/4.00

Experience

Facebook, Inc.   *Menlo Park, USA*
SOFTWARE ENGINEERING   *May 2019 - Aug 2019*
- 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).

Samsung Research America   *Mountain View, USA*
RESEARCH INTERN   *May 2018 – Aug 2018*
- Mentor: Rui Chen, Samsung Pay Data Science Group
- Project: Detection, Tracking and Prediction of User Intent by Mining Online Browsing Data

The City College of New York   *New York City, USA*
RESEARCH INTERN   *Jun 2015 – Apr 2016*
- Advisor: Hernan Makse, Complex Networks and Data Science Lab, Levich Institute
- Project: Identifying Influential Spreaders in Spreading Dynamics in Large-Scale Networks

Publication

CONFERENCE & JOURNAL

Xian Teng, Yu-Ru Lin, Wen-Ting Chung, Ang Li, Adriana Kovashka. "Characterizing User Susceptibility to COVID-19 Misinformation on Twitter" The International AAAI Conference on Web and Social Media (**ICWSM 2022**) [Accepted].

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.

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**).

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).

Research Project

Assessing the Offline Risk of COVID-19 from Online Misinformation in the United States   *Pittsburgh, USA*

PITT COMPUTATIONAL SOCIAL DYNAMICS LAB   *Jan 2020 - Now*
- Study the risk of social media misinformation on mobility reduction in the United States in 2020;
- Combine daily, county-/state-level data on misinformation engagement from over 242 million tweets, movement changes across different places (e.g., recreation, grocery, and workplaces), non-pharmaceutical interventions (NPIs), and COVID-19 confirmed cases and deaths, along with county-/state-level census data on population demographics and presidential election results;
- Design a causal analysis framework to answer question: whether online misinformation exposure affect people's compliance with social distancing offline (and to what extent)?

Battling COVID-19 Misinformation via Characterizing Susceptible Users   *Pittsburgh, USA*

PITT COMPUTATIONAL SOCIAL DYNAMICS LAB   *Apr 2020 – Dec 2020*
- 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.

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.

Talks & Presentations

2021
Assessing the Offline Risk of COVID-19 from Online Misinformation in the United States Politics and Computational Social Science 2021 (PaCSS), Virtual Event, August 9-13, 2021.

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

ORGANIZER
- PittCSS Computational Social Science seminar 2021-2022
- PICSO lab seminar series 2016-2019

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)

Teaching

Teaching assistant - Data Mining (2017 Spring, 2018 Spring/Fall, 2020 Fall, 2021 Fall)

Teaching assistant - Data Analysis (2021 Fall)

Teaching assistant - Introduction to Information System (2016 Fall)

Teaching assistant - Information System (2016 Fall)