

Songgaojun (Amy) Deng

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PERSONAL STATEMENT

I am a PhD candidate in the Department of Computer Science at Stevens Institute of Technology. My research interests are **machine learning** and **data mining** motivated by real-world problems in social informatics and health informatics. My research focuses on developing deep graph learning models that capture spatio-temporal, dynamic and interpretable patterns.

EDUCATION

Stevens Institute of Technology

Ph.D. Candidate in Computer Science; GPA: 4.0/4.0

Hoboken, NJ

Aug 2018 - May 2022 (Expected)

Advisor: [Dr. Yue Ning](#)

Relevant Coursework: Deep Learning, Machine Learning, Intro Text Mining/Nat. Lang Proc, Adv. Algorithm Dsgn & Implement

Beijing Institute of Technology

Master of Engineering in Software Engineering; GPA: 4.0/4.0

Beijing, China

Sep 2016 - May 2018

Thesis: Evolutionary Neural Network Algorithm Based on Triplet Nucleotide Coding

China University of Mining and Technology

Bachelor of Science in Electronic Information Science and Technology; GPA: 3.7/4.0

Xuzhou, China

Sep 2012 - May 2016

PUBLICATIONS

- **Deng, S.**, Rangwala, H. and Ning, Y., 2022, August. "Robust Event Forecasting with Spatiotemporal Confounder Learning". In Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD).
- **Deng, S.**, Rangwala, H. and Ning, Y., 2021, November. "Understanding Event Predictions via Contextualized Multilevel Feature Learning". In Proceedings of the 21st ACM International Conference on Information and Knowledge Management (CIKM).
- **Deng, S.**, Wang, S., Rangwala, H., Wang, L. and Ning, Y., 2020, October. "Cola-GNN: Cross-location Attention based Graph Neural Networks for Long-term ILI Prediction". In Proceedings of the 20th ACM International Conference on Information and Knowledge Management (CIKM).
- **Deng, S.**, Rangwala, H. and Ning, Y., 2020, August. "Dynamic Knowledge Graph based Multi-Event Forecasting". In Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (pp. 1585-1595)
- **Deng, S.**, Rangwala, H. and Ning, Y., 2019, July. "Learning Dynamic Context Graphs for Predicting Social Events". In Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (pp. 1007-1016).
- Yang, X., **Deng, S.**, Ji, M., Zhao, J. and Zheng, W., 2018. "Neural Network Evolving Algorithm Based on the Triplet Codon Encoding Method". *Genes*, 9(12), p.626.
- Yang, X., Liu, G., **Deng, S.**, Wei, Z., He, H., Shang, Y. and Deng, N., 2019. "Exploration of a mechanism to form bionic, self-growing and self-organizing neural network". *Artificial Intelligence Review*, 52(1), pp.585-605.

RESEARCH PROJECTS

- **Causality Enhanced Societal Event Forecasting With Heterogeneous Graph Learning:** (preprint) 2022
 - Introduced a method to discover topics that have a causal effect on future events and proposed a causality-enhanced heterogeneous graph learning framework where topics, documents, and words are represented as nodes.
- **Robust Event Forecasting with Spatiotemporal Confounder Learning:** 2021
 - Introduced a robust deep learning framework that includes individual treatment effect (ITE) estimation for event prediction.
- **Understanding Event Predictions via Contextualized Multilevel Feature Learning:** 2021
 - Proposed a contextualized multilevel feature learning framework, for interpretable temporal event prediction.
- **Dynamic Knowledge Graph based Multi-Event Forecasting:** 2019
 - Proposed a temporal graph learning method with heterogeneous data fusion for predicting concurrent events of multiple types and inferring multiple candidate actors simultaneously.
- **Forecasting Long-term Spatio-Temporal Epidemic Outbreaks:** 2019
 - Studied a cross-location attention based graph neural network for learning multivariate time series embeddings and location aware attentions, which achieves the state-of-the-art prediction performance in long lead time settings (e.g. 15 weeks).
- **Learning Dynamic Context Graphs for Predicting Social Events:** 2018

- Presented a novel graph convolutional network for predicting future events. Designed a temporal encoding module to capture temporal dependencies and event context graphs.
- **Evolutionary Neural Network Algorithm Based on Triplet Nucleotide Coding:** (prior to my PhD studies) 2018
 - Proposed a new evolutionary heuristic approach inspired by biological DNA genetic information and evolutionary mechanisms, which uses a triple nucleotide coding scheme to encode a neural network and a set of genetic operators to search for global optimal solutions.
- **Face Detection Using Multi-Task Convolutional Neural Networks:** (course project) 2017
 - Implemented three Concatenated Convolutional Neural Networks (CNNs) to predict face and landmark locations in a coarse-to-fine manner.

EXPERIENCE

Yahoo Research (remote) Sunnyvale, CA
Research Engineer Intern, Targeting Science Team June 2020 - Aug. 2020

- **Applied Machine Learning:** Developed novel unsupervised clustering methods for cookieless ads targeting by studying the correlations between users' behaviors and appearances of their identities.

Institute of Electronics, Chinese Academy of Sciences Suzhou, China
Research & Development Intern July 2015 - Mar 2016

- **Distributed System:** Participated in distributed system testing, operation, and maintenance work.
- **Visualization:** Implemented data visualization for social network mining.

SKILLS

- **Programming languages:** Python, SQL, C++, PHP, JavaScript, Scala
- **Libraries:** PyTorch, Keras, DGL, Scikit-Learn, NLTK, Numpy, Pandas

ADDITIONAL EXPERIENCE & ACHIEVEMENTS

- 2022 Recipient of the Excellence in Graduate Research at Stevens.
- Received Stevens Excellence Doctoral Fellowship (2021-2022).
- Speaker of the tutorial *Explainable AI for Societal Event Predictions: Foundations, Methods, and Applications* at AAAI 2021.
- Departmental nomination for Microsoft PhD Fellowship 2021.
- Oral presentation of work *Cola-GNN: Cross-location Attention based Graph Neural Networks for Long-term ILI Prediction* at CIKM 2020.
- Oral presentation of work *Dynamic Knowledge Graph based Multi-Event Forecasting* at KDD 2020.
- Received KDD 2019 and 2020 student travel award.
- Received Women in Machine Learning (WiML @ NeurIPS 2019) travel grant.
- Oral presentation of work *Learning Dynamic Context Graphs for Predicting Social Events* at KDD 2019.
- Received travel grant to attend CRA Women in Computing Workshop 2019.

EXTERNAL SERVICES

- **Student Reviewer/Subreviewer:** WWW, IEEE BigData, ICML, NeurIPS, ICLR, AAAI, IJCAI, KDD, SDM, PAKDD, WiML, ASONAM
- **Program Committee Member:** AAAI(2022), CIKM(2022)
- **Journal Reviewer:** PeerJ, IEEE Transactions on Image Processing, Cybernetics and Systems, ACM TIST