Minghe Zhang

Website: minghe0zhang.github.io
Email: mzhang388@gatech.edu
LinkedIn: minghe-zhang-69378713b
GitHub: github.com/Minghe0Zhang

Education

Georgia Institute of Technology — Atlanta, Georgia, USA
Ph.D. in Machine Learning — 2019–Current

- Department: H. Milton Stewart School of Industrial and Systems Engineering (ISYE)
- Adviosr: Dr. Yao Xie

Georgia Institute of Technology — Atlanta, Georgia, USA
M.S. in Electrical and Computer Engineering — 2017–2019

- Thesis: "Online Subspace Tracking for Community Change Detection"

Tsinghua University — Beijing, China
B.S. in Electronic Engineering — 2013–2017

- Thesis: "Hardware Acceleration on Image Recognition"

Research Experience

Georgia Institute of Technology — Atlanta, GA, USA
Research Assistant supervised by Dr. Yao Xie — Spring 2020 - Fall 2020

- Spatial-Temporal Mutually Interactive Process Models for Solar Radiation Anomaly Events
- Built a generative spatial-temporal Bernoulli model to fit the extracted abnormal events in solar radiation observations
- Came up with a online learning algorithm to get the threshold for predicting future abnormal events, which leads to much better accuracy under non-stationary cases

Georgia Institute of Technology — Atlanta, GA, USA
Research Assistant supervised by Dr. Yao Xie — Spring 2020

- Deep Attention Point Processes with Neural Spectrum Fourier Kernel
- Created a novel attention-based model for discrete event data to capture complex non-linear temporal dependence structure
- Used attention mechanism and incorporate it into the conditional intensity function of the point processes
- Introduced a novel score function using Fourier kernel embedding, whose spectrum is represented using neural networks

Georgia Institute of Technology — Atlanta, GA, USA
Research Assistant supervised by Dr. Yao Xie — Fall 2018 - Fall 2019

- Spectral CUSUM for Online Network Structure Change Detection
- Designed a Spectral CUSUM procedure to detect community change in dynamic graphs
- Used a Gaussian model to represent the graph structure, and got the closed-form for the Expected Detection Delay (EDD) and Average Run Length (ARL)
- Already published a paper on ICASSP and currently working on a more detailed journal version

University of Southern California (USC) — Los Angeles, CA, USA
Research Assistant supervised by Dr. Peter Beerel — Summer 2016

- Retiming of Two-Phase Latch-Based Resilient Circuits

– Proposed a new network-simplex-based retiming method, which was used for two-phase latch-based resilient circuits, to reduce the overhead of the combination of normal and error detecting latches

Tsinghua University Beijing, China
Research Assistant supervised by Dr. Shouyi Yin Fall 2016 – Fall 2017

– Data Mining and Machine Learning in Vehicle Systems
– Used Tensorflow to study different driving styles based on the filtered data, which allowed the software to distinguish whether the car is turning around, accelerating, coasting, etc
– Applied the Binary Neural Network (BNN) methods to Tensorflow to accelerate the study process and computation speed

Publications

[2] **M. Zhang**, L. Xie, and Y. Xie, "Online community detection by spectral cusum", in *ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2020, pp. 3402–3406.

[4] S. Zhu, R. Ding, **M. Zhang**, P. Van Hentenryck, and Y. Xie, "Spatio-temporal point processes with attention for traffic congestion event modeling", *IEEE Transactions on Intelligent Transportation Systems*, 2020.

[8] H. Cheng, H.-L. Wang, **M. Zhang**, D. Hand, and P. A. Beerel, "Automatic retiming of two-phase latch-based resilient circuits", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 38, no. 7, pp. 1305–1316, 2018.

[9] H.-L. Wang, **M. Zhang**, and P. A. Beerel, "Retiming of two-phase latch-based resilient circuits", in *Proceedings of the 54th Annual Design Automation Conference 2017*, 2017, pp. 1–6.

Preprints

[1] S. Wei, S. Zhu, **M. Zhang**, and Y. Xie, "Goodness-of-fit test for self-exciting processes", *arXiv preprint arXiv:2006.09439*, 2020.

[3] **M. Zhang**, C. Xu, and Y. Xie, "Spatial-temporal mutually interactive process models for solar radiation anomaly events", *In Preparation*, 2020.

[5] S. Zhu, L. Xie, **M. Zhang**, R. Gao, and Y. Xie, "Distributionally robust k-nearest neighbors for few-shot learning", *arXiv preprint arXiv:2006.04004*, 2020.

[6] S. Zhu, S. Yuchi, **M. Zhang**, and Y. Xie, "Sequential adversarial anomaly detection for dependent events", *arXiv preprint arXiv:1910.09161*, 2020.

[7] S. Zhu, **M. Zhang**, R. Ding, and Y. Xie, "Deep attention point processes with neural spectrum fourier kernel", *arXiv preprint arXiv:2002.07281*, 2020.

Work Experience

Argonne National Lab Chicago, IL, USA
Research Assistant Fall 2020

– Transferable Reinforcement Learning for solving Combinatorial Optimizations
– Currently working on using a Graph Neural Network structure to embed the network for better generalization ability

SF Express Shenzhen, Guangzhou, China
Machine Learning and Artificial Intelligence Engineer Summer 2018

- Built a recommendation system based on logistic networks between companies
- Implemented change point detection to find out the fluctuation of the employers' salaries
- Used multiple machine learning techniques such like SVM, random forest and deep neural networks to decide whether added-value insurance is needed for a delivery

Teaching

- **Teaching Assistant** at Georgia Tech Summer 2020
  Computational Data Analysis / Machine Learning I (ISYE/CSE 6740)
- **Teaching Assistant** at Georgia Tech Fall 2019, Spring 2020
  Basic Statistical Methods (ISYE 3030)

Skills

- **Programming:** C/C++, java, Python, Cuda, Perl, JavaScript, HTML, CSS, MATLAB, R, Pspice;
- **Office Applications:** Microsoft Office, Lucid Chart;
- **Deep Learning:** PyTorch, TensorFlow, scikit-learn;
- **Mathematics:** Stochastic Process, Statistical Machine Learning, Convex Optimization, etc.

Languages

- **English:** Professional working proficiency
  - **GRE:** Verbal - 161 (88th percentile) Quantitative - 170 (97th percentile) Analytical Writing - 4.0
  - **TOEFL:** Total 104 (Reading 28, Listening 25, Speaking 22, Writing 29)
- **Chinese:** Native proficiency