CHUNHENG JIANG

Troy NY, 12180 +1 (518) 960-7682 jiangchunheng@gmail.com jiangch horsehour horsehour.com

EDUCATION

Rensselaer Polytechnic Institute (RPI), Troy NY, USA
Ph.D. in Computer Science, *Aug 2016 – May 2022*
M.S. in Computer Science, *Aug 2016 – May 2018*

Southwest Jiaotong University, Chengdu, China
M.S. in Applied Mathematics, *Sep 2011 – Jul 2014*

WORK EXPERIENCE

IBM Thomas J. Watson Research Center, Yorktown Heights, NY
Research Summer Intern, *Jun – Aug 2020*

Antusuoji Network Technology Co., Ltd., Chengdu, China
Software Engineer, *Jul 2014 – Mar 2016*

SKILLS / COURSES / SERVICE

Languages: Python, Java, C/C++, Matlab, MPI, HTML, LaTeX

Operating Systems: Linux, OS X, Windows

Databases: MySQL, SQLite, MongoDB

Softwares: TensorFlow, PyTorch, Keras, Pandas, Scikit-Learn, XGBoost, LightGBM, AWS/EC2, SLURM, Git

Courses: Operating Systems, Data Structure, Parallel Computing, Data Mining, Machine Learning from Data, Randomized Algorithms, Advanced Algebra, Probability Theory & Mathematical Statistics, Operational Theory, Numerical Analysis, Differential Equation

Reviewer: ICML, WWW, NetSci, Complex Networks, NERCCS

—— SELECTED PROJECTS ——

- *Aug 2020 – Present*: **Dynamical System View of Neural Network Training**, RPI-IBM AIRC ⬍ **Research Extern** ⬍ TensorFlow
  - Built a novel graph representation for various neural architectures (e.g., ResNet, DenseNet, MobileNet, VGG, etc.)
  - Derived approximated training dynamics to speed-up neural network training and neural architecture search (NAS)
  - Identified predictive graph measures (e.g., resilience, shortest path length) of neural architectures' performance
  - Achieved 10 $\sim$ 70% relative improvement over the best baseline w.r.t ranking of neural networks
  - ★ *Related Skills: SGD, Transfer Learning, Neural Architecture Search, Learning Curve Prediction*
- *Jun – Aug 2020*: **Acoustic Environment Transfer**, IBM ⬍ **Research Summer Intern** ⬍ Python, TensorFlow, Keras, SLURM
  - Extended neural style transfer techniques to the synthesis of audio with desired environmental sounds (UrbanSound8K)
  - Developed a new metric to evaluate various acoustic style transfer backbone models (e.g., Ulyanov, Mital, VGGish and SoundNet)
  - Generated augmented data with diverse environmental sound textures to increase the robustness of audio classifiers
  - ★ *Related Skills: AutoEncoder, Audio Classification, FFT, Griffin-Lim Algorithm, Data Augmentation*
- *Aug 2018 – May 2020*: **Mean-Field Approaches for Network Inference**, RPI ⬍ **Research Assistant** ⬍ Python, Scikit-Learn
  - Developed a set of mean-field approaches to infer various incomplete networks (e.g., social, ecology, epidemic, regulatory)
  - Recovered true nonlinear dynamics and full nodal degrees with incomplete topology and equilibrium state information
  - Designed a heuristic optimization algorithm based on our topology inference approach to solve K-SUM problem
  - Solved large-scale nonlinear dynamical systems in parallel (10$\times$ speedup *w/* MPI/SLURM)
  - ★ *Related Skills: Graph Sampling, Link Prediction, Mean-Field, Optimization, Parallel Computing*
- *May – Aug 2017*: **Multi-round Winner Determination**, RPI ⬍ **Research Assistant** ⬍ Python, Java, TensorFlow, Keras
  - Devised heuristic strategies (sampling, caching, pruning) to efficiently identify all tied winners in voting
  - Developed reinforcement learning models to simulate voting procedures and improve the search efficiency
  - Reduced run time by 50 $\sim$ 80% relative to the baseline DFS approach
  - ★ *Related Skills: Voting, DFS, Pruning, Priority Queue, Reinforcement Learning*

—— SELECTED PUBLICATIONS ——

Jiang, C., Pedapati, T., Chen, P.-Y., Sun, Y. & Gao, J. Neural Capacitance: A new perspective of neural network selection via edge dynamics. Preprint at `https://arxiv.org/abs/2201.04194` (2022)

Jiang, C., Szymanski, B. K., Lian, J., Havlin, S. & Gao, J. Nuclear reaction network unveils novel reaction patterns based on stellar energies. *New J. Phys.* 23, 083035 (2021)

Niu, X., **Jiang, C.**, Gao, J., Korniss, G. & Szymanski, B. K. From data to complex network control of airline flight delays. *Sci. Rep.* 11, 18715 (2021)

Niu, X., Brissette, C., **Jiang, C.**, Gao, J., Korniss, G. & Szymanski, B. K. Heuristic assessment of choices for risk network control. *Sci. Rep.*, 11, 7645 (2021)

Jiang, C., Gao, J. & Magdon-Ismail, M. Inferring degrees from incomplete networks and nonlinear dynamics. In *Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence*, 3307 – 3313 (IJCAI, 2020)

Jiang, C., Gao, J. & Magdon-Ismail, M. True nonlinear dynamics from incomplete networks. In *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 34, 131 – 138 (AAAI, 2020)

Jiang, C., Ahn, J.-w. & Desai, N. Acoustic environment transfer for distributed systems. In *SEC-2020: The 5th IEEE/ACM Symposium on Edge Computing*, (IEEE, 2020)

Wang, J., Sikdar, S., Shepherd, T., Zhao, Z., **Jiang, C.** & Xia L. Practical algorithms for multi-stage voting rules with parallel universes tiebreaking. In *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 33, 2189–2196 (AAAI, 2019)

Jiang, C., Sikdar, S., Wang, J., Xia, L. & Zhao, Z. Practical algorithms for computing STV and other multi-round voting rules. In *EXPLORE-2017: The 4th Workshop on Exploring Beyond the Worst Case in Computational Social Choice*, (2017)

Jiang, C. & Lin, W. DEARank: A Data-envelopment-analysis-based Ranking Method. *Mach. Learn.*, 101, 415 – 435 (2015)