

Jing Liu (Ph.D.)

<https://jaymiliu.github.io/JingLiu/>

SUMMARY	Skilled in data analysis, supervised learning, and deep learning with TensorFlow. Proficient in Pandas, Numpy, Matplotlib, Scikit-learn, and SQL. Equipped with basic knowledge in construction project management and experiences in working with construction companies.	
STRENGTHS	Technical Skills: Machine Learning (scikit-learn), Deep Learning (TensorFlow), Graph Neural Network, Pandas, Numpy, Matplotlib, NLTK Programming Languages: Python, R, SQL, C#, MATLAB	
EXPERIENCE	Data Scientist, eCommerce, Walmart Labs -	Mar. 2020 to Present Reston, VA, US
	Research Associate, Deep Learning and Machine Learning Area Center for Secure Information Systems, George Mason University <i>Advisor: Dr. Noseong Park</i>	
	Aug. 2018 to Aug. 2019 Fairfax, VA, US	
	<ul style="list-style-type: none">• <i>Social media data analysis with Graph Neural Networks (GNN)</i><ul style="list-style-type: none">- Processed both unstructured (e.g., textual data) and structured (e.g., friendship relations and retweet records) social media data- Customized a bi-directional long short term memory (LSTM) network to embed tweet texts and integrated it with one state-of-the-art graph convolution neural network for predicting the severity of vulnerabilities- Proposed a node-edge co-convolution graph neural network architecture and demonstrated its effectiveness in predicting information diffusion (i.e., influence probability) over social networks• <i>Data augmentation with Generative Adversarial Networks (GAN)</i><ul style="list-style-type: none">- Developed a GAN architecture to synthesize incomplete tabular data with two constraints that are maintaining column-wise statistical means and functional dependencies- Improved classification performance with synthesized data and outperformed various state-of-the-art data augmentation approaches• <i>Modeling and accelerating large-scale optimization problems with TensorFlow</i><ul style="list-style-type: none">- Proposed a neural network to model non-linear 0-1 knapsack problem and devised an adaptive gradient ascent method to solve the network- Developed deep neural networks to model and maximize airline market share over air transportation network	
	Research Assistant, Construction Project Scheduling and Management Area The Hole School of Construction Engineering, University of Alberta <i>Advisor: Dr. Ming Lu</i>	
	Sep. 2014 to Jul. 2018 Edmonton, Canada	
	<ul style="list-style-type: none">• <i>Dual-Level Resource-Constrained Multi-Project Scheduling Framework for Prefabrication in Construction</i><ul style="list-style-type: none">- Proposed a dual-level multi-project scheduling methodology to improve the resource allocation practice of multiple concurrent projects by enhancing the robustness of derived resource plans- Implemented the proposed methodology in <i>IBM ILOG CPLEX Optimization Studio</i> for proof-of-concept- Developed a Microsoft Project addon (in C#) for a partner construction company to apply the proposed methodology in scheduling bridge girder fabrication projects	
EDUCATION	<ul style="list-style-type: none">• Doctor of Philosophy, Civil Engineering, Jun. 2018 University of Alberta, Edmonton, Canada• Master of Engineering, Electronic Engineering, Jun. 2013 Tsinghua University, Beijing, China• Bachelor of Engineering, Information Engineering, Jun. 2010 Southeast University, Nanjing, China	

SELECTED PUBLICATIONS

1. **Jing Liu**, Yudi Chen, Duanshun Li, Noseong Park, Kisung Lee, and Dongwon Lee, “Predicting Influence Probabilities using Graph Convolutional Networks,” the 2019 IEEE International Conference on Big Data (IEEE Big Data’19) (Regular paper, acceptance rate $106/550=19.3\%$)
2. Haipeng Chen, **Jing Liu**, Rui Liu, Noseong Park, and VS Subrahmanian. “VASE: A Twitter-based Vulnerability Analysis and Score Engine.” the 19th International Conference on Data Mining (ICDM’19) (Short paper, acceptance rate $194/1046=18.5\%$)
3. Haipeng Chen, **Jing Liu**, Rui Liu, Noseong Park and V. S. Subrahmanian, “VEST: A System for Vulnerability Exploit Scoring & Timing,” the 28th International Joint Conference on Artificial Intelligence (IJCAI’19), demo track
4. Haipeng Chen, Sushil Jajodia, **Jing Liu**, Noseong Park, Vadim Sokolov, and V. S. Subrahmanian, “FakeTables: Using GANs to Generate Functional Dependency Preserving Tables with Bounded Real Data,” the 28th International Joint Conference on Artificial Intelligence (IJCAI’19) (Acceptance rate $850/4752=17.9\%$)
5. **Jing Liu** and Ming Lu (2019) “Synchronized Optimization of Various Management-Function Schedules in a Multi-Project Environment: Case Study of Planning Steel Girder Fabrication Projects in Bridge Construction.” *Journal of Construction Engineering and Management* (accepted, Oct 2019)
6. **Jing Liu** and Ming Lu (2018) “Robust Dual-Level Optimization Framework for Resource-Constrained Multi-Project Scheduling for a Prefabrication Facility in Construction.” *Journal of Computing in Civil Engineering*, 33(2). [https://doi.org/10.1061/\(ASCE\)CP.1943-5487.0000816](https://doi.org/10.1061/(ASCE)CP.1943-5487.0000816)
7. **Jing Liu** and Ming Lu (2018) “Constraint Programming Approach to Optimizing Project Schedules Under Materials Logistics and Crew Availability Constraints.” *Journal of Construction Engineering and Management*, 144(7). [10.1061/\(ASCE\)CO.1943-7862.0001507](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001507)
8. **Jing Liu** and Ming Lu (2017) “Optimization on Supply-Constrained Module Assembly Process.” In: *25th Annual Conference of the International Group for Lean Construction* Heraklion, Greece, 9-12 Jul 2017. pp 813-820. [10.24928/2017/0104](https://doi.org/10.24928/2017/0104)

PATENTS

1. Fei Qiao, **Jing Liu**, Qi Wei, Zhe Wu, and Huazhong Yang “A Novel Video Compression System Based on Underdetermined Blind Source Separation.” National Patent of China, CN102413333A.

SELECTED AWARDS

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| • IJCAI’19 Demonstration Innovation Award Runner-up | 2019 |
| • Joseph D Thompson/Zurich Canada Graduate Award | 2017 |
| • FGSR Graduate Student Travel Award | 2017 |
| • GSA Academic Travel Award | 2017 |

SELECTED TALKS

Invited Talks at Universities and Companies

- Southeast University, Nanjing, China, Jul. 2019
- Supreme Group, Edmonton, Canada, Dec. 2017
- Southeast University, Nanjing, China, Dec. 2015

Presentations at Conferences

- The 28th International Joint Conference on Artificial Intelligence(IJCAI-19), Macao, China, Aug. 2019
- Lean & Computing in Construction Congress (LC3) 2017, Heraklion, Greece, Jul. 2017
- Winter Simulation Conference 2016 (WSC), Arlington, VA, US, Dec. 2016
- The 7th FTRA International Conference on Multimedia and Ubiquitous Engineering, Seoul, South Korea, May 2013