Qi Song

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Industry Experience

2020.04-now **Applied Scientist**, *Amazon.com*, Seattle.

Education

2015.05-2020.04 **Phd**, *School of Electrical Engineering and Computer Science, Washington State University, Major: Computer science*, Mentor: Prof. Yinghui Wu.

2012.09–2015.02 **Master**, *School of Computer Science and Engineering, Beihang University, Major: Computer science*, Mentor: Prof. Jinpeng Huai.

2008.09–2012.07 **Bachelor**, *School of Computer Science and Engineering, Beihang University, Major: Computer science*.

Research Interests

Data Mining (Distributed) graph data mining, (temporal) graph query models and languages, knowledge graph query and completion.

Machine Learning Deep learning (e.g., deep neural network models like CNN and RNN) for graph analysis (e.g., ranking, anomaly detection).

Research Experience

2015 - 2020 Research Assistant, Washington State University, Supervisor: Prof. Yinghui Wu.
Research topic: Towards User-friendly Graph Exploration.
- Knowledge graph summarization (2015-2017).
- Temporal graph association rule mining (2018).
- Graph fact checking (2018).
- Answering Why-Questions on attributed graphs (2018-2019) .

2019 summer Applied scientist intern, Amazon.com
Research topic: Time fixed effects for long-running experiments..

2018 summer Intern research assistant, JD AI Research, Silicon Valley, Mentor: Dr. Wei Li, Jin Guo and (Martin) Congmin Min.
Research topic: user prompt generation for online e-commerce dialogue system. This project introduces a framework that generates diversified user prompts from user search logs and product knowledge graph.

2017 summer Intern research assistant, NEC labs America, Mentor: Dr. Bo Zong.
Research topic: unsupervised anomaly detection model for network attack detection. This project introduces a Deep Autoencoding Gaussian Mixture Model (DAGMM) for unsupervised anomaly detection in high dimension space. The model makes prediction based on the low-dimensional representation and reconstruction error generated by a deep autoencoder.

2016 summer Intern research assistant, NEC labs America, Mentor: Dr. Bo Zong.
Research topic: temporal graph ranking for system log analysis. This project studies the problem of learning to rank nodes in temporal graphs. I propose TGNet, a novel neural network model for temporal graph ranking, and an efficient end-to-end learning algorithm .

Publications

(17) 2021 **Qi Song,** Mohammad Hossein Namaki, Peng Lin, Yinghui Wu, *"Answering Why-Questions for Subgraph Queries"*, Accepted by IEEE Transactions on Knowledge and Data Engineering (**TKDE**), 2021.

(16) 2020 Peng Lin**, Qi Song,** Yinghui Wu, *"Repairing Entities using Star Constraints in Multirelational Graphs"*, IEEE International Conference on Data Engineering (**ICDE**), 2020.

(15) 2019 Mohammad Hossein Namaki**, Qi Song,** Yinghui Wu, Shengqi Yang, *"Answering Why-questions by Exemplars in Attributed Graphs"*, ACM SIGMOD Conference on Management of Data (**SIGMOD**), 2019.

(14) 2019 Mohammad Hossein Namaki**, Qi Song,** Yinghui Wu, Jiaxing Pi, *"NAVIGATE: Explainable Visual Graph Exploration by Examples"*, ACM SIGMOD Conference on Management of Data (**SIGMOD (demo)**), 2019.

(13) 2019 **Qi Song,** Mohammad Hossein Namaki, Yinghui Wu, *"Answering Why-Questions for Subgraph Queries in Multi-Attributed Graphs"*, IEEE International Conference on Data Engineering (**ICDE**), 2019.

(12) 2018 **Qi Song,** Bo Zong, Yinghui Wu, Lu-An Tang, Hui Zhang, Guofei Jiang and Haifeng Chen, *"TGNet: Learning to Rank Nodes in Temporal Graphs"*, ACM International Conference on Information and Knowledge Management (**CIKM**), 2018.

(11) 2018 Peng Lin, **Qi Song,** Jialiang Shen, Yinghui Wu, *"Discovering Graph Patterns for Fact Checking in Knowledge Graphs"*, International Conference On Database Systems for Advanced Applications(**DASFAA**), 2018.

(10) 2018 Bo Zong, **Qi Song,** Martin Renqiang Min, Wei Cheng, Cristian Lumezanu, Daeki Cho, Haifeng Chen, *"Deep Autoencoding Gaussian Mixture Model for Unsupervised Anomaly Detection"*, International Conference on Learning Representations(**ICLR**), 2018.

(9) 2018 **Qi Song,** Yinghui Wu, Peng Lin, Xin Luna Dong, Hui Sun, *"Mining Summaries for Knowledge Graph Search"*, IEEE Transactions on Knowledge and Data Engineering (**TKDE**), 30(10), 1887-1900, (2018).

(8) 2018 Peng Lin, **Qi Song,** Yinghui Wu, *"Discovering Patterns for Fact Checking in Knowledge Graphs"*, Journal of Data and Information Quality(**JDIQ**), 2018.

(7) 2018 Peng Lin, **Qi Song,** Yinghui Wu, *"Fact Checking in Knowledge Graphs with Ontological Subgraph Patterns"*, Data Science and Engineering(**DSE**), 2018.

(6) 2018 Wei Cai, Baochun He, Min Hu, Wenyu Zhang, Deqiang Xiao, Hao Yu, Nan Xiang, Jian Yang, **Qi Song,** Songsheng He, Yaohuan Huang, Wenjie Huang, Fucang Jia, Chi-hua Fang, *"A radiomics-based Nomogram for the Preoperative Prediction of Posthepatectomy Liver Failure in Patients with Hepatocellular Carcinoma"*, Surgical Oncology(**SO**), 2018.

(5) 2017 Mohammad Hossein Namaki, Yinghui Wu, **Qi Song,** Peng Lin, Tingjian Ge, *"Discovering Temporal Graph Association Rules"*, ACM International Conference on Information and Knowledge Management (**CIKM**), 2017.

(4) 2017 **Qi Song,** Mohammad Hossein Namaki, Peng Lin, Yinghui Wu, *"Parallel Graph Summarization for Knowledge Search"*, 13th International Workshop on Mining and Learning with Graphs (**MLG**), 2017.

(3) 2016 **Qi Song,** Yinghui Wu, Xin Luna Dong, *"Mining Summaries for Knowledge Graph Search"*, IEEE International Conference on Data Mining (**ICDM**), 2016.

(2) 2014 **Qi Song,** Bo Li, Weiren Yu, Jianxin Li, Bin Shi, *"NSLPA: A node similarity based label propagation algorithm for real-time community detection"*, IEEE International Conference on Utility and Cloud Computing (**UCC**), 2014.

(1) 2013 Jianxin Li, **Qi Song,** Weiren Yu, Chunming Hu, Jian Kang, *"iScreen: A Merged Screen of Local System with Remote Applications in a Mobile Cloud Environment"*, IEEE International Symposium on Service Oriented System Engineering (**SOSE**), 2013.

Patents

(6) **Qi Song,** Congmin Min, Jin Guo, Wei Li, *"Intelligent shopping guide oriented dialogue system and method"*, Patent App. 16/296,169, Status: Application.

(5) Bo Zong, Daeki Cho, Cristian Lumezanu, Haifeng Chen, **Qi Song**, *"Density estimation network for unsupervised anomaly detection"*, Patent App. 16/169,012, Status: Application.

(4) Bo Zong, LuAn Tang, **Qi Song,** Biplob Debnath, Hui Zhang, Guofei Jiang, *"Discovering critical alerts through learning over heterogeneous temporal graphs"*, Publication No. : US10409669B2, Status: Granted.

(3) Bo Li, **Qi Song,** Jianxin Li, Weiren Yu, *"Data segmenting method and system of distributed graph calculating system"*, Publication No. : CN104281664B, Status: Granted.

(2) Jianxin Li, Weiren Yu, **Qi Song,** Chenggen Sun, Bo Wu, *"Desktop presenting method based on cloud"*, Publication No. : CN103595759B, Status: Granted.

(1) Chunming Hu, Weiren Yu, **Qi Song,** Chenggen Sun, Bo Wu, *"File picture sharing method based on cloud"*, Publication No. : CN103595760B, Status: Granted.

Skills

Language Java, C, C++,Python.

Platform Spark (GraphX), Dato, Neo4j, TensorFlow, Amazon EC2.

Data Mining Graph mining and query optimization; Association analysis, Approximate query processing, with applications in social network analysis, network security, knowledge base management.

Machine learning Statistical models (e.g., regression, SVM, etc.); Deep neural network models (e.g., CNN, autoencoder, GAN, etc.).

Awards

2019.04 **NSF Student Travel Award for SIGMOD 2019**.

2019.04 **NSF Student Travel Award for ICDE 2019**.

2017.11 **SIGIR Student Travel Award for CIKM 2017**.

2016.11 **NSF Student Travel Award for ICDM 2016**.

2015 & 2016 **NSF Travel support for NSF Graduate Data Science Workshop 2015, 2016**.

2014.11 **MediaTek Inc. - Beihang Univ. Science and Technology Award**.