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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 TGNNet, a novel neural network model for temporal graph ranking, and an efficient end-to-end learning algorithm .

Publications

- (18) 2021 **Qi Song**, Peng Lin, Hanchao Ma, Yinghui Wu, "*Explaining Missing Data in Graphs: A Constraint-based Approach*", IEEE International Conference on Data Engineering (**ICDE**), 2021.
- (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, Jiaying 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, "*TGNNet: 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.**