

Qing Wang

Ph.D.

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Interests

Large-scale Data Mining; Machine Learning; Reinforcement Learning; Multi-armed Bandits;

Brief Bio

Dr. Wang currently is a Postdoctoral Researcher in IBM T.J. Watson Research Center after she received her PhD degree in the School of Computing and Information Sciences at Florida International University under the supervision of Dr. Tao Li, Dr. S. S. Iyengar and Dr. Shu-Ching Chen. Dr. Wang entered FIU PhD program in Fall 2014, immediately after obtaining her Master and Bachelor degree in Computer Science from **Xidian University** and **Zhengzhou University**. In 2017, she received the **Best Student Paper Award** from IEEE SCC. She was a recipient of **2018 FIU SCIS Overall Outstanding Graduate Student**. Qing's research focuses on **learning from data**: how to efficiently discover useful patterns and how to effectively retrieve information. The interests lie broadly in data mining and machine learning studying both the algorithmic and application issues. The algorithmic aspects involve developing new scalable, efficient and interactive algorithms that can handle very large datasets. The underlying techniques of my research interests include clustering, classification, reinforcement learning, etc.

Education

2014.8- **Ph.D. in Computer Science**, *Florida International University*, Miami, FL,
2018.12 USA.

GPA: 3.81/4.0

2010.8- **M.E. in Computer Science**, *Xidian University*, Xi'an, Shaan'xi, China.

2013.5 GPA: 3.3/4.0

2005.8- **B.S. in Computer Science**, *Zhengzhou University*, Zhengzhou, Henan,
2009.6 China.

GPA: 3.6/4.0

Research Experience

- 2019.3- **Postdoctoral Researcher, *IBM T.J Watson Research Center***, New York, NY, USA.
- Leveraging AI in Service Automation Modeling: from Classical AI Through Deep Learning to Combination Models. (ICSOC 2019)
 - AI for operations: facilitated problem diagnosis and determination, outage prediction, auto-resolution in complex IT environment by understanding the text description of IT ticket, identifying the temporal pattern from system events, and mining causality among system monitoring time series data.
- 2018.5- **Research Intern, *IBM T.J Watson Research Center***, New York, NY, USA.
- Proposed and implemented an interactive framework using bandit models for AI skill Orchestration.
 - Developed a new reward mechanism and deep learning model of reinforcement learning based on natural machine translation to learn the logic forms from natural language.
 - Published a patent on anomaly detection in service computing.
- 2017.5- **Research Intern, *IBM T.J Watson Research Center***, New York, NY, USA.
- Online IT Automation Recommendation Using Hierarchical Multi-armed Bandit Algorithms. (SDM 2018)
 - Proposed a new online learning algorithm, a hierarchical multi-armed bandit algorithm for the IT automation recommendation;
 - Implemented these online algorithms and conducted comparative experiments on a large-scale real ticket dataset collected from IBM Global Services.
- 2016.6- **Research Intern, *IBM T.J Watson Research Center***, New York, NY, USA.
- Constructing the Knowledge Base for Cognitive IT Service Management. (Best Student Paper Award of IEEE SCC 2017)
 - Proposed an integrated framework for the ticket resolution recommendation;
 - Constructed a domain knowledge base using ontology modeling techniques.
- 2015.8- **Research Assistant, *Knowledge Discovery Research Group***, FIU, USA.
- 2018.12 ○ **Multi-armed bandits.** Multi-armed bandits are very popular applying into various interactive recommender systems. I am working on modeling the interactive behaviors between users and items to better track users' preference.
- **Event Mining.** Designed and implemented a **frequent-itemset mining module** of the online Event Mining system. This module is able to discover some interesting frequent patterns from event data.

Teaching Experience

2014.8-2016.5 **Teaching Assistant**, *School of Computing and Information Sciences*, FIU, USA.

- 2014.8-2014.12 COP 4772 Principle of Database.
- 2015.2-2015.5 TCN 5010 Telecommunications Technology and Applications.
- 2015.8-2015.12 COP 2210 Java Programming I.
- 2016.2-2016.5 CAP 4770 Introduction to Data Mining.
- 2017.8-2017.12 CAP 5768 Introduction to Data Science.

Selected Talks

- “An Integrated Solution for Ontology-based Ticket Recommendation Using Problem Inference,” IBM Intern Workshop, Yorktown Heights, NY, Jun. 20-23, 2016.
- “Constructing the Knowledge Base for Cognitive IT Service Management,” IEEE SCC, Honolulu, HI, USA, Jun. 25-30, 2017.
- “STAR: A System for Ticket Analysis and Resolution,” SIGKDD, Halifax, Canada, Aug. 13-17, 2017.
- “FLAP: An end-to-end event log analysis platform for system management,” SIGKDD, Halifax, Canada, Aug. 13-17, 2017.
- “Online Context-Aware Recommendation with Time Varying Multi-Armed Bandit,” FIU GSAW Scholarly Forum, Mar. 27-28, 2017.
- “Constructing the Knowledge Base for Cognitive IT Service Management,” FIU GSAW Scholarly Forum, Mar. 19-23, 2018.
- “Online IT automation recommendation Using Hierarchical Multi-armed Bandit Algorithms,” SIAM SDM, San Diego, California, May 3-5, 2018.
- “Automate the Automation,” IBM Intern Workshop, Yorktown Heights, NY, July 26, 2018.
- “Taking Digital Service by Storm: from Traditional AI to Deep AI,” 2019 IBM Northeast Region Academy Affiliates Face-to-Face Meeting.

Selected Publications

Paper Awards

1. **Best Student Paper Award** at the 2017 IEEE International Conference on Services Computing (IEEE SCC 2017); Conf paper: **Q. Wang**, W. Zhou, C. Zeng, T. Li, L. Shwartz and G. Y. Graharnik, “Constructing the Knowledge Base for Cognitive IT Service Management.” (CCF C in Software Engineer/System Software/Programming Language)

Journal Papers

1. **Qing Wang**, Chunqiu Zeng, Wubai Zhou, Tao Li, S. S. Iyengar, Larisa Shwartz, Genady Ya. Graharnik, “Online Interactive Collaborative Filtering Using Multi-armed Bandit with Dependent Arms”, IEEE Transactions on Knowledge and Data Engineering (IEEE TKDE), 2018. (CCF A in Database/Data Mining/Information Retrieval)

2. Hongjun Li, Biao Cai, Shaojie Qiao, Shu-Ching Chen, **Qing Wang**, "ExTCKNN: Expanding Tree-based Continuous K Nearest Neighbor Query in Road Networks with Traffic Rules", IEEE Access, 2018.
3. Tao Li, Chunqiu Zeng, Wubai Zhou, Wei Xue, Yue Huang, Zheng Liu, Qifeng Zhou, Bin Xia, **Qing Wang**, Wentao Wang, Xiaolong Zhu, "FIU-Miner (a fast, integrated, and user-friendly system for data mining) and its applications", Knowledge and Information Systems (KIAS), 2016. (**CCF B in Database/Data Mining/Information Retrieval**)

Conference Papers

1. **Qing Wang**, Larisa Shwartz, Genady Ya. Graharnik, Michael Nidd, Jinho Hwang. "Leveraging AI in Service Automation Modeling: from Classical AI Through Deep Learning to Combination Models", International Conference on Service-Oriented Computing (IC-SOC 2019). Springer, Toulouse, France, 2019. (**CCF C in Software Engineer/System Software/Programming Language**)
2. **Qing Wang**, Chunqiu Zeng, S. S. Iyengar, Tao Li, Larisa Shwartz, Genady Ya. Graharnik, "AISTAR: An Intelligent System for Online IT Ticket Automation Recommendation", IEEE International Conference on Big Data (IEEE BigData 2018), Seattle, Washington, USA, 2018. (**CCF C in Interdisciplinary/Comprehensive/New**)
3. Kaylin Hagopian, **Qing Wang**, Yupeng Gao, Tengfei Ma, Lingfei Wu. "Learning Logical Representations from Natural Languages with Weak Supervision and Back Translation", Knowledge Representation & Reasoning Meets Machine Learning Workshop at **NeurIPS**, Vancouver, Canada, 2019. (**CCF A in Artificial Intelligence**)
4. **Qing Wang**, Tao Li, S. S. Iyengar, Larisa Shwartz, Genady Ya. Graharnik, "Online IT automation recommendation Using Hierarchical Multi-armed Bandit Algorithms", SIAM International Conference on Data Mining (SDM 2018), San Diego, California, USA, 2018. (**CCF B in Database/Data Mining/Information Retrieval**)
5. Wei Xue, Wubai Zhou, Tao Li, **Qing Wang**, "MTNA: A Neural Multi-Task Model for Aspect Category Classification and Aspect Term Extraction on Restaurant Reviews", International Joint Conference on Natural Language Processing (IJCNLP 2017), Taipei, Taiwan, 2017.
6. **Qing Wang**, Wubai Zhou, Chunqiu Zeng, Tao Li, Larisa Shwartz, Genady Ya. Graharnik, "Constructing the Knowledge Base for Cognitive IT Service Management", IEEE International Conference on Services Computing (IEEE SCC 2017), Honolulu, Hawaii, USA, 2017. [**Best Student Paper Award**] (**CCF C in Software Engineer/System Software/Programming Language**)
7. Wubai Zhou, Wei Xue, Ramesh Baral, **Qing Wang**, Chunqiu Zeng, Tao Li, Jian Xu, Zhen Liu, Larisa Shwartz, Genady Ya. Graharnik, "STAR: A System for Ticket Analysis and Resolution", ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (ACM SIGKDD 2017), Halifax, Nova Scotia, Canada, 2017. (**CCF A in Database/Data Mining/Information Retrieval**)
8. Chunqiu Zeng, **Qing Wang**, Shekoofeh Mokhtari, Tao Li, "Online Context-Aware Recommendation with Time Varying Multi-Armed Bandit", ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (ACM SIGKDD 2016), San Francisco,

California, USA, 2016. (**CCF A in Database/Data Mining/Information Retrieval**)

9. Tao Li, Wubai Zhou, Chunqiu Zeng, **Qing Wang**, Qifeng Zhou, Dingding Wang, Yue Huang, Jia Xu, Wentao Wang, Minjing Zhang, Steve Luis, Shu-Ching Chen and Naphtali Rish, "DI-DAP: An Efficient Disaster Information Delivery and Analysis Platform in Disaster Management", ACM International Conference on Information and Knowledge Management (ACM CIKM 2016), Indianapolis, Indiana, USA, 2016. (**CCF B in Database/Data Mining/Information Retrieval**)
10. Chunqiu Zeng, **Qing Wang**, Wentao Wang, Tao Li, Larisa Shwartz, "Online Inference for Time-varying Temporal Dependency Discovery from Time Series", IEEE International Conference on Big Data (IEEE Big Data 2016), Washington D.C., USA, 2016. (**CCF C in Interdisciplinary/Comprehensive/New**)

Patents

1. Hongtan Sun, Larisa Shwartz, Rohit Madhukr Khandekar, **Qing Wang**, Bing Zhou, "Assessing Technical Risk in Information Technology Service Management Using Visual Pattern Recognition." U.S. Patent 16/571088, issued Sep. 14, 2019.

Service Activities

Session Chair

1. The 6th IEEE International Conference on Big Data, 2018 (IEEE Big Data 2018)

Reviewer

1. ACM International Conference on Information and Knowledge Management (CIKM)
2. IEEE International Conference on Data Mining (ICDM)
3. European Conference on Information Retrieval (ECIR)
4. IEEE International Conference on Machine Learning and Applications (ICMLA)
5. AAAI Conference on Artificial Intelligence (AAAI)
6. International Joint Conference on Artificial Intelligence (IJCAI)
7. Conference on Empirical Methods in Natural Language Processing (EMNLP)
8. ACM International Conference on Web Search and Data Mining (WSDM)

Honors & Awards

1. **IBM Outstanding Technical Achievement Award.** (Nov. 2019)
2. **NeurIPS Travel Award.** (Nov. 2019)
3. **FIU SCIS Overall Outstanding Graduate Student Award.** (Nov. 2018)
4. **IEEE SCC Best Student Paper Award.** (Jun. 2017)
5. **FIU Dissertation Year Fellowship.** (Aug. 2018 - Aug. 2019)

6. **SIAM Student Travel Award.** (May. 2018)
7. **SIGKDD Student Travel Award.** (Jul. 2017)
8. **FIU GPSC Student Travel Award.** (Nov. 2018)
9. **FIU GPSC Student Travel Award.** (Jul. 2017)
10. **DiDi Beijing-IEEE Future Elite Forum Invitation.** (May. 2018)
11. The Winner of Poster Presentation in Engineering Computing of **GSAW 2017 Scholarly Forum.** (Mar. 2017)

■ Programming Skills

Languages:	Java (proficient), Python (familiar), Javascript (familiar)	Frameworks:	Tensorflow, Apache Hadoop, Map Reduce, Tomcat, jQuery
DB:	DB2, MySQL, Redis	Tools:	Git, SVN