

# Su Zhang

• Email: su.zhang2@wsu.edu • Phone: (812)3498473 • Homepage



## Research Interests

---

Machine Learning, Reinforcement Learning, Transfer Learning, Case-Based Reasoning

## Education

---

### Washington State University

Ph.D. in Computer Science

Advisor: Dr. Matthew E. Taylor, Current GPA: 3.9/4.0

Pullman, WA

Expected May 2022

### Indiana University

M.S. in Computer Science, GPA: 3.97/4.0

Bloomington, IN

May 2017

### Wuhan University

B.S. in Computer Science & B.S. in Economics, GPA: 3.48/4.0

Wuhan, China

Jun 2015

## Publication

---

[1] **Zhang, S.**, & Taylor, M. (2018). Work-In-Progress: Enhanced Learning from Multiple Demonstrations with a Two-level Structured Approach. *In Proceedings of the Adaptive Learning Agents Workshop (at AAMAS)*.

[2] Zhang, Y., **Zhang, S.**, & Leake, D. (2017). Maintenance for Case Streams: A Streaming Approach to Competence-Based Deletion. *In Case-Based Reasoning Research and Development: 25th International Conference Proceedings (pp. 420-434)*.

[3] Zhang, Y., **Zhang, S.**, & Leake, D. (2016). Case-base maintenance: A streaming approach. *In Workshop Proceedings of the Twenty Fourth International Conference on Case-Based Reasoning (pp. 222-231)*.

## Research Experience

---

### Washington State University

*Efficient Exploration with Probability Map*

Pullman, WA

May 2019 - present

- Objective: To enable efficient exploration and estimation with prior knowledge that contains uncertainty
- Utilizing the prior probability distribution as a probability map, combined with observation of the reinforcement learning agent, and improve the learning efficiency in scenario like robot scavenger hunt as the performance.

### *Effective Transfer Learning*

Sep. 2017 - present

- Objective: To integrate knowledge from multiple demonstrations and effective transfer in reinforcement learning by proposing a flexible two-level structured approach.
- Summarized knowledge from weighted demonstrations and build a two-level model which was inspired by multi-armed bandit algorithms, improved the performance of Mario gaming agents via HAT (Human Agent Transfer) algorithm
- Initial results accepted for presentation as a poster at the ALA 2018 workshop

### *Building Empathetic Robotics Societies*

Sep. 2017 - Mar. 2019

- Objective: To imbue large-scale connected robotic societies with empathy and human-like values, and enable effective human-robot, robot-robot interactions and collaboration

- Utilizing sociological principles of Spiral Dynamics to create a bottom-up empathetic model of societal evolution in robots; Using intrinsic reinforcement learning and apprenticeship learning in the multi-robots scenario for developing different policies (behaviors) under different empathetic levels

### **Indiana University**

Bloomington, IN

*Case-Base Maintenance with Streaming Strategy*

Apr.2016 - Apr.2017

- Objective: To enable efficient continuous case-base maintenance and reduce demands on case storage with large-scale streams by applying a novel streaming algorithm
- Conducted experiments to demonstrate the practicalities and benefits of the new approach for handling 1) scale-up of case-base maintenance and 2) concept drifts in settings with on-line or real-time data streams
- Results published at ICCBR-16 workshop track and ICCBR-17 main track

### **Washington State University**

Pullman, WA

*Transfer in Deep Reinforcement Learning*

May.2016 - Jul.2016

- Objective: To leverage transfer and multi-task learning techniques to improve data efficiency and learning speeds of Deep Q-Learning
- Implemented a transferable memory structure with the prioritized experience replay settings for Atari gaming agents and analyzed the improvements in learning speed and performance

## **Professional Experience**

---

### **Washington State University**

Pullman, WA

*Graduate Research Assistant*

Sep.2017 - Present

- Focus: Reinforcement Learning, Transfer Learning
- Project: Effective Transfer Learning, Building Empathetic Robotics Societies, Efficient Exploration with Probability Map

*Graduate Teaching Assistant*

Feb.2018 - Present

- CptS 223 Advanced Data Structures C/C++, CptS 321 Object-Oriented Software Principles, CptS 350 Design and Analysis of Algorithms, CptS 451 Introduction to Database Systems, CptS 415 Big Data

### **Indiana University**

Bloomington, IN

*Graduate Teaching Assistant*

Jan.2017 - May.2017

- B659 Topics in Artificial Intelligence: Reinforcement Learning For AI

### **Accenture (China) Co. Ltd**

Beijing, China

*Consultant Analyst Intern*

Aug.2014 - Oct.2014

- Design a Digital Transformation Plan for optimizing the sale infrastructure of China Telecom Group Beijing Corporation
- Responsible for collecting leading practice in digital sales, analyzing with similarity model, and developing evaluation criteria for as-is assessment

## **Conference Experience**

---

2019 International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2019), 2019, Montreal, Canada.

- Oral and poster presentation on “Enhanced Learning from Multiple Demonstrations with a Flexible Two-level Structure Approach” at Doctoral Consortium Program

- 25th International Conference on Case-Based Reasoning (ICCBR-17), 2017, Trondheim, Norway
- Oral presentation for paper *"Maintenance for Case Streams: A Streaming Approach to Competence-Based Deletion."* at main conference track
- 24th International Conference on Case-Based Reasoning (ICCBR-16), 2016, Atlanta, GA
- Oral presentation for paper *"Case-Base Maintenance: A Streaming Approach."* at Workshop on *Synergies between CBR and Knowledge Discovery*
- 25th International Joint Conference on Artificial Intelligence (IJCAI-16), 2016, New York, NY
- Attended the Workshop on *Deep Reinforcement Learning: Frontiers and Challenges* funded by Intelligent Robot Learning Laboratory, Washington State University

## Awards

---

AAMAS 2019 Student Travel Scholarship (\$1200)	Mar.2019
Graduate Research Assistantship, Washington State University	Sep.2017
Student Travel Grants of ICCBR-17 (\$2000)	Jun.2017
Computer Science MS Program Travel Award (\$800), Indiana University	2015 - 2017
Computer Science MS Program Financial Award (\$4000), Indiana University	2015 - 2016
University Scholarship (top 5%), Wuhan University, China	2012 - 2014