Su Zhang

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Research Interests

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

Education

Washington State University Pullman, WA
Ph.D. in Computer Science Expected May 2022
Advisor: Dr. Matthew E. Taylor, Current GPA: 3.9/4.0

Indiana University Bloomington, IN
M.S. in Computer Science, GPA: 3.97/4.0 May 2017

Wuhan University Wuhan, China
B.S. in Computer Science & B.S. in Economics, GPA: 3.48/4.0 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 Pullman, WA

Efficient Exploration with Probability Map 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 Robtics 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 Univeristy Pullman, WA
Graduate Research Assistant Sep.2017 - Present

- Focus: Reinforcement Learning, Transfer Learning
- Project: Effective Transfer Learning, Building Empathetic Robtics 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