Lin Guan

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Research Interests

Multi-Modal Human-Agent Interaction, Interactive Reinforcement Learning, Human-in-the-Loop Reinforcement Learning

Education

Arizona State University   *Tempe, AZ*
Ph.D. Student in Computer Science   *Fall 2019 - Expected Spring 2024*
- GPA: 4.0/4.0

The University of Texas at Austin   *Austin, TX*
B.S. with Highest Honors in Computer Science   *Fall 2016 - Spring 2019*
- GPA: 3.97/4.0

Publications

Widening the Pipeline in Human-Guided Reinforcement Learning with Explanation and Context-Aware Data Augmentation
Lin Guan, Mudit Verma, Sihang Guo, Ruohan Zhang, Subbarao Kambhampati
NeurIPS 2021 (Spotlight)

Enhanced Exploration in Neural Feature Selection for Deep Click-Through Rate Prediction Models via Ensemble of Gating Layers
Lin Guan, Xia Xiao, Ming Chen, Youlong Cheng
AAAI 2022 Workshop on Practical Deep Learning

Symbols as a Lingua Franca for Bridging Human-AI Chasm for Explainable and Advisable AI Systems
Subbarao Kambhampati, Sarath Sreedharan, Mudit Verma, Yantian Zha, Lin Guan
AAAI 2022, Blue Sky Track

Contrastively Learning Visual Attention as Affordance Cues from Demonstrations for Robotic Grasping
Yantian Zha, Siddhant Bhambri, Lin Guan
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)

Leveraging Human Guidance for Deep Reinforcement Learning Tasks
Ruohan Zhang, Faraz Torabi, Lin Guan, Dana H. Ballard, Peter Stone
IJCAI 2019 Survey Track

Atari-HEAD: Atari Human Eye-Tracking and Demonstration Dataset
Ruohan Zhang, Calen Walshe, Zhuode Liu, Lin Guan, Karl S. Muller, Jake A. Whritner, Luxin Zhang, Mary M Hayhoe, Dana H Ballard
AAAI 2020

Learning from Ambiguous Demonstrations with Self-Explanation Guided Reinforcement Learning
Yantian Zha*, Lin Guan* (equal contribution), Subbarao Kambhampati
In submission to ICRA 2022

Experience

TikTok, ByteDance Ltd.   *Mountain View, CA*
Machine Learning Software Engineer Intern   *May. 2021 - Aug. 2021*
- Worked with the Applied Machine Learning team to improve existing AutoML-inspired feature selection and network pruning methods for deep recommender systems.
- Proposed a novel ensemble learning based exploration strategy to search for the best subset of features, which consistently outperforms existing methods in two public datasets and with three different underlying recommendation models (results are presented in a research paper submitted to AAAI 2022 Workshop on Practical Deep Learning).

Yochan Lab (AI Lab), Arizona State University — *Tempe, AZ*

Graduate Research Assistant, under the Supervision of Dr. Subbarao Kambhampati — *Aug. 2019 - Present*

- Work on multi-modal human-agent interaction (e.g. evaluative feedback + visual explanations) and human advice interpretation (from a neuro-symbolic perspective) under the context of data-efficient human-in-the-loop reinforcement learning and value alignment (i.e. reward learning).
- Design learning methods that can take human advice beyond plain numeric labels, such as visual explanation, task-relevant concepts, and symbolic knowledge.

Vision, Cognition, and Action Virtual Reality Lab, The University of Texas at Austin — *Austin, TX*

Undergraduate Research Assistant, under the Supervision of Dr. Dana H. Ballard — *June 2018 - June 2019*

- Implemented a variety of learning from human feedback algorithms and evaluated them on a human-agent interaction framework based on the GridWorld in the UC Berkeley Pac-Man project (programmed 2500+ lines in Python).
- Investigated the advantages and limitations of different types of human guidance (e.g. demonstrations, evaluative feedback, and human gaze) used in deep reinforcement learning theoretically and empirically, which led to a survey paper presented at IJCAI 2020.

Hauoli LLC — *Austin, TX*

Software Engineer Intern — *Aug. 2017 - June 2019*

- Developed three mobile games with Unity and Google VR SDK to demonstrate the company's human motion tracking technology at the Consumer Electronics Show (CES 2018), which attracted several potential business partners such as Bose and Samsung.
- Collaborated with a cross-functional team to build a Unity plugin that wraps Hauoli's tracking SDK written in C++ and released the plugin as the company's first product on Unity Asset Store.

Selected Projects

Multi-Modal Human-Agent Interaction for Data-Efficient Advisable RL   Proposed to augment binary evaluative feedback with human visual explanation (salient regions in image observation). Employed a novel context-aware data augmentation method to inject domain knowledge in visual explanation into interactive deep reinforcement learning, resulting in state-of-the-art performance. Designed an object-oriented user interface to collect human feedback in a low-effort and semi-automated way.

Exploring the Use of Human Gaze in Imitation Learning   Built a gaze data collection pipeline, from reading raw data from eye tracker to post-processing gaze data (e.g. removing outliers and computing dataset statistics). Demonstrated the usefulness of human gaze data by training gaze-guided imitation learning agents in Atari games. Experimented with different ways to bias policy learning with human attention prior, including predicting human attention heatmap as an auxiliary task and enforcing an attention alignment constraint.

Service

2021	**Served as Program Committee for AAAI-22 and ICRA 2022**
2020	**Served as Program Committee for AAAI-21**

Awards

2020	**Graduate College Travel Award**, Arizona State University	*Tempe, AZ*
2019	**CIDSE Doctoral Fellowship**, Arizona State University	*Tempe, AZ*
2019	**Graduating with Highest Honors (Top 4%)**, The University of Texas at Austin	*Austin, TX*
2018	**2018 Honors Day, College Scholar (Top 20%)**, The University of Texas at Austin	*Austin, TX*
2018	**2018 University Honor (GPA Based Honors)**, The University of Texas at Austin	*Austin, TX*
2018	**Chevron Scholarship**, The University of Texas at Austin	*Austin, TX*
2017	**2017 University Honor (GPA Based Honors)**, The University of Texas at Austin	*Austin, TX*

Additional Information

Languages	Python, JavaScript, Java, C#, C, C++
Tools	PyTorch, Scikit-Learn, Numpy, Pandas, Flask, Unity, React JS
Selected Coursework	Reinforcement Learning, Statistical Machine Learning, Data Mining, Data Visualization, Operating System
Personal Interests	Human-in-the-Loop Machine Learning, Reinforcement Learning, Data Analytics, Software Development
Work Eligibility	Eligible to work in the U.S.; will require visa sponsorship for full-time employment