# 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 - Fall 2018*
- GPA: 3.97/4.0

## Publications

**Leveraging Approximate Symbolic Models for Reinforcement Learning via Skill Diversity**
Lin Guan*, Sarath Sreedharan*, Subbarao Kambhampati
*ICML 2022*

**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-22 Workshop on Practical Deep Learning*

**Learning from Ambiguous Demonstrations with Self-Explanation Guided Reinforcement Learning**
Yantian Zha*, Lin Guan* (equal contribution), Subbarao Kambhampati
*AAAI-22 Workshop on Reinforcement Learning in Games*

**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*

## Experience

**TikTok, ByteDance Ltd.**                                                                                       *Mountain View, CA*
**Software Engineer Intern (Applied Machine Learning)**                                                          *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 accepted 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 leveraging multi-modal human inputs (e.g. binary feedback + explanations, natural language feedback, or knowledge-based/concept-based advice) for data-efficient human-in-the-loop reinforcement learning and human preference modeling (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.

**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

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

## Awards

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| 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

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| **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 |