

# Lin Guan

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## Research Interests

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

## Education

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### 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

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### 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, *to appear in Proceedings of NeurIPS 2021 (Spotlight)*.

### 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, *to appear in Proceedings of AAAI 2022, Blue Sky Track*.

### Contrastively Learning Visual Attention as Affordance Cues from Demonstrations for Robotic Grasping

Yantian Zha, Siddhant Bhambri, Lin Guan, *appeared in 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, *appeared in International Joint Conference on Artificial Intelligence (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, *appeared in Proceedings of AAAI 2020*.

### 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, *in submission to AAAI 2022*.

### Learning from Ambiguous Demonstrations with Explanation Guided Reinforcement Learning

Yantian Zha\*, Lin Guan\* (equal contribution), Subbarao Kambhampati, *in submission to IEEE International Conference on Robotics and Automation (ICRA 2022)*.

## Experience

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### 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 and workshops).

## 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