Yue Yang

🌐 https://yy-gx.github.io/ | ✉ yygx@cs.unc.edu | ⬤ YY-GX | ▣ Yue Yang | ▪ +1(404)452-7437

Research Interests

Robotics, **Imitation Learning**, and their application to **Human Robot Interaction**

Education

University of North Carolina at Chapel Hill, Chapel Hill NC	Expected May 2028
Ph.D. in Computer Science, College of Arts and Science.	**GPA**: 4.0/4.0
Georgia Institute of Technology, Atlanta GA	May 2023
Master of Science in Computer Science, College of Computing.	**GPA**: 3.9/4.0
Northeastern University, Shenyang China	June 2021
BEng in Software Engineering (pivot class).	**TOEFL**: 105 **GRE**: 327+4.0 **GPA**: 90/100
University of California San Diego, La Jolla CA	Dec 2019
Exchange student, School of Engineering.	**GPA**: 4.0/4.0

Publications & Preprints

IROS' 24 (in submission)	**Yue Yang**, Bryce Ikeda, Gedas Bertasius and Daniel Szafir, "ARCADE: Scalable Demonstration Collection and Generation via Augmented Reality for Imitation Learning," in submission to IROS'24
HRI' 24 VAM Workshop	**Yue Yang**, Bryce Ikeda, Gedas Bertasius and Daniel Szafir, "Augmented Reality Demonstrations for Scalable Robot Imitation Learning," in *7th International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions*, 2024
HRI' 24	**Yue Yang***, Letian Chen*, Zulfiqar Zaidi*, Sanne van Waveren, Arjun Krishna and Matthew Gombolay, "Enhancing Safety in Learning from Demonstration Algorithms via Control Barrier Function Shielding", in *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, 2024
The Visual Computer (in submission)	**Yue Yang***, Atith N Gandhi* and Greg Turk, "Annotated Hands for Generative Models", in *arXiv preprint arXiv:2401.15075*, 2024
CoRL' 22 LAR Workshop	**Yue Yang**, Letian Chen and Matthew Gombolay, "Safe Inverse Reinforcement Learning via Control Barrier Function," in *Proceedings of CoRL Learning for Agile Robotics workshop*, 2022
Preprint	**Yue Yang** and Pengtao Xie, "Discriminative Cross-Modal Data Augmentation for Medical Imaging Applications", *arXiv preprint arXiv:2010.03468*, 2020
EMNLP' 20	Guangtao Zeng, Wenmian Yang, Zeqian Ju, **Yue Yang**, Sicheng Wang, Ruisi Zhang, Meng Zhou, Jiaqi Zeng, Xiangyu Dong, Ruoyu Zhang, Hongchao Fang, Penghui Zhu, Shu Chen, and Pengtao Xie, "MedDialog: Large-scale medical dialogue dataset," in *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2020
Preprint	Xuehai He*, Xingyi Yang*, **Yue Yang**, Ruofan Guo, Yuxiao Liang, Shanghang Zhang, Li Du, and Pengtao Xie, "Supervised Pretraining or Self-supervised Pretraining? A Tale of Two Transfer Learning Paradigms", *arXiv preprint arXiv:2007.04234*, 2020.

Research Experience

Scalable Demonstration Collection and Generation via AR	2023 - 2024
Graduate Research Assistant, Co-Advisors: Dr. Daniel Szafir, Dr. Gedas Bertasius	UNC-CH

- Aimed to solve two challenges in Imitation Learning: (1) complex process of demonstration collection; (2) data hungry, a large set of demonstrations are required for an effective IL training.
- Proposed the ARCADE framework to address (1) by utilizing Augmented Reality (AR) to capture a single demonstration in a user-friendly way, and (2) by autonomously generating additional demonstrations with minimal user intervention.

- Applied ARCADE to address three fundamental tasks—3-Waypoints-Reach, Push, Pick-And-Place—alongside the more intricate real household task, Pouring-Water. ARCADE demonstrated excellent performance across all tasks, outperforming the baseline method of kinesthetic teaching.

Safe Inverse Reinforcement Learning via Control Barrier Function   2022 - 2023
Graduate Research Assistant, Advisor: Dr. Matthew Gombolay   Georgia Institute of Technology
- Studied the safety issue of inverse reinforcement learning (IRL).
- To enforce safety in LfD without relying on experts, we propose a new framework, SECURE, which learns a customized Control Barrier Function (CBF) from end-users that prevents robots from taking unsafe actions while imposing little interference with the task completion.
- Applied SECURE on two simulated robotic and autonomous driving tasks, and a real-world knife-cutting, meal-preparation task, where SECURE achieves much safer performance in all experiments. Also, we demonstrate in a user study that non-roboticists can use SECURE to effectively teach the robot safe policies that avoid collisions with the person and prevent coffee from spilling.

Annotated Hands for Generative Models   [More Details]   2022
Graduate Research Assistant, Advisor: Dr. Greg Turk   Georgia Institute of Technology
- Worked on the research problem of synthesizing human-like hand images for popular generative models (e.g., GAN, Diffusion Models).
- Proposed a novel lifelike hand synthesis pipeline with deep generative models via leveraging additional information (e.g., keypoints of hands, dorsal or ventral, left or right, etc.).
- Achieved successful preliminary results with the correct number and position of fingers.

Anytime Bounded Conflicted-Based Search for Dynamic Environments   [More Details]   2020
Research Assistant, Advisor: Dr. Jia Pan   University of Hong Kong
- Enhanced centralized multi-agent path finding (MAPF) via leveraging the accurate decentralized perception of dynamic obstacles positions.
- Proposed a novel low-level Focal Search algorithm to consider the dynamic obstacles and unpredictable events in real-world situations.
- Funded by the computer science internship program of Hong Kong University.

Discriminative Cross-Modal Data Augmentation   [More Details]   2020
Research Assistant, Advisor: Dr. Pengtao Xie   University of California San Diego
- Aimed to mitigate the data deficiency issue in medical imaging in a cross-modal way.
- Proposed a discriminative unpaired image-to-image translation framework, DUIIT, to perform cross-modality data augmentation.
- Applied DUIIT on three different modalities and achieved better physiological age prediction performance than baselines.

Comparison between Transfer Learning and Self-supervised Learning   [More Details]   2020
Research Assistant, Advisor: Dr. Pengtao Xie   University of California San Diego
- Worked on the selection of pre-training methods between supervised pre-training and self-supervised pre-training.
- Designed various experiments to study factors that affect the comparison of these two pre-training methods. Factors include domain difference, the amount of training data, class imbalance in source tasks, and using target data for additional pre-training.
- Provided six insights to guide the selection of pre-training methods for future researchers.

Creation of Medical Dialogue Dataset   [More Details]   2020
Research Assistant, Advisor: Dr. Pengtao Xie   University of California San Diego
- Participated in the creation of the largest medical dialogue dataset to date.
- Pre-trained several dialogue generation models on the Chinese MedDialog dataset and studied the transferability of models trained on MedDialog to low-resource medical dialogue generation tasks.
- Cited by 58 research articles.

Collision Avoidance Racecar under Complex Environments. [More Details] 2019

Research Assistant, Advisor: Dr. Zheng Fang   Northeastern University (China)

- Studied a robotic system that is high-speed and auto-obstacle-avoidance under complex environment.
- Adopted maximum gap to implement reactive motion planning, and used behavioral cloning for short-term planning in some specific scenarios (e.g., U-turn corners).
- The robot speed reached nearly 4.0 m/s under the complex environment and won 1st Prize in the NXP Cup National University Students Intelligent Car Race.

Industry Experience

Water-Mirror, *Robotic Algorithm Engineer Intern*   Sep 2020 - Nov 2020

- Deploy anytime and bounded CBS algorithm to intelligent warehouse management, which requires up to 100 robots path planning.
- The proposed algorithm has much faster calculation speed($\sim 90\%$) and higher successful rate($\sim 50\%$) compared to traditional multi-agent path finding methods(e.g., CBS, WHCA*, etc.).
- Implemented the algorithm in two language versions: Python and C++. Exposed an API to the company's system.

Neusoft Corporation, *Software Development Engineer Intern*   Jul 2020 - Aug 2020

- Rebuilt a storage system with AWS RDS, S3, and CloudFront from local storage for non-structural data like pictures, texts, and labels. Successfully improved the loading speed of static resources and reduced system load.
- Developed micro-services based on Spring Boot framework for user and product information management, connected with Oauth2 authentication server to verify token as well, deployed to EC2 server.
- Configured deployment automation for microservices by using Docker and Jenkins.

Awards and Honors

- 1st Prize, The NXP Cup National University Students Intelligent Car Race, 2019
- Second-Class Scholarship, Northeastern University (Top 5%), 2018 & 2019