Boshen Zhang

(540) 497-4082 | boshenzh@usc.edu | https://boshenzh.github.io

RESEARCH INTERESTS

I am interested in Artificial Intelligence, particularly in the development of decision-making agents capable of adaptive, rapid, and robust operations within cooperative environments. My objective is to develop decision-making methodologies with applications in robotics. The following key areas currently shape my research endeavors:

- Multi-Agent Systems
- Robot Learning
- Human Robot Interaction
- Foundation models

EDUCATION

University of Southern California, GPA: 3.60/4.0 Jun 2023 - Dec 2024
Master of Science, Computer Science
Coursework: Robot Learning, Robotics, Autonomous Decision-Making, Computational Human-Robot Interaction, Algorithm Analysis, Machine Learning, Linear Programming and Extensions

Virginia Tech, GPA: 3.60/4.0 Aug 2018 - Dec 2022
Bachelor of Science, Computer Science & Applied Mathematics

RESEARCH EXPERIENCE

Interactive and Collaborative Autonomous Robotics Lab (ICAROS) Los Angeles, CA
University of Southern California Dec 2023 -
Research Assistant | Advisor: Stefanos Nikolaidis

- Investigating diverse human behavior emulation with LLM-aided Quality Diversity optimization approach in multi-agent reinforcement learning system

Computational Human Robot Interaction Course Los Angeles, CA
University of Southern California Jan 2024 –
Research Lead | Advisor: Stefanos Nikolaidis

- Enhancing agent real time adaptability to human behavior by utilizing LLMs for lower-level planning and benchmarking agent adaptability in reactive scenarios
- Finetuned llama3-8B-instruct model using LoRa based on trajectory from existing PPO algorithm and human experts

PUBLICATIONS

** denotes equal contribution*

Boshen Zhang*, Shipeng Liu*, Zhehui Huang. 2024. Benchmark Real-time Adaptation and Communication Capabilities of Embodied Agent in Collaborative Scenarios. (Under Review)

Shipeng Liu*, FNU Shrutika, **Boshen Zhang**, Zhehui Huang, Feifei Qian. 2024. Effect of Adaptive Communication Support on Human-AI Collaboration. (Under Review)

PRESENTATION

Southern California Robotics Symposium. 2024. (Oral) Riverside, CA
Benchmarking Reactive Human-AI Collaboration Powered by Foundation Models

AWARDS & ACHIEVEMENTS

- Overall 2nd place for VTHacks IX Hackathon (387 participants) 2022
- IISE DAIS Mobile/Web App Competition Finalist 2022
- IISE Annual Conference & Expo, 4th place in final presentation 2022

COMPUTER SKILLS

Languages: Python, Java, JavaScript, C, Swift, MATLAB, Bash
Libraries: PyTorch, NumPy, Pandas, Huggingface

Robotics: ROS, Linux, PyBullet

WORK EXPERIENCE

Prof. Weijun Xie's Research Group Blacksburg, VA
Virginia Tech Aug 2021 - May 2022
Software Engineer

- Implemented an educational website for K12 students using JavaScript, Express.js, jQuery, and Bootstrap to showcase interactive drunk driver interdiction network.
- Processed asynchronous HTTP requests using Ajax and maintained/analyzed user data with MySQL, enabling data analysis for 5,000+ users.

PROJECTS

Steakhouse-AI Feb - May 2024
Multi-agent Reinforcement learning testbed extended from Overcooked environment

- Added 5 medium level actions and 4 unique dishes on top of Overcooked testbed.
- Developed an interactive game interface using Pygame to facilitate human-agent gameplay and communication

Fetch Arm Manipulation Jan 2024
Scripts for Fetch robot objects manipulation in iGibson simulated environment.

- Implemented Inverse Kinematics for precise robot configurations in response to target positions
- Generated motion planning trajectories using RRT algorithms to manipulate objects while avoiding collisions

Smart Search Mar 2022
Chrome extension enabling search contents in form of synonyms, images, and videos. Alternative for Ctrl + F

- Achieved ~90% search accuracy by building a Chrome extension with JavaScript for synonyms and image recognition and highlighting features.
- Developed website object detection pipeline using YOLO and launched it with google cloud

LANGUAGE

Chinese (Native), English (Full-professional), Japanese (Elementary)