Abrar Anwar

Ph.D Student in Computer Science

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EDUCATION

University of Southern California

Los Angeles, CA

Ph.D in Computer Science

Fall 2021 – Present

• Advised by Prof. Jesse Thomason

University of Texas at Austin

Austin, TX

Bachelors of Science in Computer Science

May 2021

• Honors Thesis: Deep Reinforcement Learning for Optimal Refinement of Cross-Sectional Mesh Sequence Finite Elements. Advised by Prof. Chandrajit Bajaj

National University of Singapore

Singapore

Exchange Program funded by Gilman Scholarship

Fall 2019

RESEARCH INTERESTS

- Language-guided Robotics: use language to improve safety, scene understanding, or evaluation on physical robots using controls/RL
- Embodied AI: transfer agents that can generalize from simulated environments to real-world robots
- Language Grounding: measuring how much pragmatic information that language provides a robot

Academic Works

- [1] ReMEmbR: Building and Reasoning over Long-Horizon Spatio-Temporal Memory for Robot Navigation Abrar Anwar, John Welsh, Joydeep Biswas, Soha Pouya, Yan Chang Preprint. In Review at ICRA 2024.
- [2] Contrast Sets for Evaluating Language-Guided Robot Policies Abrar Anwar*, Rohan Gupta*, Jesse Thomason CoRL 2024.
- [3] Generating Contextually-Relevant Navigational Instructions for Blind and Low Vision People Zain Merchant, Abrar Anwar, Emily Wang, Souti Chattopadhyay, Jesse Thomason RO-MAN Late Breaking Report. 2024 RO-MAN Interactive AI Workshop. 2024. Best paper award.
- [4] Which One? Leveraging Context Between Objects and Multiple Views for Language Grounding Chancharik Mitra*, Abrar Anwar*, Rodolfo Corona, Dan Klein, Trevor Darrell, Jesse Thomason NAACL 2024
- [5] Robot-assisted Inside-mouth Bite Transfer using Robust Mouth Perception and Physical Interaction-Aware

Rajat Jenamani, Daniel Stabile, Ziang Liu, Abrar Anwar, Katherine Dimitropoulou, Tapo Bhattacharjee HRI 2024. Best systems paper award nomination. Honorable mention.

- [6] Exploring Strategies for Efficient Real-World Language-Guided VLN Evaluation Abrar Anwar*, Rohan Gupta*, Elle Szabo*, Jesse Thomason CoRL 2023 Workshop on Language and Robot Learning. 2023. Oral. (Top 15% of papers)
- [7] Human-Robot Commensality: Bite Timing Prediction for Robot-Assisted Feeding in Groups Janko Ondas*, Abrar Anwar*, Tong Wu*, Fanjun Bu, Malte Jung, Jorge Ortiz, Tapo Bhattacharjee CoRL 2022
- [8] Watch Where You're Going! Gaze and Head Orientation as Predictors for Social Robot Navigation Blake Holman, Abrar Anwar, Akash Singh, Mauricio Tec, Justin Hart, Peter Stone ICRA 2021
- [9] Deep Reinforcement Learning for Optimal Refinement of Cross-Sectional Mesh Sequence Finite Elements Abrar Anwar

UT Austin Undergraduate Honors Thesis. May 2021

[10] Evolving Spiking Circuit Motifs using Weight Agnostic Networks

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AAAI 2021 Undergraduate Consortium

[11] Evolving Spiking Circuit Motifs using Weight Agnostic Networks

Abrar Anwar, Craig Vineyard, William Severa, Srideep Musuvathy, Suma Cardwell. Sandia Computer Science Research Institute Summer Proceedings. SAND2020-12580R. 2020.

[12] BrainSLAM: Robust autonomous navigation in sensor-deprived contexts

Felix Wang, James B. Aimone, **Abrar Anwar**, and Srideep Musuvathy Sandia National Labs Technical Report SAND2019-11302R. 2019.

PATENTS

[1] Incidental Perception for Robotics

Abrar Anwar, Yan Chang, Joydeep Biswas Provisional Utility Patent Application. NVIDIA. 2024.

[2] Neural Network Robustness via Binary Activation

William Severa, Craig Vineyard, Ryan Dellana, **Abrar Anwar** Non-Provisional Utility Patent Application. US 2021/0350236. Sandia National Labs. 2021.

EXPERIENCE

NVIDIA May 2024 - August 2024

Intern - PIs: Prof. Joydeep Biswas, Dr. Yan Chang

Santa Clara, CA

- Isaac Janus Team, working towards learning-based mobility foundation models. Focused on long-horizon language-guided memory for semantic navigation and planning.
- Designed long-horizon online memory for online perception, data curation, and triage to support Isaac Perceptor and GR00T efforts
- Collected human-annotated and synthetically-generated long-horizon video QA for navigation robots

Cornell University

May 2022 - July 2022

Visiting Scholar - PI: Prof. Tapo Bhattacharjee

Ithaca, NY

- ML for social dynamics understanding and robot-assisted feeding in groups

Cornell University, Google Research ExploreCSR, UTRGV

June 2021 - August 2021

Research Assistant - Prof. Tapo Bhattacharjee

Remote

- Social group dynamics simulation based on cognitive science for robot-assisted feeding

UT Austin, Building Wide Intelligence Lab

May 2018 - May 2021

Research Assistant - PI: Prof. Peter Stone, Prof. Justin Hart

Austin, TX

- Social navigation, human+robot gaze understanding, and navigation & manipulation robot infrastructure

Sandia National Laboratories

May 2020 - August 2021

Research Intern - PI: Dr. Craig Vineyard

Albuquerque, NM

- Neural network-hardware co-design and evolutionary methods for control

UT's Oden Institute, Computational Visualization Center

April 2020 - May 2021

Undergraduate Thesis - PI: Prof. Chandrajit Bajaj

Austin, TX

- Deep reinforcement learning for meshes and learning temporally-consistent SDFs

Sandia National Laboratories

May - July 2019

R&D Autonomy Intern - PI: Dr. James Brad Aimone

Albuquerque, NM

- Brain-inspired SLAM and localization for hypersonic flight vehicles

SERVICE

- 1. Lead Organizer, USC Robotics Seminar (UROS). Fall 2023-
- 2. Founding Editor, USC RASC Blog. 2024-
- 3. Lead Organizer, USC Robotics Visit Day Events, 2022-
- 4. Recurring Panelist, Google Computer Science Research Mentorship Program (each semester from 2021-23)
- Reviewing: ICLR 2024, CoRL 2024, RA-L 2024, ACL Rolling Review 2023-4, EMNLP 2023, ICRA 2023-25
- 6. Reviewer of RO-MAN 2024 Workshop Proposals
- 7. Workshop Reviewing: LangRob Workshop @ CoRL 2023, Social Intelligence Workshop @ RSS 2024

MENTORSHIP

• Emily Wang (undergraduate, USC)	2023-Present
• Rohan Gupta (undergraduate, USC)	2023-Present
• Yiming Tang (master's, USC)	2023-Present
• Zain Merchant (undergraduate, USC)	2023-2024
• Kyle He (undergraduate, USC)	2023-2024
- Chancharik Mitra (undergraduate, Berkeley) \rightarrow CMU MS	2023
- Lydia DiBlasio (undergraduate, USC) \rightarrow ML @ Oracle	2023
ullet Elle Szabo (undergraduate, USC) $ o$ Founded startup	2022-23
• Caleb Pong (high school, USC SHINE)	2023

Presentations

- [1] ReMEmbR: Building and Reasoning Over Spatio-Temporal Memory for Robot Navigation NVIDIA Jetson AI Lab. October 2024
- [2] Human-Robot Commensality: Bite Timing Prediction for Robot-Assisted Feeding in Groups SoCal Robotics Symposium. September 2022
- [3] Evolving Spiking Circuit Motifs using Weight Agnostic Neural Networks

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ACM International Conference on Neuromorphic Systems (ICONS). July 2020.

Media

Using Generative AI to Enable Robots to Reason and Act with ReMEmbR. Tech Blog. More soon! 2024. Robotic system feeds people with severe mobility limitations. TechXplore and Cornell Chronicle. 2024.

Providing Access to Computing Technologies. NSF Convergence Accelerator. 2023.

USC Robotics Open House 2023. USC Viterbi. 2023.

Robot that learns social cues could feed people with tetraplegia. NewScientist. 2022.

AWARDS, HONORS & RECOGNITION

• Outstanding Mentor Award from USC Viterbi Graduate Mentorship Program	2024
• Horatio Alger Graduate Scholar (100k fellowship). 1 of 7 winners out of 89 applicants.	2023
• NSF GRFP Honorable Mention	2023
• USC Graduate Fellowship, for 1 year of the Ph.D program	2021-22
• Research Distinction, UT Austin College of Natural Sciences - top 5% of UT seniors in research	2021
• CNS Award for Excellence in Computer Science (\$500) - Undergraduate Research Forum, UT Austin	2021
• Google Computer Science Research Mentorship Program (CSRMP) Class of 2021	2021
• AAAI Undergraduate Consortium - 1 of 14 accepted out of 82 applicants	2021
• Benjamin A. Gilman International Scholar (Singapore)	Fall 2019
• Horatio Alger Honeywell Scholar	2017-21
Technical Skills	

Languages: Python, C/C++, MATLAB, Java, R, JavaScript, C#, LATEX

Technologies: PyTorch, Tensorflow, Pandas, ROS, sklearn, OpenCV, OpenAI Gym, Unity, OpenMPI

Robots: BWIBot, Toyota HSR, UR5, Kinova Gen2 + Gen3, Franka Panda, LoCoBot, NVIDIA Nova Carter