

EDUCATION

- **University of Texas at Austin** Austin, TX
Master of Science in Electrical and Computer Engineering; GPA: 4.00 Aug. 2024 – Present
- **Birla Institute of Technology and Science** Pilani, India
B.E in Electrical and Electronics; M.Sc. in Chemistry; GPA: 8.86/10 (top 10% of the class) Aug. 2017 - July. 2023

RESEARCH EXPERIENCE

- **University of Texas at Austin** Learning Agents Research Group
Research Student June 2024 - Present
Supervisors: Prof. Peter Stone, Dr. Roberto Martin-Martin
 - **LLM assisted Task and Motion Planning:**
 - * Given some objects in an unknown home, we use a Large Language Model to generate an initial belief of their poses and use text embeddings to know the similarity between the objects.
 - * We create a correlational particle filter that updates the belief of objects based on the observations made by the robot (using probabilities from similarities).
 - * Task and Motion Planning, and execution performed in pybullet simulation using PDDLStream, and the realistic Kitchens' World.
 - **RoboCup@Home** [🔗](#) :
 - * Team member of the UT Austin Villa@Home team competing in the 2025 RoboCup@Home competition.
 - * Preparing the robot to perform household tasks involving general perception, manipulation, and planning.
- **IIIT Hyderabad** Robotics Research Centre, Hyderabad
Research Engineer Oct 2022 - Present
Direct Supervisor: Prof. Madhava Krishna
Collaborators: Dr. Mohan Sridharan, Dr. Krishna Murthy Jatavallabhula, Dr. Brojeshwar Bhowmick
 - **CLIPGraphs** [🔗](#):
 - * Integrated graph networks with multimodal input data to develop commonsense reasoning. Objects are mapped to their correct rooms for the rearrangement task in Embodied AI.
 - * Trained the graph network to generate an embedding space that efficiently represents the similarity between graph nodes.
 - * My contributions: Formed and trained the graph convolutional network along with ablations on various contrastive loss functions. Also worked on paper writing and presented the paper at IEEE RO-MAN 2023, and EEML Summer School 2023.
 - **Anticipate & Act** [🔗](#):
 - * This project aims to create an intelligent household agent that can learn the pattern of task execution.
 - * Used and compared different Large Language Models for extracting user behavior and preferences.
 - * Created representations of tasks and actions in Planning Domain Definition Language (PDDL).
 - * Paper accepted at IEEE ICRA 2024.
 - * My Contributions: I formulated and led this project with a team of 4 students. Generated the diverse state and action space in PDDL, prompted different LLMs along with major part of paper writing.
- **University of Luxembourg** Theoretical Chemical Physics, Luxembourg
Research Assistant June 2021 - Oct 2022
Supervisor: Prof. Alexandre Tkatchenko
 - **Deep learning for quantum chemistry:**
 - * This project leveraged machine learning for generating a well modeled chemical compound space that maps chemical properties of molecules to their molecular structure.
 - * Developed novel molecular descriptors to mathematically encode molecules. In this method, existing geometric descriptors are combined with electronic properties to generate appropriate molecular representation.
 - * Used Autoencoders to reduce the dimensionality of high-dimensional geometric descriptors like SLATM, and Bag-of-bonds, for training the neural network.
 - * Aimed to improve the prediction of properties, which is crucial for drug discovery, with a focus on transferability and scalability of ML models.

PUBLICATIONS

- **Harnessing Discrete Representations for Bayesian Inference of Gene Regulatory Networks with GFlowNets**: N. Pande, **Raghav Arora**, D. Liu
In: Women in Machine Learning Workshop at NeurIPS 2024 ([🔗](#)).
- **Anticipate & Act: Integrating LLMs and Classical Planning for Efficient Task Execution in Household Environments** [🔗](#) : **Raghav Arora**, S. Singh, K. Swaminathan, A. Datta, S. Banerjee, B. Bhowmick, K. Jatavallabhula, M. Sridharan, and M. Krishna
In: IEEE International Conference on Robotics and Automation (ICRA) ([🔗](#)). Yokohama, Japan.
- **Anticipate & Collab: Data-driven Task Anticipation and Knowledge-driven Planning for Huma-robot Collaboration** [🔗](#) : S. Singh*, K. Swaminathan*, **Raghav Arora***, R. Singh, A. Datta, S. Banerjee, D. Das, M. Sridharan, and M. Krishna
In: Cooking Robotics Workshop at ICRA ([🔗](#)). Yokohama, Japan.
- **CLIPGraphs: Multimodal Graph Networks to Infer Object-Room Affinities** [🔗](#): Ayush Agrawal*, **Raghav Arora***, A. Datta, S. Banerjee, B. Bhowmick, K. Jatavallabhula, M. Sridharan, and M. Krishna
In: 32nd IEEE International Conference on Robot and Human Interactive Communication ([🔗](#)). Busan, Korea And, In: Pretraining for Robotics Workshop at the 2023 International Conference on Robotics and Automation - ICRA ([🔗](#))

TEACHING AND LEADERSHIP EXPERIENCE

- **Teaching Assistantship (Full Course)**: Neural Networks and Fuzzy Logic (BITS Pilani, 2020). Took lectures, quiz invigilation, and created project assignments in a course of 400 students.
- **Student Assistantship**: ([PSD](#), BITS Pilani, 2020). Organized online industry exposure practice school for junior batches during COVID-19. This included creating a learning management system to allow companies and professors to create online sessions for students, create quizzes and grade them.
- **Lecture**: (RRC Summer School, 2023) Took a session on introduction to Deep Learning, theory and frameworks used in recent research.
- **Volunteer Work**: Teaching underprivileged children at [Make a Difference](#) (2022-2023). 3 out of 5 students taught qualified university entrance exams and joined Bachelor of Computer Applications.
- **Projects' Head**: Led a team of 20+ developers for University wide applications and websites ([DVM](#), BITS Pilani, 2019-2020)

FELLOWSHIPS

- **Eastern European Machine Learning Summer School, 2023**: For attending the summer school and poster presentation on CLIPGraphs.
- **Pioneer Research Grant**: Research Fellowship for conducting my off-campus thesis work on 'Deep learning for quantum chemistry using Density Functional Tight-Binding Method' ([IPCD BITS Pilani](#), 2022)

PROJECTS

- **Investigation of image mosaicing techniques for UAV navigation** [Dr. Meetha V. Shenoy](#)
Mosaicing aerial images captured by swarm of UAVs(Unmanned Aerial Vehicles), using feature detection and blending algorithms. We use Convolutional Neural Networks for extracting relevant features from aerial images, and match the common features to blend different images. RANSAC variation of BaySac algorithm is used for seamlessly blending the images, resulting in a large field of view for navigation.
- **E-Wallet** : Development RESTful APIs used by college students to make payments using the college app. It was used during college fest with a total participation of 4000 participants generating sales worth \$30,000 in five days. Major drawback involved a bug in the E-Wallet: race conditions. It took months of reading and rewriting the code to fix the bug, and ultimately, I made use of celery to make the firebase calls asynchronous to solve the problem. Included work in Python, Javascript, Django, SQL, among other tools.

TECHNICAL SKILLS

- **Areas of Interest**: Representation Learning, Robotics, Computer Vision, Reinforcement Learning
Proficient in:: Python, PyTorch, Keras, Git, \LaTeX , C++, Java, Docker
Robotic Simulators: [Gazebo](#), [Pybullet](#), [Coppeliassim](#), [AI2THOR](#), [AIHabitat](#), [VirtualHome](#), [PDDLStream](#)