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Vidhi Jain

Education

2022–Present **Doctorate in Robotics, Carnegie Mellon University**.
Robotics Institute, Advisor: Yonatan Bisk

2019–2021 **Masters of Science in Robotics, Carnegie Mellon University**.
Robotics Institute, *GPA 4.0* Advisor: Katia Sycara

2014–2018 **Bachelor of Engineering (Honors) in Computer Science, BITS Pilani**.
CGPA 9.06/10.00, Distinction, Advisor (off-campus thesis): Aaron Courville

Publications and Presentations

Dec 2022 *Vidhi Jain*, Yixin Lin, Eric Undersander, Yonatan Bisk, Akshara Rai, **Transformers are Adaptable Task Planners**, Conference on Robot Learning (CoRL) 2022, Auckland, New Zealand. Video | Full Paper | Website | Code

Dec 2022 *Vidhi Jain*, Jayant Sravan Tamarapalli, Sahiti Yerramilli, Yonatan Bisk, **MAEA: Multimodal Attribution for Embodied AI**, NeurIPS 2022, 5th Robot Learning Workshop: Trustworthy Robotics (RLW 2022), & NeurIPS 2022 Progress and Challenges in Building Trustworthy Embodied AI Workshop (TEA 2022), New Orleans, USA. Short Paper | Website

Oct 2020 *Vidhi Jain*, Rohit Jena, Huao Li, Tejus Gupta, Dana Hughes, Michael Lewis, Katia Sycara, **Predicting strategies in simulated search and rescue tasks**, NeurIPS AI+HADR 2020, Virtual. Video | Preprint

Oct 2020 *Vidhi Jain*, Shishir Patil, Prakhar Agarwal, Katia Sycara, **Learning Embeddings that Capture Spatial Semantics for Indoor Navigation**, NeurIPS 2020 Object Representations for Learning and Reasoning (ORLR 2020), Virtual. Video | Preprint | Code

Jul 2020 *Vidhi Jain*, Simin Liu, Ganesh Iyer, **Coping with sample inefficiency in deep reinforcement learning (DRL) in embodied AI**, ICML'20 Women In Machine Learning (WiML) Un-Workshop, Virtual. Discussion | Presentation

Aug 2017 Sajjad Gholami, Oliver Schulte, *Vidhi Jain*, Qiang Zhao, **Model Selection Scores for Multi-Relational Bayesian Networks**, IJCAI 2017 Declarative Learning Based Programming (DeLBP). Invited Paper

May 2017 *Vidhi Jain*, Prakhar Agarwal, **Symptomatic Diagnosis and Prognosis of Psychiatric Disorders through Personal Gadgets**, Student Research Competition at ACM Conference on Human Factors in Computing Systems (CHI 2017), Denver, USA. Short Paper

Dec 2016 *Vidhi Jain*, Matthias Frank, **Empowering API Consumer Community: Collaborative Annotation of Web API Documentation for Semantically Structured Format**, Grace Hopper Conference India (GHCI 2016), Bengaluru, India. Extended Abstract | Poster

Experience

Sep'22–Present **Connecting Language to Actions & the World (CLAW) Lab**, *CMU Pittsburgh, PA, USA*.
PhD student with Yonatan Bisk
- Training motion policies in simulated tasks with rich physical context and language instruction diversity.
- Enforcing language grounding in LLMs through information-seeking actions and their outcomes.
- Training the whole-body control policy for the end-effector's smooth traversal through the waypoints to improve task efficiency in successive pick-place tasks.

Sep'21– Aug'22 **Meta (Facebook)**, *Menlo Park, CA, USA*.
AI resident with Akshara Rai and Yixin Lin
- Developed procedural generation of feasible trajectories for loading the simulated dishwasher in AI Habitat Replica Synthetic Apartment 0 Kitchen. Code
- Trained Encoder-decoder Transformer-based high-level policy for learning preferences in loading dishwasher from a single demonstration as prompt. Paper
- Demonstrated the transfer to real hardware with a Robot arm (Franka-Emika) to load dishes in drawers. Website

Sep'19– Aug'21 **Advanced Agent-Robotics Technology (AART) Lab**, *CMU Pittsburgh, PA, USA*.
Graduate Research Assistant with Katia Sycara
- **Minimap for Minecraft** Aggregated 2D representation of the Minecraft 3D voxelized map for urban search and rescue scenario by customizing `gym-minigrid` environment Code | Slides
- **Predicting Navigation intent for Artificial Social Intelligence for Successful Teams (ASIST)** Modelled navigation using Transformers to predict an individual's strategy based on their previous trajectory. Paper
- **Visual dialogue for Human-robot tele-communication** Developed dialog-driven navigation for embodied AI by adapting language models for the identification of the target and its contextual attributes. Code

Aug'18– Aug'19 **Microsoft Research**, *Bengaluru, India*.
Research Fellow with Amit Deshpande and Navin Goyal
- **Divergence minimization in GANs** Investigated the properties of Jensen Shannon and Wasserstein divergences between the given and the generated distributions during training neural network generators, to discuss the learning dynamics like convergence and generalization.
- **Unsupervised learning from Information-theoretic perspective** Experimented with techniques like Contrastive Estimation, Predictive Coding, and Mutual Information to explain the empirical performance of unsupervised learning strategies and the existing gap compared to the supervised performance.

Jan'18– Jun'18 **Montreal Institute for Learning Algorithms (MILA)**, *Montreal, QC, Canada*.
Research Intern with Aaron Courville
- **Out-of-Distribution Detection in Generative Models** Experimented on autoregressive generative models and Variational Autoencoders, to detect any 'out-of-distribution (OOD)' sample at deployment. Thesis
- **Distillation in Generative Models** Investigated probabilistic knowledge distillation in autoregressive generative models and looked into the challenges in minimizing only Kullback Leibler (KL) divergence between the two distributions modeled by teacher and student network for a high-dimensional output in generative models.

May'17– Jul'17 **Simon Fraser University (SFU)**, *Burnaby, BC, Canada*.
MITACS Globalink Research Intern with Oliver Schulte
- **Learning Bayesian Networks for Relational Databases** Remodelled existing codebase for project *FactorBase* to integrate cross-table sufficient statistics or population variables in the contingency tables for learning ground-level sufficient statistics. Code

May'16– Jul'16 **Forschungszentrum Informatik (FZI)**, *Karlsruhe, Germany*.
Research Intern with York Sure-Vetter and Matthias Frank
- **API annotation platform using Semantic Web** Designed and developed a customized Semantic MediaWiki for annotation of APIs for dynamic integration of provenance information in the decision support system of Project *BigGIS*; Presented Technical Poster at Grace Hopper Celebration India GHCI'16, Bengaluru, India;

Academic Projects

Mar'20– May'20 **Learning Diverse Goal-Conditioned Policies for Frontier Selection in Navigation**.
Deep Reinforcement Learning for Robotics : Decomposed the task of map exploration into modular differentiable policies that can be combined hierarchically for navigation strategy: (1) implemented the 'global' policy for proposing frontier locations that lead to high coverage, and (2) created sub-maps from a planner for the 'local' policy trained for low-level control. [Report]

Nov'19– Dec'19 **Towards Zero-Shot Alignment and Retrieval for Forensic Detection**.
Intro to Machine Learning (PhD) : Designed contrastive learning-based noise removal architecture for matching probed shoe prints with the reference image. [Report]

Selected Awards and Honors

Aug 2020 **CIFAR Deep Learning Reinforcement Learning Summer School**

Apr 2020 **Young Researcher at Heidelberg Laureate Forum (HLF '20)** among 224 researchers worldwide.

Jul 2019 **J N Tata Endowment Scholarship for Higher Studies, India**

Jun 2019 **K. C. Mahindra Scholarships for Post-Graduate Studies Abroad**

Mar 2017 **Citi Women Leader Award (CWLA), Mumbai, India**, Awarded one year of study scholarship covering upto INR 400,000 i.e. USD 6000, among the top 3 out of 1200 applicants

Jun 2016 **GE Foundation Scholar-Leaders Program (GEFSLP)**, Awarded USD 2000 for two years of study, among top 5 scholars selected in India

2014–15 **Merit Scholarship** by Dean, BITS Pilani, *Top 1% among the batch of about 900 students*

2013 **Awarded Kishore Vaigyanik Protsahan Yojna (KVPY) Fellowship** by Dept of Science and Tech., Govt.of India

2010 **Awarded National Talent Search Exam (NTSE) Scholarship** by NCERT, India

2010 **National Standard Examination in Junior Science (NSEJS) (Top 1% in Regional State)**

Talks

Oct 2021 SAiDL (Virtual) - *3 brushes to paint your research canvas* Video | Event Poster

May 2019 PyLadies Bangalore - *Tutorial on Deep Learning with PyTorch* Presentation | Event Poster

Jan 2019 *The One in Asankhya Project* by Sukriti Paul and Mansi Goyal Video | Blog

Aug 2018 IIIT-Bangalore ACM Student Chapter Video

Jul 2017 Six students for panel discussion on 'Innovation by Young India', telecasted on national news channel NDTV India Video

Professional Service and Leadership

Jan'20–Present **Reviewer** at International Conference on Machine Learning (ICML), Neural Information Processing and Signal (NeurIPS) and International Conference on Learning Representations (ICLR).

Jan'23–Present **Teaching Assistant** for 16720 Computer Vision by Deva Ramanan.

Sep'17–May'18 **Co-Founder and Vice Chair** | BITS Pilani Association for Computing Machinery-Women Chapter, *Started with 16 on-campus girls, organized project brainstorming and mentoring sessions*

Jan'17–May'17 **Teaching Assistant** | CS F111 Computer Programming by Vishal Gupta, *Mentored 35 students for 4 hours per week for Code programming lab sessions*

May'15–Aug'15 **Technical Volunteer** | ARISE Impact, non-profit organization *Developed Android application for Audio-based learning for visually challenged*

Courses

- Intro to Machine Learning (PhD)
- Deep RL for Robotics (seminar)
- Computer Vision
- Convex Optimization
- Deep Reinforcement Learning and Control (intro)
- Kinematics, Dynamics and Control

References

Yonatan Bisk, Assistant Professor, Carnegie Mellon University, ybisk at andrew.cmu.edu

Akshara Rai, Research Scientist, Meta (previously Facebook), Menlo Park, akshararai at fb.com