Omkar Patil

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I completed my Bachelor's and Master's degrees at IIT Madras, where I built a strong foundation in robotics and machine learning. I am currently pursuing my Ph.D. at Arizona State University (ASU) in Dr. Nakul Gopalan's lab, focusing on robot learning, particularly methods that leverage compositionality to build generalizable manipulation skills.

Education

Arizona State University *August 2023 – May 2028*

Doctor of Philosophy in Computer Science

- Planning/Learning Methods for AI
- Knowledge Representation and Reasoning

Indian Institute of Technology, Madras *July 2018 – May 2020*

Master of Technology in Robotics and AI

- Deep Learning
- Reinforcement Learning

Indian Institute of Technology, Madras *December 2015 – December 2019*

Bachelor of Technology in Mechanical Engineering

- Computational Heat & Fluid Flow
- Design of Machine Elements

Experience

Graduate Intern *September 2025 – January 2026*

Robotics and AI Institute (Formerly BDAI)

Fall intern in the Compose team working on long-horizon manipulation

Graduate Research Assistant *July 2023 – Present*

Arizona State University

Research assistant in Dr. Nakul Gopalan's lab at Arizona State University.

Senior Quantitative Analytics Specialist *October 2022 – July 2023*

Wells Fargo

Member of the Artificial Intelligence and Automation team within Corporate Model Risk.

- Researched and implemented prompt-tuning on language models for generating different kinds of paraphrases for downstream applications such as robustness testing.
- Collaborated with other researchers within the team to develop methodologies for evaluating model weaknesses with a special focus on text classification models.

Quantitative Analytics Specialist *August 2020 – October 2022*

Wells Fargo

Member of the Artificial Intelligence and Automation team within Corporate Model Risk.

- Explored text generation for the task of paraphrasing and developed a new metric to evaluate the quality of paraphrases.
- Surveyed various document automation frameworks present in literature.
- Contributed significantly to the internal code library and made several presentations on research projects, across the group

Research Intern *May 2018 – July 2018*

Eaton

Survey research on amorphous metals in the Additive Manufacturing team.

- Performed extensive literature review to put forward Eaton products that could benefit from amorphous metals.

- Enhanced cold spray simulation capability by creating a Python script for the fluid dynamics part of the simulation

Head *April 2017 – May 2018*

Institute WebOps and MobOps

Lead of the official mobile development team of IIT Madras.

- Led a team of 9 students for the development of the 'Students App', managing a budget of ~INR 3L.
- Increased the number of active users by ~160%, to 6500+ students, with 12000+ downloads in total.
- Developed a sophisticated Java front-end and PHP back-end to build a secure and useful application on Android.
- Introduced innovative features such as a complaints portal, institute-attuned timetable, and calendar

Publications

Factorizing Diffusion Policies for Observation Modality Prioritization *April 2025*

ICRA 2025 Workshop on Foundation Models and Neuro-Symbolic AI for Robotics| *Omkar Patil, Prabin Rath, Kartikay Pangaonkar, Eric Rosen, Nakul Gopalan*

Method to prioritize observational modalities, such as vision over tactile for learning diffusion policies.

Learning Sequential Kinematic Models from Demonstrations for Multi-Jointed Articulated Objects *May 2025*

Arxiv | *Anmol Gupta, Weiwei Gu, Omkar Patil, Jun Ki Lee, Nakul Gopalan*

Framework that learns kinematic constraints and manipulation sequences of multi-DoF objects from human demonstrations.

Composing Diffusion Policies for Few-shot Learning of Motions *October 2024*

Compositional Learning Workshop @ NeurIPS 2024 | *Omkar Patil, Anant Sah, Nakul Gopalan*

Compositional approach that enables few-shot learning for novel skills by utilizing a combination of base policy priors is presented.

Hardware-Software Co-Design for Path Planning by Drones *October 2024*

IROS 2024 | *Ayushi Dube*, Omkar Patil*, Gian Singh, Nakul Gopalan, and Sarma Vrudhula*

This work consists of designing a hardware-software co-design, MT+, for adapting the Mikami-Tabuchi (MT) algorithm for on-board path planning by drones in a 3D environment.

Learning Temporally Composable Task Segmentations with Language *October 2024*

IROS 2024 | *Divyanshu Raj, Omkar Patil, Weiwei Gu, Chitta Baral and Nakul Gopalan*

We present an approach to identify sub-tasks within a demonstrated robot trajectory with the supervision provided by language instructions.

Understanding metrics for paraphrasing *May 2022*

Arxiv | *Omkar Patil, Rahul Singh, Tarun Joshi*

We propose a novel metric ROUGE-P to measure the quality of paraphrases along the dimensions of adequacy, novelty and fluency.

Document automation architectures and technologies: A survey *September 2021*

Arxiv | *Mohammad Achachlouei*, Omkar Patil*, Tarun Joshi, Vijayan Nair*

This paper surveys the current state of the art in document automation in light of recent advances in AI and deep neural networks.

Skills

Robotics: Robot Learning, Generative Modeling, Compositional Learning

Natural Language Processing: Human-robot Interaction, Robustness