

Pranay Mathur

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EDUCATION

M.S. Robotics (AI and Perception)	Georgia Institute of Technology	Aug 2022 – May 2024
B.E. Electronics and Instrumentation	Birla Institute of Technology and Science, Pilani	Aug 2017 – July 2021

EXPERIENCE

Collaborative Robotics — Machine Learning Engineer, Perception Seattle, WA	Jan 2025 – Present
<ul style="list-style-type: none">Setup scalable training, inference, evaluation and monitoring pipeline to train vision models with DDP and multi-GPU supportDeveloped pipeline to fine-tune vision foundation models to automate data annotation pipelines and for knowledge distillation	
MathWorks — EDG Software Engineer Natick, MA	June 2024 – Jan 2025
<ul style="list-style-type: none">Implemented vision foundation models and wrote custom transformer layers to achieve a 10x speed up in inferenceDeveloped an ML-based recommendation algorithm using language embeddings and KNN to match development teams with candidates	
MathWorks — Engineering Development Group Intern Natick, MA	May 2023 – Aug 2023
<ul style="list-style-type: none">Developed the test harnesses search feature in the Simulink Test Toolbox using graph search algorithms and deployed it to productionOptimized the C++ and MATLAB back-end of the Simulink Test Toolbox achieving a 70% speed-up over original execution time	
Google Summer of Code — Open-source Developer Remote	June 2022 – Aug 2022
<ul style="list-style-type: none">Utilized 3D multi-view geometry and object detection for mapping landmarks and path-finding for a 1:10 scale autonomous racing carImplemented model compression using quantized EfficientDet to improve inference speed on an embedded PC with an Edge TPU	
Addverb Technologies — Perception Engineer, Mobile Robotics India	Aug 2021 – July 2022
<ul style="list-style-type: none">Prototyped appearance-based navigation using spatio-temporal LSTM for semantic-scene understanding and efficient image retrievalUsed bag-of-words of learnt key-point descriptors for Visual-Place Recognition (VPR) to augment SLAM and de-localization recoveryShipped monitoring and control infrastructure for a fleet of autonomous mobile robots on the cloud for low-latency visualization	
Autonomous Robots Lab, UNR— Undergraduate Researcher Reno, NV	July 2020 - Jan 2021
<ul style="list-style-type: none">Developed a generalizable Resource-Aware algorithm for deployment of Visual Inertial Odometry (VIO) algorithms on computationally constrained aerial vehicles achieving a reduction in average CPU usage of up to 50% under the guidance of Prof. Kostas AlexisReleased two official ROS and ROS2 perception packages - a ROS wrapper for Open3D and example use-cases with pointcloudsContributions selected for presentation as a Lightning Talk at ROSCon 2020 and are part of official ROS-Perception repositories	
KPIT Technologies — Research Intern India	May 2020 – July 2020
<ul style="list-style-type: none">Developed CNN based multi-modal sensor fusion architecture for object detection using a 3D LiDAR, monocular camera and RADARImplemented architecture for low-latency inference in self-driving cars during adverse weather, low-illumination and partial occlusions	

PUBLICATIONS (Selected)

EgoMimic: Scaling Imitation Learning through Egocentric Video

Simar Kareer, Dhruv Patel*, Ryan Punamiya*, **Pranay Mathur***, Shuo Cheng, Chen Wang, Judy Hoffman, Danfei Xu – IEEE International Conference on Robotics and Automation (ICRA), 2025

Neural Visibility Field for Uncertainty-Driven Active Mapping

Shangjie Xue, Jesse Dill, **Pranay Mathur**, Frank Dellaert, P. Tsiotras, Danfei Xu – IEEE/CVF Computer Vision and Pattern Recognition (CVPR), 2024

Proactive Human-Robot Interaction using Visuo-Lingual Transformers and Object Interaction Graphs (*Best Paper Award*)

Pranay Mathur – Geriatrionics Workshop - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2023

Resource-aware Online Parameter Adaptation for Computationally-constrained Visual-Inertial Navigation Systems

Pranay Mathur, Nikhil Khedekar, Kostas Alexis - IEEE-RAS International Conference on Advanced Robotics (ICAR), 2021

A Generalized Kalman Filter Augmented Deep-Learning based Approach for Autonomous Landing in MAVs (*Best Paper Award*)

Pranay Mathur, Yash Jangir, Neena Goveas - IEEE International Symposium of ACA on Intelligent Robotics and Industrial Automation (IRIA), 2021

PROJECTS (Selected)

Embodiment Agnostic Long-Horizon Manipulation with Differentiable Kinematics using Human-Play Data	Aug 2023 – May 2024
Faculty Advisor: Dr. Danfei Xu, Assistant Professor at Georgia Tech and Research Scientist at NVIDIA AI	
<ul style="list-style-type: none">Worked on generalizable manipulation policies by scaling imitation learning through egocentric videos of human-play dataImplemented vision encoder for a trajectory prediction model using the DINOv2 foundation model with LoRA. Achieved embodiment agnostic visual representations by aligning latent-space visual embeddings using an auxiliary KL divergence loss and manipulator maskingImplemented a modified version of action-chunking with transformers (ACT) using Differentiable-Kinematics and integrated it with low-level controllers for a modified version of the ALOHA robot platform	
Long-Horizon planning of Next-best-view of NeRFs and Gaussian Splats	Aug 2023 – Nov 2023
Faculty Advisor: Dr. Danfei Xu, Assistant Professor at Georgia Tech and Research Scientist at NVIDIA AI	
<ul style="list-style-type: none">Established SOTA in visibility-based uncertainty quantification in Neural Radiance Fields (NeRFs) applied to active mapping approachesImplemented pose optimization pipeline and active mapping baselines to evaluate and compare our proposed approach with current SOTA	
Human-Motion Prediction: With great power comes great res-pose-ability	Jan 2023 – May 2023
Faculty Advisor: Dr. Zsolt Kira, Assistant Professor at the School of Interactive Computing	
<ul style="list-style-type: none">Implemented transformers and Convolutional Seq-to-Seq models for human-motion prediction on computationally-constrained systemsAchieved comparable performance to several baselines implemented in the fairmotion library at reduced computational costs	

SKILLS

Tools/Frameworks: C, C++, Python, Java, Bash, CUDA, PyTorch, TensorFlow, CMake, OpenCV, OpenMP, ROS 1/2, MATLAB, Linux, GitHub, AWS

Courses: Deep Learning, Data Structures and Algorithms, Object Oriented Programming, Advanced Computer Vision, State Estimation and Localization