Udit Ekansh

West Lafayette, IN · uekansh@purdue.edu · 929-606-4462
linkedin.com/in/udit-ekansh · udit176.github.io

EDUCATION

Purdue University, USA – MS in Autonomy — Aug 2024 – May 2026

MIT Art, Design, and Technology University, India – B.Tech in Mechatronics and Automation Engineering — Jul 2019 – May 2023

TECHNICAL SKILLS

Languages: Python, C++, C, MATLAB, ARM Assembly

Simulation & Modeling: ROS, ROS2, Gazebo, Simulink, AnyBody Modeling System

Tools: Linux, Git, LaTeX, STM32 (hardware), Docker

ML & Data: PyTorch, NumPy, pandas, scikit-learn, matplotlib

Certifications: Machine Learning – Stanford/Coursera · MATLAB Onramp – MathWorks · What is Data Science? – IBM/Coursera

EXPERIENCE

Research Engineer, Learning from Demonstration | SCALE Robotics Lab, Purdue – West Lafayette, IN — Sep 2025 – Present
Advisor: Prof. Rohan Paleja

- Built an automated labeling pipeline for 40 Kinova Gen3 Lite user studies, converting raw teleoperation trajectories into phase-level mistake, correction, and exploration labels for policy training; removing off-task correction segments before behavior cloning reduced path inefficiency by 29% (8.17 to 5.80) compared with training on all demonstrations.

Research Engineer, Perception & Biomechanics | TRACE Lab, Purdue – West Lafayette, IN — Aug 2025 – Present
Advisor: Prof. Yan Gu

- Built a calibrated 4-camera 3D pose pipeline for human motion analysis, achieving 15 mm mean error across 17 joints.
- Built an inverse dynamics pipeline in AnyBody and MATLAB to estimate caregiver–patient interaction forces, enabling data-driven design of assistive humanoid control strategies.

Software Engineering Intern, Distributed Systems | YWG Labs – Portland, OR — Jun 2025 – Sep 2025

- Built a blockchain-backed, token-metered billing system in Go and Python using async I/O, caching, and batch processing, enabling real-time usage tracking and automated payment settlement.
- Migrated centralized database to a distributed blockchain-backed system, reducing latency by 40%, sustaining 39 TPS at 99% reliability, and eliminating single points of failure.

Research Engineer, Multi-Agent Systems | Purdue Digital Twin Lab – West Lafayette, IN — Jan 2025 – May 2025
Advisor: Prof. Ziran Wang

- Built a decentralized multi-agent navigation framework in which car-like robots share intent and feasible motion sets via V2V, removing centralized planning.
- Improved simulated task success from 53% to 80% in shared-goal navigation and from 47% to 93% in constrained parking, eliminating deadlocks in warehouse-like environments.

Research Engineer, Autonomous Systems | Indian Institute of Technology, Bombay – India — Jul 2023 – Jul 2024
Advisor: Prof. Leena Vachhani

- Designed a real-time GNC framework for AUV navigation in unknown 3D environments using onboard sonar only, with no GPS or prior map required.
- Achieved 4-5x lower peak accelerations than a PID baseline in ROS-Gazebo simulation under sensor noise and environmental uncertainty.

Business Strategy Intern | TATA Power – Bombay, India — Mar 2023 – Jun 2023

- Co-authored a 100+ source technical review of robotics in power systems; findings directly shaped the company's automation R&D roadmap.

PUBLICATIONS

Instantaneous Planning, Control and Safety for Navigation in Unknown Underwater Spaces. V. Karthik, U. Ekansh, T. Bedmutha, S. Vishwakarma, R. Deshpande, L. Vachhani. Preprint.

PROJECTS

- **Autonomous Exploration on TurtleBot3:** Designed a fully autonomous exploration stack; end-to-end mapping of unknown environments with zero human input. *(ROS2, frontier SLAM, A*, Python)*
- **Causal RL for Robotic Manipulation:** Domain-shift success improved from 47% to 93%; zero-shot task transfer enabled without retraining. *(PyTorch, causal inference)*
- **Offline RL for Robot Navigation:** 94% navigation success with tuned Behavioral Cloning; diagnosed conservative Q-learning failure modes in discrete action spaces. *(PyTorch, Gazebo, Reinforcement Learning)*
- **Transparent Reinforcement Learning:** Q-values exposed across all 64 states with live policy, confidence, and heatmap visualizations. *(Python, tabular Q-learning, policy interpretability)*
- **California Housing Price Prediction:** Implemented linear regression from scratch using the Normal Equation; RMSE 0.74 (train) / 0.75 (test). *(Python, NumPy, linear algebra, data preprocessing)*
- **PythonSystemID (Open-Source Library):** Modular system ID library with parametric and grey-box models and reproducible evaluation pipelines. *(Python, control theory, system identification, dynamical systems)*

VOLUNTEERING & SERVICE

Educational Ambassador | CARE, Purdue – West Lafayette, IN — Jun 2025 – Present

- Lead peer education sessions on interpersonal violence prevention, consent, and bystander intervention across Purdue residence halls and student organizations.

Student Security Patroller (Part-Time) | Purdue University Police Department – West Lafayette, IN — Aug 2024 – Present

- Support campus safety through proactive patrol and incident reporting during high-traffic and overnight shifts.

Conference Volunteer | IEEE MARSS, Purdue – West Lafayette, IN — Jul 28 – Aug 1, 2025

- Coordinated session logistics and speaker support across parallel tracks of an international robotics conference.

Cultural Exchange & Business Development Manager | AIESEC – Pune, India — Feb 2020 – Jan 2021

- Secured 5+ corporate sponsorships and directed hybrid event operations for 100+ international participants.