

ABHISH KHANAL

akhanal7@gmu.edu $\diamond$ [linkedin.com/in/aabs7](https://www.linkedin.com/in/aabs7) $\diamond$ www.abkhanal.com

Ph.D. researcher in Embodied AI and Robotics with 7+ years of experience designing and deploying generalist embodied agents across simulation and real-world platforms. Research spans LLM-guided robot behavior, learning-augmented planning, reinforcement learning, robot control, and multi-agent systems with hands-on deployment on humanoids, mobile manipulators, quadrupeds, and drones.

EXPERIENCE

Graduate Research Assistant

George Mason University

Jun 2022 - present

Fairfax, VA, USA

- Designed embodied agent architectures that integrate model-based planning with learning, enabling general purpose multi-robot task planning in previously unseen environments.
- Developed learning-augmented multi-robot coordination algorithms for object search, inspection, and long-horizon task-execution. Deployed across diverse robotic platforms, including G1 humanoids, spot quadrupeds, LoCoBots, vertiwheelers, quadrotors demonstrating cross-platform generalization.
- Developed motion-planning algorithms that enables quick re-planning for vehicle with dynamics in unknown environments that achieves significant improvement in path quality and compute time over classical algorithms like RRT; Developed learning-informed technique for effective navigation of vehicle with dynamics constraints in previously unseen environments.
- Investigate the use of large language models (LLMs) to improve object search and task planning in partially known indoor environments. Developed approaches to improve reliability of LLM guided robots via deployment time *introspection* and selection of best behaviors.

Graduate Teaching Assistant

George Mason University

Aug 2021 - Aug 2022

Fairfax, VA, USA

- Supported undergraduate and graduate courses in robotics, machine learning, programming, and computer graphics. Mentored students on course materials, project development, and lab.

Robotics Software Engineer

Prokura Innovations

Feb 2020 - Apr 2021

Lalitpur, Nepal

- Simulated, analyzed, and built and tested fixed wings, VTOL, and multicopter UAVs for autonomous medical delivery in remote regions of Nepal.
- Developed flight control and mission-planning software. Analyzed line-of-sight (LOS) and beyond-visual-line-of-sight (BV-LOS) communication using satellite DEM data and mesh networking.

Embedded Software Engineer

National Innovation Center

Nov 2019 - Feb 2020

Kirtipur, Nepal

- Made *Nyano Nani*, a low-cost neonatal warmer now deployed in 100+ hospitals. Designed electronic circuitry and embedded firmware for thermal regulation, user interfaces, and safety-critical operation.

Robotics Engineer / Team Lead

Robotics Club, Institute of Engineering, Pulchowk Campus

Nov 2015 - Nov 2019

Lalitpur, Nepal

- Led end-to-end development of autonomous robots for international robotics competition; oversaw hardware design, PCB fabrication, embedded programming, perception, and control, and estimation; Implemented sensor fusion using Kalman filtering with LIDAR, IMU, and vision sensors.
- Mentored the development of an autonomous legged robot.

PUBLICATIONS

Khanal, A., Paudel, A., Pham, H., & Stein, G.J. (2025). Multi-Robot Learning-Informed Task Planning Under Uncertainty. ICRA (under review).

Paudel, A., **Khanal, A.**, Hossain, S., & Stein, G.J. (2025). LLM-informed object search in partially- known environments via model-based planning and prompt selection. ICLR (under review).

Khanal, A., Mathew, J.P., Nowzari, C., & Stein, G.J. (2025). [Learning-Augmented Model-Based Multi-Robot Planning for Time-Critical Search and Inspection Under Uncertainty](#). CASE.

Khanal, A., Bui, H., Plaku, E., & Stein, G.J. (2024). [Learning-informed Long-Horizon Navigation under Uncertainty for Vehicles with Dynamics](#). IROS.

Khanal, A., & Stein, G.J. (2023). [Learning Augmented, Multi-Robot Long-Horizon Navigation in Partially Mapped Environments](#). ICRA.

Khanal, A., Bui, H., Stein, G.J., & Plaku, E. (2023). [Guided Sampling-Based Motion Planning with Dynamics in Unknown Environments](#) . CASE.

Khanal, A., (2022). [RRT and RRT* Using Vehicle Dynamics](#) Arxiv.

Khanal, A., Chand, D., Chaudhary, P., Timilsina, S., Panday, S.P., Shakya, A., & Pandey, R.K. (2020). [Search Disaster Victims using Sound Source Localization](#). ISCRAM.

TECHNICAL SKILLS

Languages and Frameworks : Python, C, C++, Matlab, PyTorch, TensorFlow, ROS2, OpenCV, HTML & CSS

Tools: Git, Docker, Linux, Embedded System Programming (ATmega, ARM), PCB Design (Ki-CAD), Testing.

Machine Learning: Probability & Statistics, Regression, SVM, Decision Trees, KNN, Generative AI (GAN, Diffusion/Flow Matching), Imitation Learning, Vision Language Models (VLMs and VLAs) , Reinforcement Learning,

Robotics: Estimation (Kalman filters), Control (classical control theory, MPC), Planning (RRT*, A*, PRMs), Aerial Vehicles (with Ardupilot, PX4 flight stacks), robots (turtlebot, locobots, spot, g1 humanoid, trossen arms).

Simulation Tools: Gazebo, Unity, Mujoco.

Soft Skills: Teamwork, Project management

EDUCATION

Doctorate in Computer Science, George Mason University, Fairfax, VA, USA Aug 2021 - Current

Research: Planning under uncertainty, Multi-agent systems, Robot Learning, Robotics, Machine Learning.

Master of Science in Computer Science, George Mason University, Fairfax, VA, USA Aug 2021 - Dec 2024

Relevant Coursework: Analysis of Algorithms, Advanced Artificial Intelligence, Data Mining, Software Testing, Robotics Motion Planning, Research Methodologies in CS.

Bachelor in Electronics and Communication Engineering, Pulchowk Campus, Nepal Nov 2015 - Sep 2019

Highlights: Actively participated in an international robotics competition, Team leader for Nepal in [ABU Robocon 2018](#), Organized national level robotics competition and several workshops related to robotics.

SELECTED PROJECTS

Nyano Nani: A low-cost baby warmer built targeting remote parts of Nepal where the Neonatal mortality rate is high. Health centers in more than 23 districts (100+ hospitals) in Nepal use Nyano Nani. (Nyano Nani was awarded [People's Choice Award](#) in North East Ohio Medical University, USA)

Last Mile Delivery: Funded by [UNICEF Innovation](#), we developed low-cost drones (fixed-wing and multicopters) for medical delivery in Nepal. It had a range of 20 KM, with ground control stations and software to control and monitor multiple UAVs for health post and hospitals..

Probabilistic PDDL for Task Planning under Uncertainty Designed a PDDL like interface with support for probabilistic action effects to incorporate world uncertainty, and concurrent task execution for multiple robots. Early prototype deployed onboard locobot, vertiwheelers, and humanoid robots.

Foundation Models for General-Purpose Robot Manipulation: Developing a unified framework for manipulation using Diffusion Policies, Flow Matching, and Vision-Language-Action (VLA) models, enabling robots to perform diverse manipulation tasks from natural language instructions.

AWARDS AND ACHIEVEMENTS

Distinguished Academic Achievement Award, George Mason University

IROS Travel Grant Award 2024, Abu Dhabi, UAE

Graduate Student Travel Fund Award, George Mason University

International Robotics Awards [Best Engineering Award](#) and [Panasonic Award](#) in ABU Robocon 2016, Thailand; [Best Shuttlecock Award](#) in [ABU Robocon 2018](#), Vietnam; ROHM Award in ABU Robocon 2019, Mongolia

Best Project Poster Presentation by the Department of Computer Engineering: Institute of Engineering, Pulchowk Campus, for the presentation of our final year project in engineering.

Best Instrumentation Project This award was provided for our project 'IOT Based Home automation' under the Instrumentation category in Nepal's National Technological Exhibition (LOCUS).

PROFESSIONAL SERVICES

Session Chair, IEEE 21st International Conference on Automation Science and Engineering (CASE 2025). 2025

Co-mentor, Aspiring Scientists Summer Internship Program (ASSIP). 2023-2025

Reviewer, IEEE Robotics and Automation Letters (RA-L); International Conference on Robotics and Automation. 2024-2025