HOSSEIN NADERI

Robotic Engineer

Email: hnaderi@vt.edu Mobile: 202-892-0958 Linkedin: h-naderi

EDUCATION

Ph.D. in Construction with a focus on AI and Robotic
| Virginia Tech

Aug. 2022 – Aug. 2025 Blacksburg, VA

Master's in Computer Science
| Virginia Tech

Aug. 2023 – May. 2025 Blacksburg, VA

B.Sc. in Civil Engineering
| Semnan University

Sep. 2011 – Sep. 2016 Semnan, IR

RESEARCH EXPERIENCE

Graduate Research Assistant
Virginia Tech

Fall 2022 – Present

- **AI, Foundation Models, and Legged Robotics**
  (Fall 2023 – Spring 2025)
  Conducted research in application of vision language models (VLMs) and multi modal agents for robotics, focusing on legged robots and AI for autonomous navigation, perception, and task planning.

SELECTED SKILLS

- **AI**: Multi-Modal Foundation Models, LLM, VLM, PyTorch, OpenCV, Transformers, Tensorflow.
- **Robotics**: ROS, SLAM, Navigation, Perception, Gazebo, MoveIt

Perception | Python | SLAM | ROS | C++ | Linux

HONORS & AWARDS

- **Carl and Jane Belt Graduate Fellowship**
  Virginia Tech, 2023-2024
- **Innovation Prize**
  Apex Center for Entrepreneurs, Virginia Tech, 2023
- **Third Place Team**
  Siemens Tech 2023 Competition

CERTIFICATIONS

- **Project Management Professional (PMP)**
  Project Management Institute (PMI), December 2023
- **Project Scrum Master (PSM I)**
  Scrum.org, March 2020

ABOUT ME

I'm passionate to harnessing AI-driven solutions to improve robot perception, autonomy, and planning in unstructured environments, specially construction sites. My objective is to find internship (for summer 2025) or full-time position (fall 2025).

WORK EXPERIENCE

Data Engineer
| ImenRah Co.

Jan 2018 – June 2021 Tehran, Iran

- Preprocessed and cleaned construction project data using Python libraries such as Pandas and NumPy to ensure data accuracy and consistency.
- Predicted project costs and completion times using advanced machine learning algorithms, including XGBoost, Decision Trees, and Neural Networks
- Designed interactive dashboards and visualizations for manager meetings using Tableau, Matplotlib, and Seaborn, facilitating data-driven decision-making.

SELECTED PROJECTS

Adaptable Task Planning in Mobile Robots via Vision-Language-Based Multi-Agent System

- Developed a perception-driven multi-agent AI system using LLMs and VLMs (Llama-8b and Llava-7b) for **interpreting visual data** and autonomously generating robot action plans.
- Integrated **real-time perception and reasoning** on the Unitree-Go2 Edu robot, enabling task planning based on **scene understanding and assigned roles**.
- Evaluated system performance in unstructured environments, demonstrating **superior perception-based planning** over GPT-4o while being 10x more cost-effective.

Autonomous Inspection and Report Generation in Quadruped Robots

- Integrated lightweight VLMs and LLMs on the Unitree-Go2 Edu robot for generating report after navigating the environment.
- Integrated **Lidar, RGB-D cameras, and odometry data fusion** for robot autonomy.
- Implemented **SLAM, 3D mapping, and autonomous navigation** using RTABMAP and Nav2 stack, enabling the robot to autonomously explore the environment.

Hand Gesture-Based Perceptual Control for Legged Robots

- Built a **vision-based gesture recognition system** for quadruped robots using TensorFlow, OpenCV, and MediaPipe, enabling **real-time human-robot interaction**.
- Deployed the system on Unitree Go2 Edu, allowing intuitive **gesture-controlled navigation and actions**

SELECTED PUBLICATIONS

- **H. Naderi**, A. Shojaei, and L. Huang, "Foundation Models for Autonomous Robots in Unstructured Environments," ArXiv, 2024
- **H. Naderi**, A. Shojaei, "Autonomous construction safety incentive mechanism using blockchain-enabled tokens and vision-based techniques" Automation in Construction, 2023.