

Harnaik Singh Dhami

dhami@umd.edu

EDUCATION

UNIVERSITY OF MARYLAND

Doctor of Philosophy in Computer Science
Specializing in Artificial Intelligence and Robotics
Advisor: Dr. Pratap Tokekar
GPA: 3.85

College Park, MD
August 2019-May 2024 (Expected)

VIRGINIA TECH

Master of Science in Computer Engineering
Specialized in Software and Machine Intelligence
Thesis: Using UAV Mounted LiDAR to Estimate Plant Height and Growth
GPA: 3.77

Blacksburg, VA
January 2018-August 2019

VIRGINIA TECH

Bachelor of Science in Computer Engineering
Cum Laude

Blacksburg, VA
August 2014-December 2017

EXPERIENCE

Robotic Algorithms and Autonomous Systems (RAAS) Lab at University of Maryland

Graduate Research Assistant

College Park, MD
August 2019-Present

- Utilizing path planning, perception, and machine learning algorithms to solve exploration, inspection, monitoring, and 3D reconstruction tasks with UAV and 3D LiDAR

NASA Jet Propulsion Laboratory

Intern for 397K – Artificial Intelligence, Observation Planning and Analysis Group

Pasadena, CA (Virtual)
January 2021-June 2021

- Helped develop simulation framework for semi-autonomous inspection robot

Central Intelligence Agency

Graduate Fellow

Washington, DC
May 2018-August 2018

- Worked on Android WearOS application development
- Briefed project developments to senior office leadership

Central Intelligence Agency

Graduate Fellow

Washington, DC
December 2017-January 2018

- Continued data modem work from summer 2016

Central Intelligence Agency

Intern

Washington, DC
May 2017-August 2017

- Setup and tested a new configuration of a network system. Presented findings to senior office leadership
- Fixed several malfunctioning network devices for other officers
- Worked with other interns by helping solve some of their project-related problems
- Supported officers in training

Robotic Algorithms and Autonomous Systems (RAAS) Lab at Virginia Tech

Undergraduate Research Assistant

Blacksburg, VA
January 2017-May 2017

- Learned about visual teach and repeat, ROS, and controlling the Husky robot

Central Intelligence Agency

Intern

Washington, DC
July 2016-August 2016

- Obtained TS/SCI clearance
- Worked with the configuration of data modems

TEACHING

University of Maryland

Graduate Teaching Assistant

College Park, MD

August 2020-December 2020

- Worked as a teaching assistant for the Computer Science Course CMSC818B: Decision Making for Robotics

AI4ALL

Mentor

College Park, MD

July 2020

- Mentored high school students during Artificial Intelligence summer program at UMD
- Project: Searching for Objects in Unknown Environments with a Robot

Virginia Tech

Graduate Teaching Assistant

Blacksburg, VA

January 2018-May 2019

- Worked as a teaching assistant for the Master of Information Technology Course ECE5484: Fundamental Computer Systems

CONFERENCE PUBLICATIONS

MAP-NBV: Multi-agent Prediction-guided Next-Best-View Planning for Active 3D Object Reconstruction

- **Harnaik Dhami***, Vishnu Dutt Sharma*, and Pratap Tokekar
- **Under review:** *IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, 2023

Pred-NBV: Prediction-guided Next-Best-View Planning for 3D Object Reconstruction

- **Harnaik Dhami***, Vishnu Dutt Sharma*, and Pratap Tokekar
- *IEEE/RSS International Conference on Intelligent Robots and Systems (IROS)*, 2023

GATSBI: An Online GTSP-Based Algorithm for Targeted Surface Bridge Inspection

- **Harnaik Dhami**, Kevin Yu, Troi Williams, Vineeth Vajipey, and Pratap Tokekar
- *International Conference on Unmanned Aerial Systems (ICUAS)*, 2023

Intermittent Deployment for Large-Scale Multi-Robot Forage Perception: Data Synthesis, Prediction, and Planning

- Jun Liu, Murtaza Rangwala, Kulbir Ahluwalia, Shayan Ghajar, **Harnaik Dhami**, Pratap Tokekar, Ben Tracy, and Ryan Williams
- *IEEE Transactions on Automation Science and Engineering (TASE)*, 2022

DeepPaSTL: SpatioTemporal Deep Learning Methods for Predicting Long-Term Pasture Terrains using Synthetic Datasets

- Murtaza Rangwala, Jun Liu, Kulbir Ahluwalia, Shayan Ghajar, **Harnaik Dhami**, Ben Tracy, Pratap Tokekar, and Ryan Williams
- *MDPI Agronomy*, 2021

Crop Height and Plot Estimation for Phenotyping from Unmanned Aerial Vehicles using 3D LiDAR

- **Harnaik Dhami**, Kevin Yu, Tianshu Xu, Qian Zhu, Kshitiz Dhakal, James Friel, Song Li, and Pratap Tokekar
- *IEEE/RSS International Conference on Intelligent Robots and Systems (IROS)*, 2020

WORKSHOP PUBLICATIONS

Pred-NBV: Prediction-guided Next-Best-View Planning for 3D Object Reconstruction

- **Harnaik Dhami***, Vishnu Dutt Sharma*, and Pratap Tokekar
- *Robotics: Science and Systems (RSS) Workshop: Robot Representations for Scene Understanding, Reasoning, and Planning*, 2023

Pred-NBV: Prediction-guided Next-Best-View Planning for 3D Object Reconstruction

- **Harnaik Dhami***, Vishnu Dutt Sharma*, and Pratap Tokekar
- *Robotics: Science and Systems (RSS) Workshop: Inference and Decision Making for Autonomous Vehicles*, 2023

PRESENTATIONS

Using UAV Mounted 3D LiDAR to Estimate Plant Height

- **Harnaik Dhami**, Kevin Yu, Tianshu Xu, Qian Zhu, Kshitiz Dhakal, James Friel, Song Li, and Pratap Tokekar
- *International Conference on Digital Technologies for Sustainable Crop Production (DIGICROP)*, 2020

Autonomous Crop Height Estimation and Navigation using an Unmanned Ground Vehicle in Row-based Farmlands

- Tianshu Xu, **Harnaik Dhami**, Song Li, and Pratap Tokekar
- *Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping V*, 2020

Using UAV Mounted 3D LiDAR to Estimate Plant Height

- **Harnaik Dhami**, Kevin Yu, Tianshu Xu, Qian Zhu, Song Li, and Pratap Tokekar
- *Do Good Robotics Symposium*, 2019

ACTIVITIES

International Conference on Unmanned Aerial Systems (ICUAS)

Warsaw, PL

Session Co-Chair

June 2023

- Co-Chair of UAS Applications I paper session

Residential Leadership Community

Blacksburg, VA

Resident

August 2014 – May 2014

- Living/learning community that promotes leadership, public speaking, and teamwork

SKILLS

Programming

- Advanced knowledge in ROS, C, C++, and Python
- Network programming with sockets (TCP and UDP)

Advanced Linux Knowledge

- Command line interfacing, shell scripts, and reconfiguring Linux to be used on an embedded device

General Amateur Radio License