

Vishnu Dutt Sharma

[GitHub Profile](#)

vishnuds@umd.edu

[LinkedIn Profile](#)

EDUCATION

University of Maryland, College Park

June 2020 - May 2024 (expected)

Doctor of Philosophy (Ph.D.) in Computer Science

Advisor: Dr. Pratap Tokekar

Virginia Polytechnic Institute and State University

August 2019 - May 2020

Doctor of Philosophy (Ph.D.) in Computer Engineering

Advisor: Dr. Pratap Tokekar

(Transferred to University of Maryland, College Park)

Indian Institute of Technology Kharagpur

July 2012 - June 2017

Master of Technology, Bachelor of Technology

Major: Electronics & Electrical Communication Engineering

Specialization: Visual Information & Embedded Systems

Minor: Computer Science & Engineering

RESEARCH & DEVELOPMENT EXPERIENCE

Robotics Algorithms & Autonomous Systems Lab

Aug'19 - Present

Graduate Research Assistant

- Working on interpretable decision making and risk-aware planning for multi-robot coordination
- Ongoing and prior work include Semantic Segmentation, Image Inpainting and Reinforcement Learning for robotic perception path planning

Comcast Corporation

May'21-Aug'21

Graduate Research Intern, Applied AI Team

- Contributed to the improvement of the maintenance truck scheduling system using learning algorithms
- Designed a deep learning architecture to replace the heuristic-based variables, and weak-supervision rules for label improvement
- Implemented data monitoring pipelines for the existing data, and data processing modules for the new variables with PySpark

American Express India Pvt Ltd

Jul'17 - Jul'19

Risk Analyst, Machine Learning & Data Science Team

- Developed deep learning models for applications including fraud detection, credit authorization and new accounts approval with specific focus on RNNs
- Contributed towards deep learning model deployment, benchmarking on cloud platform (AWS) and analyzing emerging techniques like distributed learning
- Implemented a variable creation tool using RNN aimed for enterprise-wide adoption

FlytBase Labs (Formerly NavStik Labs)

May'16 - Jul'16

Summer Intern

- Integrated Semi-Direct Visual Odometry (SVO) package with FlytPOD flight computer for indoor localization
- Analyzed position estimation with visual odometry incorporating SVO for simple and complex trajectories in GPS-denied and GPS-assisted conditions

- Achieved indoor relocalization error contained within 10cm for linear and circular trajectories

American Express India Pvt Ltd

May'15 - Jul'15

Summer Intern, Commerce Data Science Team

- Designed a categorization algorithm using SKU (Stock Keeping Unit) description for retail items
- Implemented a rule-based categorization system in Python for generating database by web-crawling and processing results for web search with Natural Language Processing Toolkit (NLTK) and other open-source libraries
- Achieved 60% accuracy in categorizing item across type, gender and brand dimensions

PROJECTS

[Empirical Study of Second-Order Optimizers for Deep Learning Applications](#)

Studied the effect of architecture and data on CNN and MLP with SGD, L-BFGS, and K-FAC optimizers for regression and classification tasks

[SegNet: Reproducibility and Qualitative Analysis](#)

Analyzed reproducibility, generalizability, and effect of input image properties for SegNet architecture

[DeepVO: A Deep Learning approach for Monocular Visual Odometry](#)

Implemented a CNN-based solution for Monocular Visual Odometry for ground robot

[Word Segmentation and Poetry Linearization in Sanskrit](#)

Contributed to projects focused on deep learning-based solutions for *Sandhi* segmentation and poetry-to-prose conversion in Sanskrit texts. These projects resulted in three conference papers

[Autonomous Aerial Vehicle](#)

Worked on development of control stack of the Unmanned Aerial Vehicle. Part of the Best Team Co-operation Award-winning team at the International Aerial Robotics Competition 2016

[Autonomous Underwater Vehicle](#)

Contributed towards the development of the embedded and control stack of the underwater vehicle

[Plagiarism Detection using Tree-kernel methods](#)

Developed plagiarism detection algorithm using sub-tree kernel matching over the abstract syntax trees extracted from C source codes

Others Projects:

[SmartKart](#) (Semi-autonomous shopping cart), [ROACH](#) (Semi-autonomous all-terrain vehicle), [Sirius](#) (All-terrain vehicle with hybrid leg)

PUBLICATIONS

- **Sharma, V. D.**, Toubeh, M., Zhou, L., & Tokekar, P. (2020). [Risk-Aware Planning and Assignment for Ground Vehicles using Uncertain Perception from Aerial Vehicles](#). In Proceedings of the 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-2020).
- Krishna, A., **Sharma, V. D.**, Santra, B., Chakraborty, A., Satuluri, P., & Goyal, P. (2019, July). [Poetry to Prose Conversion in Sanskrit as a Linearisation Task: A case for Low-Resource Languages](#). In Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL-2019).
- Krishna, A., Santra, B., Bandaru, S. P., Sahu, G., **Sharma, V. D.**, Satuluri, P., & Goyal, P. (2018). [Free as in Free Word Order: An Energy Based Model for Word Segmentation and Morphological Tagging in Sanskrit](#). In Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing (EMNLP-2018).
- Reddy, V., Krishna, A., **Sharma, V. D.**, Gupta, P., Vineeth, M. R., & Goyal, P. (2018, May). [Building a Word Segmenter for Sanskrit Overnight](#). In Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC-2018).

Under Review

- Zhou, L., **Sharma, V. D.**, Li, Q., Prorok, A., Ribeiro, A., & Kumar, V. [Graph Neural Networks for Decentralized Multi-Robot Submodular Action Selection](#) (*Under review at ICRA 2022.*)
- **Sharma, V. D.**, & Tokekar, P. [Risk-Aware Path Planning for Ground Vehicles using Occluded Aerial Images](#) (*Under review at ICRA 2022.*)

TECHNICAL STRENGTHS

| | |
|----------------------------------|--|
| Languages & Scripts | Python, C++, C, PySpark, Hive, MATLAB |
| Packages & Frameworks | PyTorch, TensorFlow, OpenCV, AirSim, ROS |

RELEVANT COURSEWORK

Advanced Techniques in Visual Learning and Recognition*, Deep Learning, Advanced Machine Learning, Computer Vision, Data Analytics, Decision Making for Robotics, Advanced Numerical Optimization, Empirical Research Methods in Computer Science, Natural Language Processing
textit*Ongoing