VINIT KATARIYA

Assistant Professor

Department of Electrical Engineering and Computer Science

University of Wyoming

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EDUCATION

Ph.D. in Electrical Engineering - University of North Carolina at Charlotte, NC, USA — December 2023

Dissertation Title: Advancing Highway Safety: Embedded-edge AI for Real-time Applications

Advisor: Dr. Hamed Tabkhi

M.S. in Electrical Engineering - University of North Carolina at Charlotte, NC, USA — May 2016

Project Title: A Novel RF (XBEE) and IR LOS Collaborative V2V Navigation Technique

Advisor: Dr. Jim Conrad

B.E. in Electronics - Savitribai Phule Pune University, MH, India — May 2012

Project Title: Auto-switching Of Devices Using Brain Waves

Advisor: Dr. Sanjay I. Nipanikar

RESEARCH EXPERIENCE

Assistant Professor Joint Appointment: Electrical and Computer Science (75%) & School of Computing (25%)

University of Wyoming — August 2025 - Present

- Full-time tenure-track faculty at an R1 research university to establish and be appointed to direct a nationally recognized, externally funded research program in embedded edge-based computer vision and deep learning, demonstrating the university's research achievements and potential.
- Responsible for maintaining continuous high-impact scholarly activity, supervising graduate and undergraduate students and postdoctoral researchers, and disseminating original research through top-tier peer-reviewed publications and prestigious international conferences.

Postdoctoral Researcher Department of Electrical and Computer Engineering

University of North Carolina at Charlotte — October 2023 - August 2025

- Lead the AI development in collaboration with the University of Minnesota and MnDOT Intersection Safety recommendation in MN to create novel architectures and deep learning-based vision systems for speed estimation, anomaly detection, and prediction tasks.
- Developed end-to-end pipeline, focusing on vision-based ML models for trajectory prediction and environmental perception using multi-modal sensor integration (RGB cameras, WiFi data, and depth sensors).
    - VegaEdge, a DL-pipeline [J5], [J3]: Developed an E2E pipeline for vehicle detection and trajectory prediction in highway scenarios using PyTorch.
    - VT-Former Algorithm [P7]: Developed a novel trajectory prediction model with a custom Graph and Attention-powered tokenizer, published at CVPR 2024.
    - Leading Development [J3], [J2] of datasets for trajectory prediction, action detection, and pose detection in collaboration across different teams.
- Supervised 3 Ph.D. and 6 M.Sc. students

- Secured multiple 100k+ grants from MnDOT (in partnership with the University of Minnesota and SRF Consulting, respectively).
- Helped develop proposals for a 250k NSF PFI grant (with PIs Dr. Hamed Tabkhi and Dr. Chris Neff)

Graduate Research Assistant Department of Electrical and Computer Engineering
University of North Carolina at Charlotte January 2018 - October 2023

- Developed multiple lightweight ML and DL algorithms for real-time video analysis and trajectory prediction, optimizing AI pipelines for safety applications in highway work zones. These pipelines enabled downstream tasks, including Virtual and Augmented Reality (VR/AR) integration, and smartwatch-based audio-visual and vibration notifications for workers.
    - PishguVe [J3][P4] and Pishgu [P5]: Designed and optimized deep learning models for context-aware trajectory prediction using a fully connected graph module and Attentive Graph Isomorphism Network (GIN).
    - DeepTrack [J1]: Developed DeepTrack, a real-time deep learning algorithm for vehicle trajectory prediction in intelligent transportation systems (ITS). Utilized Temporal Convolutional Networks (TCNs) and depthwise convolution to reduce model complexity.
- Supervised 2 Ph.D. and 2 M.Sc. students

PUBLICATIONS

Peer Reviewed Journals:

[J5] **Katariya, V.**, Noghre, G. A., Pazho, A. D., & Tabkhi, H. (2024). "A POV-based highway vehicle trajectory dataset and prediction architecture". IEEE Transactions on Intelligent Transportation Systems, 25(10), 13136-13146. doi: 10.1109/TITS.2024.3435775. **Impact Factor: 7.5**

[J4] Ardabili, B. R., Pazho, A. D., Noghre, G. A., **Katariya, V**., Hull, G., Reid, S., & Tabkhi, H. (2024). "Exploring Public's perception of safety and video surveillance technology: A survey approach". Technology in Society, 78, 102641. doi: 10.1016/j.techsoc.2024.102641. **Impact Factor: 10.1**

[J3] **Katariya V.**, Fatema-E-Jannat, Danesh Pazho, A., Alinezhad Noghre G., Tabkhi H. (2024). "VegaEdge: Edge AI confluence for real-time IoT-applications in highway safety". Internet of Things, 101268. doi: 10.1016/j.iot.2024.101268. **Impact Factor: 6.0**

[J2] Rashvand N., Witham K., Maldonado G., **Katariya V.**, Marer Prabhu N., Schirner G., Tabkhi H. (2024). "Enhancing Automatic Modulation Recognition for IoT Applications Using Transformers". IoT, 5(2), 212-226. doi: 10.3390/iot5020011. **Cite Score: 8.5**

[J1] **Katariya V.**, Baharani M., Morris N., Shoghli O., Tabkhi H. (2022). "Deeptrack: Lightweight deep learning for vehicle trajectory prediction in highways". IEEE Transactions on Intelligent Transportation Systems, 23(10), 18927-18936. doi: 10.1109/TITS.2022.3172015. **Impact Factor: 6.3**

Peer-Reviewed Conference Papers:

[P7] Pazho, A. D., Noghre, G. A., **Katariya, V.**, & Tabkhi, H. (2024). "VT-Former: An Exploratory Study on Vehicle Trajectory Prediction for Highway Surveillance through Graph Isomorphism and Transformer". In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) (pp. 5651-5662), Seattle, June 2024.

[P6] Noghre G. A., Yao S., Pazho A. D., Ardabili B. R., **Katariya V.**, Tabkhi H. (2024). "PHEVA: A Privacy-preserving Human-centric Video Anomaly Detection Dataset". arXiv preprint arXiv:2408.14329, August 26, 2024.
[P5] Alinezhad G., **Katariya V.**, Danesh Pazho A., Neff C., Tabkhi H. (2023). "Pishgu: Universal path prediction network architecture for real-time cyber-physical edge systems". In Proceedings of the ACM/IEEE 14th International Conference on Cyber-Physical Systems (with CPS-IoT Week 2023), San Antonio, TX, May 9, 2023. (* = joint first author)
[P4] Alinezhad G., Danesh Pazho A., **Katariya V.**, Tabkhi H. (2023). "Understanding the challenges and opportunities of pose-based anomaly detection". In Proceedings of the 8th International Workshop on Sensor-Based Activity Recognition and Artificial Intelligence, Lübeck, Germany, September 2023.
[P3] Alinezhad G., **Katariya V.**, Danesh Pazho A., Neff C., Tabkhi H. (2023). "Demonstration of Pishgu: Universal path prediction network architecture for real-time cyber-physical edge systems". In Proceedings of the ACM/IEEE 14th International Conference on Cyber-Physical Systems (with CPS-IoT Week 2023), San Antonio, TX, May 9, 2023. (* = joint first author)
[P2] **Katariya, V.**, Weldon T. P. (2019). "Search-Based Design of Digital Non-Foster Antenna Match for High-Speed Low-Impedance Converters". In 2019 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, Atlanta, GA.
[P1] Rhoades B. B., **Katariya V.**, Conrad J. M. (2018). "A Novel RF (XBee) and IR LoS (Line-of-Sight) Collaborative Vehicle-to-Vehicle Navigation Technique".SoutheastCon '18 (pp. 1-6), IEEE, St. Petersburg, FL.

TEACHING EXPERIENCE

Adjunct Faculty - University of North Carolina at Charlotte, NC, USA Summer 2024/2025
Department of Electrical and Computer Engineering, Introduction to Machine Learning (ECGR 4105/5105)

- Developed and taught a course for graduate/undergraduate students on machine learning principles that provides foundations for a data-driven approach to machine intelligence and decision-making using PyTorch. The topics include various supervised, and unsupervised learning approaches, optimization procedures, and statistical inference. During this course, the students learned and practiced their knowledge and skills through class discussion, homework, and final project (working on real-world datasets).

Guest Lecturer - University of North Carolina at Charlotte, NC, USA Fall 2024
Department of Electrical and Computer Engineering, Electromagnetic and Electronic Devices.

- Lecture on Perceptron and Vectorization and their significance in the current AI paradigm.

Teaching Assistant - University of North Carolina at Charlotte, NC, USA Summer 2021
Department of Electrical and Computer Engineering, Electromagnetic and Electronic Devices. (ECGR 3156)
Teaching Assistant - University of North Carolina at Charlotte, NC, USA Spring 2020
Department of Electrical and Computer Engineering, Computer Engr Programming II (ECGR 2104)
Teaching Assistant - University of North Carolina at Charlotte, NC, USA Fall 2019
Department of Electrical and Computer Engineering, Logic System Design (ECGR 2181)
Teaching Assistant - University of North Carolina at Charlotte, NC, USA Spring 2018
Department of Electrical and Computer Engineering, Digital Signal Processing (ECGR 4124/5124)
Guest Lecturer - University of North Carolina at Charlotte, NC, USA Spring 2018
DSP techniques in Non-foster circuit design

Industry Experience

Software Engineer - Sears Holdings Management Corporation June 2016 - May 2017

- Developed and tested a Python-based sensor system with ~80% accuracy to monitor store traffic at Kmart locations. Used SQL for data management and implemented an image comparison algorithm in a Meteor framework-based JavaScript application, leveraging low-resolution camera videos as an alternative to sensors.

Software Engineer Intern - Sears Holdings Management Corporation May 2015 - August 2015

- Implemented Message Queuing Telemetry Transport (MQTT) based client solutions for IoT devices, facilitating efficient Over-The-Air (OTA) updates and connectivity using ARM-Cortex M4-based microcontroller.

Awards and Affiliation

- Best Demo Award - ICCPS 2023
- Recipient of UNC Charlotte Graduate School Summer Scholarship 2022
- PhD Mentor, Mentor Collective 2021, 2022, 2023
- Active Member, IEEE (Member No: 93133990) 2014 - Present

Selected Professional Service

- IEEE 24th International Conference on Machine Learning and Applications (ICMLA) 2025
- IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) 2024, 2025
- International Conference on Computer Vision (ICCV) 2025
- IEEE Access 2024, 2025
- International Journal of Cognitive Computing in Engineering 2025
- Springer Nature - Artificial Intelligence 2025
- Springer Nature - Cluster Computing 2025
- Springer Nature - Operations Research Forum 2025
- Artifact Evaluation Program Committee (IEEE ICCPS) 2024
- Reviewer at International Conference on Cyber-Physical Systems (IEEE ICCPS) 2024
- Wireless Communications Letters (IEEE WCL) 2024
- Reviewer at Transactions on Intelligent Transportation Systems (IEEE T-ITS) 2022, 2023