Neehar Peri

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Education

Ph.D in Robotics, Carnegie Mellon University — Aug 2021 - Present

B.S. in Computer Engineering, University of Maryland - College Park — Aug 2017 - May 2021
QUEST Honors Program

Book Chapters

- Thermal Face Verification by Synthesis, In: Face Recognition Across the Imaging Spectrum — Springer 2024
  ***N Peri**, J Gleason, CD Castillo, T Bourlai, VM Patel, R Chellappa*

Journal Publications

- Data and Algorithms for End-to-End Thermal Spectrum Face Verification — TBIOM 2022
  *T Bourlai, J Rose, S Mokalla, A Zabin, L Hornak, CB Nalty, **N Peri**, J Gleason, CD Castillo, VM Patel, R Chellappa*

Conference Publications

- Multi-Range Pyramids for 3D Object Detection — Under Review
  M Li, **N Peri***, B Wilson, Y Wang, J Hays, D Ramanan*
- Towards Long-Tailed 3D Detection — CoRL 2022
  ***N Peri**, A Dave, D Ramanan⋆, S Kong⋆*
- A Brief Survey of Person Recognition at a Distance — ACSSC 2022
  C Nalty, **N Peri***, J Gleason*, CD Castillo, S Hu, T Bourlai, R Chellappa*
- Forecasting from LiDAR via Future Object Detection — CVPR 2022
  ***N Peri**, J Luieten, M Li, A Osep, L Leal-Taixe, D Ramanan*
- Assessment of a Novel Virtual Environment for Examining Human Cognitive-Motor Performance during Execution of Action Sequences — HCII 2022
  AA Shaver, **N Peri***, R Mezebish, G Matthew, A Berson, C Gaskins, GP Davis, GE Katz, I Samuel, JA Reggia, J Purtilo, RJ Gentili*
- A Synthesis-Based Approach for Thermal-to-Visible Face Verification — FG 2021
  ***N Peri**, J Gleason, CD Castillo, T Bourlai, VM Patel, R Chellappa*
- PreferenceNet: Encoding Human Preferences in Auction Design with Deep Learning — NeurIPS 2021
  N Peri, MJ Curry*, S Dooley, JP Dickerson*
- The Devil is in the Details: Self-Supervised Attention for Vehicle Re-ID — ECCV 2020
  P Khorramshahi, **N Peri***, JC Chen, R Chellappa*
- A Dual Path Model with Adaptive Attention for Vehicle Re-ID — ICCV 2019††
  *P Khorramshahi, A Kumar, **N Peri**, SS Rambhatla, JC Chen, R Chellappa*

Workshop Publications

- Deep k-NN Defense Against Clean-label Data Poisoning Attacks — ECCVW 2020
  N Peri, N Gupta*, WR Huang*, L Fowl, C Zhu, S Feizi, T Goldstein, JP Dickerson*
- Towards Real-Time Systems for Vehicle Re-ID, Multi-Camera Tracking, and Anomaly Detection — CVPRW 2020†
  N Peri, P Khorramshahi*, SS Rambhatla*, V Shenoy, S Rawat, JC Chen, R Chellappa*
- Attention Driven Vehicle Re-ID and Unsupervised Anomaly Detection for Traffic Understanding — CVPRW 2019†
  *P Khorramshahi, **N Peri**, A Kumar, A Shah, R Chellappa*

*Equal Contribution
⋆Equal Supervision
†Selected for Spotlight Presentation
††Selected for Oral Presentation

Patents

- End-to-End Streaming 3D Detection and Forecasting from LiDAR Point Clouds — 17/692,973
  ***N Peri**, D Ramanan*

Academic Experience

Carnegie Mellon University, Pittsburgh, PA, *Robotics Institute* *Apr 2020 – Present*

- Leading research on 3D object detection, multi-object tracking, motion forecasting, and multi-agent planning for autonomous driving applications
- Advisor: Deva Ramanan

University of Maryland, College Park, MD, *UMIACS* *May 2018 – May 2021*

- Conducted research in unsupervised traffic anomaly detection and discriminative representation learning for vehicle re-id
- Led research in defending against clean-label adversarial poisoning attacks
- Established novel method for encoding human preferences in revenue maximizing auction design
- Advisors: Rama Chellappa & John P. Dickerson

Industry Experience

Argo AI, Pittsburgh, PA, *Research Intern* *May 2021 – Oct 2022*

- Developed end-to-end 3D object detection and forecasting pipeline from LiDAR point clouds
- Implemented novel metrics that jointly evaluate detection and forecasting accuracy

MUKH Technologies, College Park, MD, *Research Intern* *Aug 2020 – May 2023*

- Led research on improving thermal-to-visible face synthesis for zero-shot identification
- Built robust face verification pipelines for multi-spectral data streams

Bank of America, Charlotte, NC, *Conversational Commerce Technology Intern* *Jun 2019 – Aug 2019*

- Developed novel deep learning pipeline to validate quality of utterance-intent pairs in chatbot conversations using PyTorch, AllenNLP, and NLTK
- Deployed RESTful Active Learning API to introduce targeted learning feedback loop and improve intent classification model performance

Teaching Experience

16-720, Carnegie Mellon University, Robotics Institute, *Head Teaching Assistant* *Spring 2022, Fall 2022*

- Managed team of teaching assistants to effectively coordinate course responsibilities
- Updated course projects, held office hours, answered student questions and graded course projects

ENEE 244, University of Maryland, ECE Department, *Undergraduate Teaching Fellow* *Spring 2019*

- Led Introduction to Digital Logic recitation for a discussion section of 15 students
- Received highest marks on metrics of preparedness, respect for students, and teaching effectiveness from all students

Invited Talks

- Image Processing and Convolutions — Sep 2022
  Guest Lecture: 16-720, Computer Vision
- How do Autonomous Vehicles See the World? — Aug 2022
  Invited Talk: RoboLaunch
- Training Convolutional Neural Networks — Apr 2022
  Guest Lecture: 16-720, Computer Vision
- Transformers for Vision — Apr 2022
  Guest Lecture: 16-720, Computer Vision
- Metrics and Methods for Detection and Forecasting in Autonomous Vehicles — Apr 2022
  Invited Talk: National Autonomous Vehicle Conference

Service

Conference Reviewer: NeurIPS 20{21,22}, CVPR 20{22,23}, AAAI 2023
Journal Reviewer: IJCV 2021
Mentorship: CMU AI Mentoring Program 20{21, 22}, QUEST Mentoring Program (2022), CMU AI for Social Good Summit (2022)
Organizer: Visual Perception and Learning in an Open World (Onsite Coordinator, CVPR 20{22, 23})
Other: TRINITY HPC Cluster Management 20{22,23}, AUTOBOT HPC Cluster Management 20{22,23}

Mentorship

Name	Institution	Year(s)	Details
Anish Madan	CMU	2022 –	Multi-modal data augmentation and generation for long-tailed 3D detection
Andrew Shen	CMU	2022 –	Benchmarking modular 3D perception stack for autonomous vehicles
Xindi Wu (w/ Aljosa Osep)	CMU	2022	Self-supervised multi-modal representation learning for point clouds
Aminah Yizar, Andrew Edgley, Ezra Schwartz, Joshua Liu, Raunak Hota, Royce He, Wesley Chen	UMD	2022	Project champion for CMSC435 software engineering capstone to build an active learning framework to allow human-in-the-loop 3D object annotation
Christopher Nalty	MUKH	2021-2022	Synthetic data augmentation for thermal-to-visible face verification
Aastha Senjalia, Andrew Vetter, Benjamin Namovicz, Cheyenne Montgomery, Ferzam Mohammad, Matthew Weinberg, Nicholas Revill	UMD	2021	Project champion for CMSC435 software engineering capstone to build a visualization platform for autonomous vehicle data. Project won People's Choice Award.

Awards

Name	Institution	Distinction	Year
Maryland Undergraduate Researcher of the Year	UMD	University	2021
Sujan Guha Memorial Best Senior Thesis Award	UMD	Department	2021
CRA Outstanding Undergraduate Researcher (Honorable Mention)	UMD	National	2021
NSF Graduate Research Fellowship (Honorable Mention)	UMD	National	2021
Yurie & Jeong H. Kim Scholarship	UMD	Department	20{18,19,20}