Vineet R. Shenoy

Contact Information

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U.S. Citizen

Objective

I am a professional with 7+ years of experience interested in building fast, efficient, and scalable systems in machine learning, computer vision, and Generative AI particularly in healthcare settings. During my PhD I collaborated with surgeons on non-contact perfusion imaging using cameras, for which we won a best paper award in *Plastic and Reconstructive Surgery*. I also built vehicle detection and tracking algorithms on operational traffic camera videos, and delivered a real-time multi-camera tracking software system to the U.S. Government. All this work also resulted in top-tier academic publications. My current work on health monitoring, in collaboration with Mitsubishi and the Curtis National Hand Center, has given me solid foundations in inverse problems, signal recovery, optimization, and imaging. I am excited to build and implement AI and ML algorithms in healthcare environments to help customers solve their challenges.

Education

Johns Hopkins University **Aug 2020 - May 2026**
PhD., Electrical and Computer Engineering
Advisor: Dr. Rama Chellappa

Johns Hopkins University **December 2024**
M.S.E, Electrical and Computer Engineering
Advisor: Dr. Rama Chellappa

Rutgers University - New Brunswick **August 2014 - May 2018**
B.S., Electrical and Computer Engineering, Computer Science
Summa Cum Laude

Skills

Languages : Python, C, Java
Softwares : Pytorch, Tensorflow, OpenCV, Matlab, Docker/Singularity, Git
Operating System : Linux, Windows

Patents

Deep equilibrium model based systems and methods for estimating vital signs
Lohit, S., **Shenoy, V.**, Mansour, H., Marks, T.
U.S. Patent Application No. 18/619,583.

System and Method for Pulse Signal Recovery from Facial Video
Shenoy, V., Peng C., Chellappa R., Sun Y.
U.S. Provisional Application No. 63/884,663.

Professional and Academic Experience

Johns Hopkins University
Research Assistant **August 2020 - May 2026**

- Improved a baseline deep learning object detector by 9 points to achieve state-of-the-art performance on operational traffic camera data using domain adaptation techniques.
- Integrated the detector along with a multi-target, multi-camera camera tracking system that re-identifies vehicles in different cameras.
- Collaborated with professional software engineers to integrate research into a real-time, multi-target multi-camera tracking system for the National Geospatial-Intelligence Agency (NGA).
- Built diffusion/generative models for remote vital signs estimation, and conducted a detailed uncertainty analysis of the models. Paper under review at Transactions on Machine Learning Research (TMLR).

Mitsubishi Electric Research Labs
Research Intern – Remote Vital Signs Estimation **July 2022 -August 2024**

- Designed two state-of-the-art deep learning algorithms for heart-rate estimation at-a-distance using facial videos, reducing error by over 14%. Publications at ICIP 2023 and IEEE Transactions on Image Processing.
- Designed and built data collection set-up for blood pressure estimation from facial videos. Identified equipment to procure, including a high frame-rate camera, lighting, and blood pressure sensor.

Blutag

Software Engineer **August 2018 - August 2019**

- Integrated a recommendation system using LightFM (Python) into ElasticSearch for efficient searching of products.
- Generated classification labels for unknown products using PyTorch. Achieved 95% accuracy after 20 epochs of training.
- Built workflow for product classification using PyTorch, from image download, data cleaning, and preparation to training and model deployment as a web service using Microsoft Azure.

Publications

Uncertainty-quantified Pulse Signal Recovery from Facial Video using Regularized Stochastic Interpolants
Shenoy V., Peng C., Chellappa R., Sun Y.
Submission to Transaction on Machine Learning Research (TMLR)

Recovering Pulse Waves from Video Using Deep Unrolling and Deep Equilibrium Models
Shenoy V., Lohit S., Mansour H., Chellappa R., Marks T
IEEE Trans. Image Processing 2026

Perfusion Assessment of Healthy and Injured Hands Using Video-Based Deep Learning Models
Shenoy V., Kingston C., Singh M., Durr N., Chellappa R., Giladi A.
Plastic and Reconstructive Surgery 2025 **Best Paper December 2025**

Time-Series U-Net with Recurrence for Noise-Robust Imaging Photoplethysmography
Shenoy V., Wu S., Comas A., Marks T, Lohit S., Mansour H.
IEEE Access 2025

Robust Feature Space Organization with Distillation for Few-Shot Object Detection
Shenoy V., Chellappa, R.
IEEE International Conference on Patern Recognition (ICPR 2024)

Unrolled iPPG: Video Heart Rate Estimation via Unrolling Proximal Gradient Descent
Shenoy V., Marks Tim K., Mansour H., Lohit S.
IEEE International Conference on Image Processing (ICIP 2023)

Robust and Scalable Vehicle Re-Identification via Self-Supervision
Khorramshahi P., **Shenoy V.**, Chellappa R.
Proc. of the IEEE/CVF Conf. on Computer Vision and Pattern Recognition Workshops 2023

Scalable and Real-Time Multi-Camera Vehicle Detection, Re-Identification, and Tracking
Khorramshahi P., **Shenoy V.**, Pack M., Chellappa R.
Pre-print 2022

Multi-Class, Multi-Movement Vehicle Counting on Traffic Camera Data
Shenoy V., Chellappa R.
Technical Report 2022

Towards real-time systems for vehicle re-identification, multi-camera tracking, and anomaly detection
Peri N., Khorramshahi P., Rambhatla S., **Shenoy V.**, Rawat S., Chen J.C. , Chellappa R.
Conference on Computer Vision and Pattern Recognition Workshops, 2020

Relevant Coursework

- Statistical Theory
- Machine Perception
- Statistical Pattern Recognition
- Advanced Digital Signal Processing
- Information Theory
- Estimation and Detection Theory
- Convex Optimization
- Stochastic and Random Processes

Achievements

- **Rutgers School of Engineering Commencement Speaker**, May 2018
- **Rutgers Chancellor's Leadership Award**, May 2018
- **Phi Beta Kappa**, Member, April 2018
- **Tau Beta Pi**, Member, December 2016
- **Valedictorian**, West Windsor-Plainsboro High School North, June 2014
- **Eagle Scout**, September 2013