

Gautam Rajendrakumar Gare

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EDUCATION

Carnegie Mellon University

Pittsburgh, PA

Doctor of Philosophy in Robotics

(start) Aug 2021

- I will be starting the Ph.D. program at the Robotics Institute of Carnegie Mellon University in Fall 2021 with my research focus on video understanding targeting both natural and medical image domains.

Master of Science in Electrical and Computer Engineering, GPA: 4.00/4.00

Dec 2020

- Courses: SLAM, Computer Vision, Convex Optimization, Intro to Deep Learning, Intro to Machine Learning, Image and Video Processing, Machine Learning for Signal Processing, Speech Recognition and Understanding

BMS College of Engineering

Bangalore, India

Bachelor of Engineering in Electronics and Communication Engineering, GPA: 9.4/10.0

May 2016

RESEARCH EXPERIENCE

Action Recognition in Untrimmed Videos - NIST ActEV Challenge

May 2020–present

Advisors: [Prof. Aswin C. Sankaranarayanan](#) and [Prof. Deva Kannan Ramanan](#), CMU

Image Science Lab, CMU

- Developing efficient model architecture for action classification on untrimmed videos, capable of operating directly on full-res untrimmed video streams with a strong emphasis on inference speed and accuracy.
- Our model processes videos 12.5x faster than real-time with comparable accuracy under set conditions.

Robust Loss functions for Noisy Labels

Feb 2020–present

Advisor: [Prof. John Galeotti](#), CMU

Biomedical Image Guidance Lab, CMU

- Introduced a novel projective loss function that exploits class similarity for robust learning, unlike traditional loss functions that work agnostic to such class similarities, under review at ICCV 2021.
- Our approach is able to achieve 88.5% accuracy even with 80% asymmetric noisy labels on the CIFAR10 dataset, and 84.97% accuracy on Food-101N, and 76.92% accuracy on ImageNet, without any training enhancement.

Dense & Diagnostic Semantic Segmentation of Ultrasound

Jun 2020–present

Advisor: [Prof. John Galeotti](#), CMU

Biomedical Image Guidance Lab, CMU

- Developed U-Net based CNNs for semantic segmentation of Pneumonia bio-markers (A-lines, B-lines and Pleural lines) for assistive medical care.
- Performed diagnostic classification into Healthy, Pneumonia and COVID-19 by directly operating on segmentation output achieving 84.9% accuracy, accepted at ISBI 2021.

Ultrasound raw RF waveform analyses using CNN

Sep 2019–Apr 2020

Advisor: [Prof. John Galeotti](#), CMU

Biomedical Image Guidance Lab, CMU

- Developed W-Net, a CNN architecture that analyzes spectral content of raw ultrasound RF waveform, outperforms existing architectures for breast lesion segmentation & diagnosis, providing the first quantitative proof of the utility of RF data in breast cancer detection.

Multi-Person 3D Human Pose Estimation in Occluded Scenarios

Dec 2019–Feb 2020

Advisor: [Prof. Anthony Rowe](#), CMU

CONIX Research Centre, CMU

- Developed a custom fisheye stereo vision system using the Taylor omnidirectional camera model, to estimate 3D human pose from 2D key points detected using OpenPose deep learning model, for VR & AR applications.

PUBLICATIONS

- [1] **Gare, Gautam Rajendrakumar** and J. M. Galeotti, “Exploiting Class Similarity for Machine Learning with Confidence Labels and Projective Loss Functions”, under review at *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, [[paper-link](#)], 2021.
- [2] **Gare, G.R.**, A. Schoenling, V. Philip, V. H. Tran, P. B. deBoisblanc, R. Rodriguez, and J. Galeotti, “Dense Pixel-Labeling for Reverse-Transfer and Diagnostic Learning on Lung Ultrasound for Covid-19 and Pneumonia Detection”, under review at *IEEE International Symposium on Biomedical Imaging (ISBI)*, [[paper-link](#)], 2021.
- [3] **Gare, G.R.**, J. Li, R. Joshi, R. Magar, M. P. Vaze, M. Yousefpour, R. L. Rodriguez, and J. M. Galeotti, “W-Net: Dense and diagnostic semantic segmentation of subcutaneous and breast tissue in ultrasound images by incorporating ultrasound RF waveform data”, under review at *Medical Image Analysis (MIA)*, *MICCAI Journal*, [[paper-link](#)], 2020.
- [4] **Gare, G.R.**, J. Li, R. Joshi, M. P. Vaze, R. Magar, M. Yousefpour, R. L. Rodriguez, and J. M. Galeotti, *W-net: Dense semantic segmentation of subcutaneous tissue in ultrasound images by expanding u-net to incorporate ultrasound rf waveform data*, [[paper-link](#)], 2020. arXiv: 2008.12413 [[eess.IV](#)].
- [5] R. Chattaraj, S. Khan, A. Dasgupta, **G. Gare**, D. Chatterjee, and S. Bhaumik, “An iteratively optimized resolution to hyper redundancy for dissimilarly doped compliant ipmc actuators”, *Mechatronics*, vol. 46, pp. 154–167, 2017, [[paper-link](#)], ISSN: 0957-4158.
- [6] **Gare, G.R.**, K. Peter, and A. L. R., “Custom 8 Bit Microprocessor Designing and Implementation on FPGA Board”, in *International Journal of Electrical Electronics Computer Science Engineering, Special Issue – News*, [[paper-link](#)], 2016.
- [7] **Gare, Gautam Rajendrakumar**, “Autonomous Vehicle Technology - A Brief Overview of The Technology and Current Trends in Autonomous Systems”, in *International Journal of Modern Trends in Engineering and Research*, [[paper-link](#)], 2016.

WORK EXPERIENCE

Carnegie Mellon University, Pittsburgh, USA

Research Associate

Feb 2021–present

- Computer Vision and Deep Learning researcher with a focus on video understanding and tracking.

Sling Media R&D, Bangalore, India

Senior Data Scientist

May 2019–Jul 2019

- Worked on feature modeling to analyze customer trends and predicted the churn rate with an accuracy of 85%.

Senior Software Engineer

Jul 2016–Apr 2019

- Lead the development of the UI interface of Sling TV Android App for AirTV Player platform.

PATENTS

- Inventor for “*Apparatuses, Systems and Methods for Adding Functionalities to control Buttons on a Remote-Control Device*”, granted on Jan 28, 2020. [[patent-link](#)]
- Co-inventor for “*System and Method for Labeling Ultrasound Data*”, applied on Jun 12, 2020.
- Inventor for “*Add-On Smart Device for Charging Portable Device*”, applied on Oct 24, 2016. [[patent-link](#)]
- Co-inventor for “*An Improved Faucet with Automatic Flow Control using Proximity Sensor*”, applied on Feb 26, 2016. [[link](#)]