DEVESH WALAWALKAR

926 Ivy Street Apt 104, Pittsburgh, PA USA 15232 | devwalkar64@gmail.com | +1 412 313 4125
Website | LinkedIn | Github

Bio

I am an engineer and avid researcher in field of Artificial Intelligence, Deep Learning and Computer Vision. My research interests include Object Detection, 2D/3D Instance Segmentation, Deep Learning Model Compression, Self-Supervised Learning, AI Model Evolution and Scene Understanding. I hold a Master's degree in ECE from Carnegie Mellon University and I am currently working full time as a ML research engineer at Honeywell. Currently, I spend my time researching and building AI based perception systems for robotics applications as well as working on personal computer vision research projects.

Education

Carnegie Mellon University Pittsburgh, USA
Master of Science in Electrical and Computer Engineering GPA: 3.58/4 (Major), 3.48/4 (Overall) May 2019
Significant Courses: Introduction to Machine Learning (PhD level), Advanced Topics in Deep learning, Computer Vision, Algorithms and Data Structures, Statistical Techniques in Robotics

Veermata Jijabai Technological Institute Mumbai, India
Bachelor of Technology in Electronics Engineering GPA: 8.96/10, Department Rank: 5th May 2017
Significant Courses: Image processing, Linear algebra, Probability theory, Introduction to Robotics, Embedded Systems

Work Experiences

Honeywell Robotics Pittsburgh, USA
Machine Learning Research Engineer Jan 2020 – Ongoing

- Researching on novel Deep Learning based models for various 2D and 3D Computer Vision tasks.
- Incorporating AI based Computer Vision systems across various Honeywell portfolios.
- Facilitating AI application knowledge across various Honeywell Robotics teams.
- Developing Robotics AI based Perception system software with emphasis on compute efficiency.

Biometrics Center, Cylab, Carnegie Mellon University Pittsburgh, USA
Summer Research Intern June 2018 - Aug 2018
Research team Lead Sept 2018 – Dec 2019

- Led a team of Deep Learning researchers and iOS app developers to create a proprietary iOS application for driver drowsiness detection.
- Researched on computationally efficient yet accurate Computer Vision architectures for performing various facial biometrics tasks which include face detection, face landmarking and face pose estimation.
- Conceptualized and managed the creation of a proprietary dataset having more than 300 subjects (as part of a CMU research study), in order to train Deep Learning models for driver drowsy face detection.
- Conducted research on real time inference-based AI model architectures sponsored by US DTRA agency.

Carnegie Mellon University Pittsburgh, USA
Graduate Research Assistant Jan 2018 – May 2018

- Researched on novel active machine learning techniques being applied for medical imaging analysis.
- Invented a new active machine learning technique to query the most important unlabeled images that the trained model is uncertain about. Technique was developed in context of training CNN models to detect diabetic retinopathy in eye color fundus images. These images are very costly to label in terms of expert supervision required and hence it is critical to optimize the number of labelled images to train the model on.
- Won the Best Paper Award for this work at IEEE ICMLA 2018.

Research Projects

Online Ensemble Model Compression using Knowledge Distillation Dec 2019 - Mar 2020

- Invented a novel ensemble model compression framework which provides multiple replicas of a given model architecture compressed to varying degrees, with each being trained in an online ensemble training scheme.
- Benchmarked framework performance across all major academic datasets and CNN model architecture families.
- Work accepted at European Conference on Computer Vision (ECCV) 2020.

Object detection DL model inference on Nvidia AGX Xavier Oct 2018 - Feb 2019

- Conducted research on highly efficient Deep learning-based Object Detection models using novel AI algorithms.
- Successfully implemented the researched models on Nvidia AGX Xavier and achieved real time performance given the Xavier's limited computational capacity.
- Conducted this research as part of proprietary work for the US Department of Defense (DTRA).

Combined audio-visual models for Speech Recognition Sept 2018 - Dec 2018

- Invented a novel attention-based mechanism for learning features extracted from both audio and visual information provided by video clips to learn the pronounced word.
- Achieved state-of-the-art results on the BBC LRW [Lip reading words] dataset.

Publications

- Walawalkar, Devesh, Zhiqiang Shen, and Marios Savvides. "Online Ensemble Model Compression using Knowledge Distillation." In *2020 16th European Conference on Computer Vision (ECCV)* [Link]

- Walawalkar, Devesh, Zhiqiang Shen, Zechun Liu, and Marios Savvides. "Attentive Cutmix: An Enhanced Data Augmentation Approach for Deep Learning Based Image Classification." In *ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 3642-3646. IEEE, 2020 [Link]

- Smailagic, Asim, Pedro Costa, Alex Gaudio, Kartik Khandelwal, Mostafa Mirshekari, Jonathon Fagert, Devesh Walawalkar et al. "O-MedAL: Online active deep learning for medical image analysis." *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery* 10, no. 4 (2020): e1353 [Link]

- Smailagic, Asim, Pedro Costa, Hae Young Noh, Devesh Walawalkar, Kartik Khandelwal, Adrian Galdran, Mostafa Mirshekari et al. "MedAL: Accurate and robust deep active learning for medical image analysis." In *2018 17th IEEE International Conference on Machine Learning and Applications (ICMLA)*, pp. 481-488. IEEE, 2018.
  [**Best Paper Award**][Link]

Awards and Recognition

- Best Overall Paper Award at IEEE International Conference on Machine Learning and Applications 2018.
- Award in recognition of securing overall academic rank fifth within EE Department for undergraduate studies.
- Award in recognition of securing academic rank first for senior year of undergraduate studies.
- Merit-based Scholarship Award for exceptional academic performance in High School.

Technical Skills

Languages: Python, MATLAB, C++, R **DL frameworks**: Tensorflow, Keras, PyTorch **Software**: ROS, OpenCV, Scikit-learn