DEVESH WALAWALKAR

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Bio

I am an avid researcher in the field of Artificial Intelligence, Deep Learning and Computer Vision. My research interests include Object Detection, 2D/3D Instance Segmentation, Deep Learning Model Compression and Self-Supervised Learning. I hold a Master's degree in ECE from Carnegie Mellon University and I am currently working full time as a Research Engineer at Flawless AI, where I research novel algorithms for facial analysis specific to the movie domain.

Education

Carnegie Mellon University   Pittsburgh, PA,USA
Master of Science in Electrical and Computer Engineering GPA 3.58/4   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

Flawless AI   Los Angeles,CA,USA
Research Engineer   Aug 2022 - Ongoing

- Conducting lead research on AI based facial analysis tech (Face detection, Face identification, Face motion tracking).
- Developing core AI systems for character facial analysis for movie/TV show domain.
- Conducting research on data efficient techniques for Neural Face Rendering algorithms.

Honeywell Robotics   Pittsburgh, USA
Advanced Data Scientist - R&D   Jan 2020 – July 2022

- 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 DOD (DTRA) .

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 the 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 labeled 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).

Publications

- Walawalkar, Devesh, Zhiqiang Shen, and Marios Savvides. "Online ensemble model compression using knowledge distillation." In *Computer Vision–ECCV 2020: 16th European Conference, Glasgow, UK, August 23–28, 2020, Proceedings, Part XIX 16*, pp. 18-35. Springer International Publishing, 2020.[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]

Patents

- Apparatuses, computer-implemented methods, and computer program products for continuous perception data learning (Status: Published)[Link]
- Methods, apparatuses and computer program products for depalletizing mixed objects (Status: Published)[Link]
- Method for compressing an ai-based object detection model for deployment on resource-limited devices. (Status: Published) (Funded by US Department of Defense under grant W911NF20D0002)[Link]
- VideoClusterNet: Self Supervised and Adaptive Clustering for Videos (Status Filed)

Review Work

- Official Reviewer for European Conference on Computer Vision 2024 (2 papers)

- Official Reviewer for International Conference on Pattern Recognition 2024 (4 papers)
- Official Reviewer for International Conference on Machine Learning and Intelligent Systems 2023 (2 papers)
- Official Reviewer for International Conference on Electronics, Communications and Networks 2023 (3 papers)
- Official Reviewer for International Conference on Electronics, Communications and Networks 2024 (1 paper)

Awards and Recognition

- Best Overall Paper Award at IEEE International Conference on Machine Learning and Applications 2018.
- Award for most innovative R&D idea at Flawless innovation event competition.
- 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.