Raviteja Vemulapalli

Research Interests

- Computer Vision and Machine Learning.

Experience

- Machine Learning Researcher, **Apple**, Seattle, WA Nov 2022 - Current
- Senior Research Scientist & Tech Lead, **Google**, Seattle, WA. Nov 2018 - Oct 2022
  - Initiated and led a research effort on federated self-supervised learning working with multiple partner teams.
  - Managed several research projects improving the performance of computer vision tasks such as semantic segmentation, mutual gaze estimation and camera view adjustment prediction when labeled data is limited.
  - Proposed and coordinated a cross-team effort demonstrating how image and face analysis technology can be used to improve personal media curation and sharing in several Google products.
  - Mentored several junior team members and interns.
- Research Scientist & Project Lead, **Google**, Seattle, WA. Sep 2016 - Oct 2018
  - Led a project on facial expression analysis working with a team of UX researchers, data curators and ML engineers resulting in direct impact on products such as Google Clips and Google Pixel.
  - Proposed and coordinated various efforts under the project such as dataset design and collection, ML model training, product-specific evaluations, and product integrations.
  - Trained ML models to represent facial expressions in a continuous fashion using a compact embedding space that mimics human visual preferences.
  - Released the large scale Google facial expression comparison dataset to external researchers by working with Google's legal team.
- Graduate Research Assistant, **University of Maryland, College Park**, MD. Sep 2011 - Aug 2016
  Advisor - Professor Rama Chellappa
  - Proposed a new 3D skeletal representation that explicitly models the relative geometry between different body parts using 3D rigid body transformations, and applied it to skeleton-based action recognition task.
  - Proposed a new way to map temporal curves from the special orthogonal group to an Euclidean space by using rolling maps, and used it for skeleton-based human action recognition.
- Research Intern, **Mitsubishi Electric Research Laboratories**, Cambridge, MA. Jan - Nov, 2015
  Collaborators - Dr. Oncel Tuzel, Dr. Ming-Yu Liu
  - Proposed novel end-to-end trainable deep network architectures based on Gaussian CRF models and used them for pixel-level vision tasks such as semantic segmentation and image denoising.
- Research Intern, **Siemens Healthcare Technology Center**, Princeton, NJ. June - Aug, 2014
  Collaborators - Dr. Shaohua (Kevin) Zhou, Dr. Hien V Nguyen
  - Proposed a general unsupervised approach for cross-modal synthesis of subject-specific scans, and used it for synthesizing T1-MRI images from T2-MRI images and vice versa.
- Software Engineer, Camera Design Team, **Cisco Systems**, India. Nov 2010 - July 2011
- Systems Technologist – R&D, **Tandberg** (acquired by Cisco Systems), India. July 2009 - Oct 2010
  - Designed and implemented the auto white balancing and auto exposure algorithms used in Tandberg/Cisco video cameras.

Education

- Ph.D in Electrical Engineering, Sep 2011 - Aug 2016
  University of Maryland, College Park, MD.
  Advisor - Professor Rama Chellappa
- Bachelor of Technology in Electrical Engineering, Aug 2005 - July 2009
  Indian Institute of Technology (IIT), Madras, India.

Recent Publications *(Google scholar page)*

- S. Garg, M. Farajtabar, H. Pouransari, R. Vemulapalli, S. Mehta, O. Tuzel, V. Shankar, F. Faghri, "TiC-CLIP: Continual Training of CLIP Models"", ICLR, 2024.
- H. Su, T.-Y. Hu, H. S. Koppula, R. Vemulapalli, J.-H. R. Chang, K. Yang, G. V. Mantena, O. Tuzel, "Corpus Synthesis for Zero-shot ASR domain Adaptation using Large Language Models", ICASSP, 2024.
- R. Vemulapalli, W. R. Morningstar, P. A. Mansfield, H. Eichner, K. Singhal, A. Afkanpour, B. Green, "Federated Training of Dual Encoding Models on Small Non-IID Client Datasets", ICLR Workshops, 2023.
- X. Zhao, R. Vemulapalli, P. Mansfield, B. Gong, B. Green, L. Shapira, and Y. Wu, *Contrastive Learning for Label-Efficient Semantic Segmentation*, ICCV, 2021.
- B. Doosti, C.-H. Chen, R. Vemulapalli, X. Jia, Y. Zhu, and B. Green, *Boosting Image-based Mutual Gaze Detection using Pseudo 3D Gaze*, AAAI, 2021.
- Y. Liu, X. Jia, M. Tan, R. Vemulapalli, Y. Zhu, B. Green, and X. Wang, *Search to Distill: Pearls are Everywhere but not the Eyes*, CVPR (Oral), 2020.

Recent Patents *(Google patents page)*

- Y.-C. Su, R. Vemulapalli, L. Shapira, C. Pitts, B. Weiss, and A. Rogers, *Systems, Apparatus, and Methods for Improving Composition of Images*, application PCT/US2021/059325, submitted November 16, 2020.
- Z. Shen, I. Bello, X. Jia, C.-H. Chen, and R. Vemulapalli, *Modeling Dependencies with Global Self-Attention Neural Networks*, application PCT/US2020/050995, submitted September 16, 2020.
- X. Jia, R. Vemulapalli, Y. Zhu, B. R. Green, B. Doosti, and C.-H. Chen, *Systems and Methods for Training Machine-learned Visual Attention Models*, application PCT/US2020/044717, submitted August 3, 2020.
- R. Vemulapalli, C.-H. Chen, L. Shapira, B. R. Green, and J. Cai, *Subtask adaptable neural network*, application PCT/US2020/036973, submitted June 10, 2020.
- R. Vemulapalli, M. Brown, and S. M. M. Sajjadi, *Frame-Recurrent Video Super-Resolution*, US Patent 10,783,611, issued September 22, 2020.

Programming Skills

- Python, C++, MATLAB, TensorFlow.

Achievements and Awards

- University of Maryland A. James Clark School of Engineering Dean's Doctoral Research Award, 2016.
- University of Maryland ECE Distinguished Dissertation Fellowship, 2016.

Community Service

- Reviewer for CVPR, ICCV, ECCV, NeurIPS, AAAI, ACM SIGGRAPH, IEEE TPAMI, IEEE TIP and International Journal of Computer Vision.