Pranav Kadam

747-334-8822 pranavka@usc.edu Website

Education

University of Southern California Aug. 2020–May 2023
Doctor of Philosophy (PhD), Electrical Engineering Advisor – C.-C. Jay Kuo *Los Angeles, CA*
Research interests – 3D point cloud analysis and compression

University of Southern California Aug. 2018–May 2020
Master of Science (Honors), Electrical Engineering GPA – 3.91 *Los Angeles, CA*
Relevant coursework – Multimedia Compression, Computer Vision, Machine Learning, Deep Learning

Savitribai Phule Pune University Aug. 2014–May 2018
Bachelor of Engineering, Electronics and Telecommunication GPA – 3.90 *Pune, India*

Research Experience

Sony Aug. 2022–Dec. 2022
Applied Research Intern *San Jose, CA*

- Developed a deep predictor network for inter-prediction in dynamic dense point cloud compression.
- Designed rate control mechanism in deep learning based point cloud compression methods using gain/inverse gain units.
- Proposed unified neural network architecture and joint training approach for I- and P-frame compression.
- Achieved BD-Rate of -10% over SOTA deep learning method with fewer parameters and BD-Rate of -60% over V-PCC.

InterDigital May 2022–Aug. 2022
Research Intern *New York, NY*

- Designed intra-/inter-mode decision module for dynamic point cloud compression.
- Proposed training of scene flow estimation methods with unsupervised RD loss for dynamic point cloud compression.
- Improved performance of dynamic LiDAR compression over G-PCC using deep learning techniques.

USC Media Communications Lab May 2019–May 2022
Research Assistant *Los Angeles, CA*

- Collaborated in research and development of unsupervised and feedforward feature learning method for 3D point clouds.
- Proposed methods for scene flow estimation, LiDAR odometry, point cloud registration and pose estimation.

Projects

Multimedia compression algorithms | *C++*

- Implemented compression algorithms like Shannon Fano, Huffman, Adaptive Huffman coding, Binary Arithmetic Coder, QM Coder and JPEG.
- Experimented with different motion estimation and rate control methods in H.264 video compression.

Structure from Motion (SfM) for 3D reconstruction | *Python, OpenCV*

- Reconstructed 3D point clouds of historic structures from pairs of images.
- Performed keypoint matching using SIFT and kNN, pose estimation from essential matrix and SVD, and triangulation.

Region based photorealistic image style transfer | *Python, PyTorch*

- Trained PSPNet on MIT ADE20K dataset for semantic segmentation of content and style images.
- Implemented segment-wise image stylization using Whitening and Coloring transform.

Technical Skills

Languages – Python, C++, Matlab, LaTeX
Libraries – PyTorch, Open3D, Minkowski Engine, OpenCV, Scikit-learn
Certifications – Deep Learning Specialization (Coursera)

Recent Publications

- PCRP: Unsupervised Point Cloud Object Retrieval and Pose Estimation. *IEEE International Conference on Image Processing (ICIP), 2022* [Paper]
- GreenPCO: An Unsupervised Lightweight Point Cloud Odometry Method. *IEEE International Workshop on Multimedia Signal Processing (MMSP), 2022* [Paper]
- R-PointHop: A Green, Accurate and Unsupervised Point Cloud Registration Method. *IEEE TIP, 2022* [Paper]
- 3D Point Cloud Analysis: Traditional, Deep Learning and Explainable Machine Learning Methods. *Springer* [Book]

Achievements and Service

Awards – Masters Honors Fellowship, Best Project in Deep Learning
Teaching Assistant – Digital Image Processing (Spring'22), Linear Algebra (Fall'21)
Reviewer – IEEE ICIP, Springer Nature, APSIPA TSIP, ISPRS Journal on Photogrammetry and Remote Sensing