# SHIVANSH RAO

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EDUCATION	
Pennyslvania State University	PA, USA
Master of Science in Computer Vision   GPA: 4/4	Dec 2021
Key courses: Deep Learning, Advanced Computer Vision, Natural Language Processing	
Delhi Technological University	Delhi, India
Bachelor of Technology in Electronics and Communication Engineering  GPA: 8.64/10	May 2019
Qualcomm Technologies Inc.   Multimedia R&D   San Diego, CA	June 2021 - Present
Core Responsibilities	
<ul> <li>Developed the core IP and system design for hardware acceleration of feature detector, descr support 6-DoF head pose estimation for XR, motion estimation for mobile, and SLAM pipeline</li> <li>Optimized the detector and descriptor IP by running concurrently on dual cameras for 4k feat ms, delivered to OEMs.</li> </ul>	iptor, and matcher to for Auto. ures, reduced latency to 10
<ul> <li>Designed and implemented the 3D-reconstruction (3DR) IP to generate the mesh of the scene</li> </ul>	by TSDF integration on the

- Designed and implemented the 3D-reconstruction (3DR) IP to generate the mesh of the scene by TSDF integration on the 3D sparse volume grid, delivered to OEMs.
- Optimized the 3DR pipeline to 15fps for TSDF integration and 1fps for Mesh Extraction.

#### Innovation & Patent Development

- Lead inventor for 5 granted US patents, and co-lead for 2 granted US patents.
- Patented a lightweight neural network to refine 2D keypoints to improve feature matching for AR/VR 6-DoF Tracking.
- Patented a diffusion-based fisheye video rectification network for diverse camera setups for ADAS applications.
- Patented a mechanism for Egocentric Gaze estimation with Audio-Visual modality fusion for AR glasses.

#### Computer Vision Lab @UManitoba |Visiting Researcher| Manitoba, Canada

- Developed the SOTA model for person re-identification from videos captured from different cameras, improved the overall Cumulative Matching Characteristics (CMC) accuracy by 8%.
- Addressed the problem of extracting long-range dependencies using a non-local attention model that captures the attention scores across all video frames. .
- Conference paper accepted to IEEE AVSS' 2019. [Paper]

#### PUBLICATIONS & PROJECTS -

## General Room Layout Estimation [Paper]

Advisor: Prof. Lee Giles, Prof. Daniel Kifer, Machine Learning Lab | OmniCV Workshop, CVPR 2021 (Poster)

- Developed SOTA model for reconstructing Manhattan World 3D room layouts from a single RGB panorama.
- Proposed a computationally efficient network that encodes the whole-room layout of the input panorama as three 1D vectors encoding the positions of floor-wall, ceiling-wall, and wall-wall boundaries.

## Emotion Guided Continuous Affect Synthesis [Paper]

Advisor: Prof. James Wang, Affective Computing Lab | HuMA Workshop, ACM' MM 2020 (Poster)

- Spring'20 Achieved SOTA performance with an improvement of 2% for the task of synthesizing continuous facial expressions from a static image.
- Developed a StarGAN based network to generate continuous facial emotions based on 2D emotion representation (valence and arousal). Proposed to utilize categorical emotions (e.g., happy, sad) to guide the network for smoother transitions in between synthesized images.

# Self Supervised Training for Facial Expression Recognition [Paper]

Advisor: Prof. James Wang, Affective Computing Lab | BEEU Workshop, ECCV 2020 (Poster)

- Developed SOTA network with an improvement of 1% for the task of facial expression recognition from videos in the wild.
- Adopted the Student-Teacher learning paradigm that uses a combination of labelled dataset and unlabelled dataset for self-training and trained the model with multi-level attention mechanism.

May 2018 - Sep 2018

Fall'20

Spring'20