Deepak Sridhar
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Profile

I am a second year PhD student at SVCL, UCSD working under Prof. Nuno Vasconcelos on computer vision problems focused on generative modeling for multimodal problems (**image/3D**). Specifically, I am currently working on an efficient 2D/3D diffusion model framework (project page) that offers high fidelity, controllability, modularity, (re)-usability (adapting existing foundational models) and applicability to **multi-modal generation** including **audio/video/text**. I am also working on addressing **hallucination** in **vision-language models** via synthetic data generation. Previously, I also worked on fundamental problems like efficient image classification/detection (link), pose estimation and action recognition (link).

Education

PhD, Electrical and Computer Engineering, 3D Vision	**2022-2026**
University of California, San Diego, La Jolla, California	**CGPA: 3.93/4**
Master of Engineering, Electrical and Computer Engineering, Thesis	**2016-2018**
McGill University, Montreal, Quebec	**CGPA: 3.88/4**
Bachelor of Technology, Instrumentation and Control Engineering	**2012 -2016**
National Institute of Technology Tiruchirappalli (NITT), India	**CGPA: 9.6/10**

Research Interests

Vision-Language models, Diffusion Models, Controllable Image Synthesis, Text-to-3D generation, Novel View Synthesis.

Publications   **Google Scholar**

D Sridhar, Y Li, N Vasconcelos **SCHEME: Scalable Channer Mixer for Vision Transformers, arXiv 2023**

D Sridhar, N Quader, S Muralidharan, Y Li, P Dai, J Lu, **Class Semantics-based Attention for Action Detection**, **ICCV 2021**, 13739-13748

D Sridhar, H Michalska, **Non-asymptotic state and input estimation for smooth linear parameter varying systems**, 2018 IEEE Conference on Decision and Control (CDC), 686-693

D Sridhar, DP Ghoshal, H Michalska, **B-splines in joint parameter and state estimation in linear time-varying systems**, 2018 Annual American Control Conference (ACC), 3508-3513

Professional Experience

Senior Computer Vision Research Engineer:	May 2018-Aug 2022

Huawei Technologies Canada Co., Toronto, Ontario

- **Hand Pose Project** - Led a small group of research engineers to develop a real-time hand pose estimation engine that was deployed for Huawei Education Tools applications in Huawei Smart Lamp.
  - Designed the end-to-end model pipeline for detecting, classifying, and localizing the hand joints.
  - Achieved the accuracy requirement (< 20 MPJPE), size (~5 MB) and speed requirements (>50 FPS) on mobile devices.
  - Designed a lightweight 3D hand joints and mesh estimation model (10% less FLOPs) that can run in real-time on low resource devices with competitive accuracy compared with large models. The architecture uses transformers as the learning head for joints and mesh prediction.
- **Smart TV Gesture Control Project** – Developed a tiny hand detection and hand classification model that surpassed the accuracy requirements (> 95% precision and > 90% recall) for detecting smart gestures such as swipe, drag and openhand. It runs under 15 ms/image speed on Huawei mobile devices. The models were successfully deployed in Huawei Smart TV launched in early 2020.

- **Action Detection** – Developed an action localization network that achieved second position in ActivityNet Challenge 2021/2022 Temporal Action Localization workshops held at CVPR'21, '22. Published a paper in ICCV'21 based on a novel attention mechanism that achieved state-of-the-art performance on action detection benchmarks – ActivityNetv1.3 and THUMOS14 datasets.

Skills

Programming: Python, Pytorch, TensorFlow, MATLAB, Caffe, C++, Java (Android), SQL

Software: Git, Visual Studio Code, Kubernetes, CI/CD, Docker, Pycharm, Android Studio, Microsoft Excel.

Academic Service

Reviewer: CVPR ('22), ECCV ('22), ICCV ('23), TNNLS ('20,'21), TPAMI ('23)
Teaching Assistant: ECSE 500 Math Foundation of Systems, ECE 271A Statistical Learning

US Patents Filed

Devices and methods for single or multi-user gesture detection using computer vision	**Feb 2022**
Systems and methods for video retrieval and grounding	**Nov 2021**
Devices and methods for gesture-based selection using machine vision	**Aug 2021**
Methods, devices, and computer readable media for training a keypoint estimation network using cgan-based data augmentation	**May 2021**
Systems, methods, and computer media for joint attention video processing	**Mar 2021**
Methods, devices, and media providing an integrated teacher-student system	**Mar 2020**

Awards

- Awarded **Jacobs Fellow Award** (highest recognition in ECE department at UCSD) | 2022
- Awarded **Future Rising Star Award** that is chosen by peers to represent being a positive force | 2022
- Awarded **Outstanding Individual Award** for the year 2021 by Huawei Canada for leading a small team of research engineers to successfully deliver a project, publishing a top-tier conference paper and filing multiple patents | 2021
- Awarded **Toronto RC Director Award** by Huawei Canada for contribution in research and delivery of key projects| 2021
- Awarded the **Globalink Graduate Fellowship** of value 15000 CAD by Mitacs Inc. | 2016-2017.
- Awarded the **Graduate Excellence Fellowship** of value 7500 CAD by McGill University | 2016-2017.
- Awarded **special merit certificate** for being among the **top 0.1 percent** of successful students of AISSE (All India Secondary School Examination) 2010.

Leadership and Volunteering

- **Community Assistant**, Graduate and Family Housing, UCSD, 2023 - Present: Organized several programs (e.g., Diwali celebration, Sustainable Scavenger Hunt, Writing retreat etc.) to build the graduate housing community to promote a sense of belonging.
- **PhD Representative** ECE Graduate Student Council (ECE GSC), UCSD, 2022 - Present: Organized 1st year PhD students' happy hour, beach bonfire events where students socialize with food and drinks. Handled the communications and logistics aspects.
- **Vice President (Operations)** Electrical Engineering Graduate Students Society (EEGSS) Council, McGill University (2017-2018): Managed events such as Activity Night, EEGSS Holiday Lunch and conducted monthly meetings with EEGSS council members.
- **International Student Services Buddy Volunteer** (McGill University): Facilitated smooth transition of new International Students to McGill (2017-2018).
- **Head of Workshops** Sensors'16, a National Level Technical Symposium of ICE at NIT Trichy: Organized a series of Workshops on eclectic topics which include Electronics/Robotics, Design, and Software. (2015-2016).