Dhruv Sheth

Email: dsheth@caltech.edu
Portfolio: dhruvsheth-ai.github.io
Mobile: +1 (626) 689 3769
Github: github.com/dhruvsheth-ai

Education

- **California Institute of Technology** — Computer Science
  Relevant Courses to be taken by Summer: CS2, CS3, CS 21, ME 8 — *2023-2027*
  - **Student Organization:**: (CAOS) Caltech Air and Outer Space - Sensors Subteam (Navigation using RealSense)

Skills Summary

- **Languages**: Python, C++
- **Frameworks**: Tensorflow, Pytorch, OpenVINO
- **Hardware**: OAK-D, Intel RealSense, Arduino Portenta, Tau Lidar, Sony Spresense
- **Some Experience**: ROS

Experience

- **Luxonis Corp.**
  ML Intern — *March 2021 - October 2021*
  - **Employer - Brandon Gilles**: Worked on developing the depthai python SDK and library for on-board depth-assisted processing and detection. Worked on custom use-case development including OpenVINO integration and integration of existing frameworks (classification, detection, segmentation, re-identification, tracking) with depthai library. Included working on a custom use-case for a startup, 'streetsense' to track traffic using OAK-D and on luxonis' segment of Commute Guardian, an algorithm to alert and prevent potential crashes with bicyclists.
- **Schepens Eye Research Institute (SERI), Harvard Medical School**
  Student Researcher at Gang Luo's Lab under Prof. Ayush Kumar — *Jan 2022 - Jan 2023*
  - **ML based eye-gaze pattern assessment in patients with Homonymous Hemaniopia**: Developing Spatial Perception and Navigation Algorithms to identify gaze pattern and assessing other quantitative measures in Homonymous Hemaniopiac patients. This research utilizes Object Detection, Tracking and Saliency Identification algorithms to quantify the nature of gaze patterns of such patients in spatio-temporally changing environments and their deviation from standard human behavior using existing ConvLSTMs methods for saliency maps.
- **EdgeImpulse**
  Research Intern and Ambassador — *Jan 2021 - Feb 2023*
  - **Employer: Adam Benzion, David Tischler**: Worked on Embedded Systems, deployment of quantized ML models on edge computing boards. Worked on testing deployment of quantized models over ARM, Sony, Seeed, Particle, Arduino boards for functionality

Projects

- **HapticCV: Depth Perception and Haptic Stimulus based bicycle assistance**: Developed a real-time obstacle detection and navigation assistance system for cyclists using stereo depth estimation, object tracking and haptic feedback.
- **Gelāre: Assistive robotic arm prototype using depth-sesing**: Goal: To mimic complex tasks of computer vision by robotic arms using lower DOF robotic arms in cluttered environments with depth perception. Used an extremely small embedded ML model for computer vision < 3 Mb to accurately detect, pick and place objects as well as apply appropriate force to pick up food items.

Conferences and Publications

- **19th ACM Conference on Embedded Networked Sensor Systems (SenSys 2021)**: "ElastiCL: Elastic Quantization for Communication Efficient Collaborative Learning in IoT"
- **Lightning talk at North American Plant Phenotyping Network (NAPPN 2022) conference:**: "Spatio-temporal generation of morphological Plant features for yield prediction before harvest from Visual Image input using Progressively Growing GANs"
- **ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN -2022)**: "Embedded ML Pipeline for Precision Agriculture" accepted as a poster

Honors and Awards

- 3rd Grand Award at ISEF'22 (International Science and Engineering Fair)
- RISE Global Winner (1 of 100 out of 13k) - Schmidt Futures and Rhodes Trust
- BL4S (Beamline for Schools by CERN): Top 25 for particle physics
- Grand Prize ($1.5k) in Neosensory Competition.
- 3rd Place ($1k) in Arm Devsummit Competition Globally.
- Hackster UN Impact Prize for Embedded ML Challenge