Kaustubh Prashant Sadekar

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Education

Ph.D. Computer Science, Portland State University — *June 2022 - Present*

Department of Computer Science

- Research : Time-of-flight sensing using single photon cameras, active stereo for transparent objects, 3D reconstruction with lensless cameras

B.Tech. Electrical Engineering, Pandit Deendayal Petroleum University — *August 2014 - May 2018*

School Of Technology Department of Electrical Engineering

- Robotics club president, IEEE student chapter representative, Motor controller team lead for prototype electric car project

Skills

Languages and libraries : Python, C++, OpenCV, Open3D, PCL, PyTorch, PyTorch3D

Platforms : Blender, Mitsuba3, Meshroom, ROS, Meshlab, Shining 3D, FARO Scene, Visual Studio, MATLAB, Arduino IDE

Hardware : Intel Realsense D345i, OAK-D, FARO Focus, EinScan Pro, NVIDIA Jetson Nano, ARM-STM32f4, Arduino, Raspberry-Pi

Experience

Indian Institute of Technology Gandhinagar — *August 2021 - March 2022*

Senior Research Fellow At The Computer Vision Imaging and Graphics Lab — *PI: Prof. Shanmuganathan Raman*

- 3D reconstruction of cultural heritage sites using FARO terrestrial scanner and EinScan structured light scanner. Proposals for research grants

Indian Institute of Technology Gandhinagar — *August 2020 - August 2021*

Junior Research Fellow At The Computer Vision Imaging and Graphics Lab — *PI: Prof. Shanmuganathan Raman*

- Point cloud and mesh post-processing pipelines for structured light 3D scans. Custom photogrammetry pipeline for 3D reconstruction

LearnOpenCV.com — *August 2019 - April 2022*

Contributing Author (remote work) — *Dr. Satya Mallick*

- Authored several technical articles explaining fundamental concepts of classical computer vision and 3D computer vision Author Profile

Indian Institute of Technology Bombay — *May 2019 - August 2020*

Research Associate At The Autonomous Robots and Multi-robot Systems (ARMS) Lab — *PI: Prof. Leena Vachhani*

- Streaming and surveillance system for spherical robots using fisheye camera. Created OmniCV - library for omnidirectional cameras Read Docs

Publications

Shadow Art Revisited: A Differentiable Rendering Based Approach — *WACV 2022*

Kaustubh Sadekar, Ashish Tiwari, Shanmuganathan Raman | *Project Page* *Paper*

LS-HDIB: A Large Scale Handwritten Document Image Binarization Dataset — *ICPR 2022*

Kaustubh Sadekar, Ashish Tiwari, Prajwal Singh, Shanmuganathan Raman | *Project Page* *Paper*

TreeGCN-ED: Encoding Point Cloud using a Tree-Structured Graph Network — *ArXiv*

Prajwal Singh, Kaustubh Sadekar, Shanmuganathan Raman | *Paper*

Major Projects

Simulating Single Photon Cameras for Supervised Depth Estimation

To Be Open Sourced *Project Page*

- Physics-based modeling of SPAD sensor measurements simulating the effect of photon randomness, laser characteristics, and ambient light

Affordable Stereo Camera

To Be Open Sourced *Project Page*

- Stereo camera with USB webcams. Supporting software for stereo calibration, multiple depth estimation algorithms, and RGB-D data processing

Implementation of Kinect Fusion Algorithm For 3D Reconstruction

To Be Open Sourced *Project Page*

- Vectorized, GPU-accelerated implementation of Iterative Closest Point (ICP) algorithm and TSDF Fusion algorithm using PyTorch

OmniCV - Library for omnidirectional cameras

Open Sourced Code And Documentation Available On GitHub *Read Docs* *Code*

- ROS compatible library with different models of omnidirectional cameras (C++ and Python support). CI-CD using GitHub actions

Cyclops - A Spatial AI-based Assistant for Visually Impaired

OpenCV Spatial-AI 2020 round 1 winners *link* | *Group members: Malav Bateriwala, Vishruth Kumar* *Project Page*

- Detects query objects with accurate depth estimates using Luxonis OAK-D and guides the user with audio feedback. RaspberryPi used as SoC