

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 from 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 Source Software

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.