

PRATIK KALSHETTI

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Research Interests

Computer Vision (object detection, segmentation, pose estimation, tracking, 3D reconstruction),
 Computer Graphics (inverse rendering, shape modeling, mesh-pointcloud registration, animation)

Education

M.Tech.+Ph.D.	Computer Science and Engineering	IIT Bombay	2024
CPI: 9.37/10			
Thesis: <i>Reconstructing Hand Shape and Appearance for Accurate Tracking from Monocular Video</i>			
Advisor: Parag Chaudhuri			
B.Tech.	Computer Science and Engineering	IIT Jodhpur	2016
CPI: 8.32/10			
Final Project: <i>Medical Image Segmentation Tool for reconstructing 3D bone from MRI data</i>			

Experience

Postdoctoral Research Fellow, IIT Bombay	2024 – present
Collaborator: Vladislav Golyanik (Max Planck Institute for Informatics)	
Research Associate, IIT Bombay	2024
Teaching Assistant, IIT Bombay	2016 – 2023
Research Intern, Adobe Research	2021
Collaborators: Alec Jacobson, Oliver Wang, Thibault Groueix, Vova Kim	
Software Development Intern, Hindustan Aeronautics Limited	2014

Awards and Honors

- ★ Featured in 50th SIGGRAPH at Los Angeles in 2023 for achieving a top-three place twice in the ACM Student Research Competition
- ★ Our research on hand shape model featured on ACM SIGGRAPH Blog
- ★ 2nd place in ACM Student Research Competition at SIGGRAPH 2022, Vancouver
- ★ 3rd place in ACM Student Research Competition at SIGGRAPH 2019, Los Angeles
- ★ Awarded TCS Research Scholar Fellowship, 2019
- ★ Winner Qualcomm Innovation Fellowship India 2017
- ★ 2nd place in Inter IIT Tech Meet 2014

Publications

- **Pratik Kalshetti** and Parag Chaudhuri. Intrinsic Hand Avatar: Illumination-aware Hand Appearance and Shape Reconstruction from Monocular RGB Video. In *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2024. [Paper] [Code] [Video]
- **Pratik Kalshetti**. Reconstructing Hand Shape and Appearance for Accurate Tracking from Monocular Video. In *SIGGRAPH Asia Doctoral Consortium*, 2023. [Paper] [Poster] [Video]

- **Pratik Kalshetti** and Parag Chaudhuri. Local Scale Adaptation to Hand Shape Model for Accurate and Robust Hand Tracking. In *Computer Graphics Forum (ACM SIGGRAPH/Eurographics Symposium on Computer Animation)*, 2022. [Paper] [Code]
- **Pratik Kalshetti** and Parag Chaudhuri. Local scale adaptation for augmenting hand shape models. In *SIGGRAPH Posters*, 2022. [Paper] [Blog]
- **Pratik Kalshetti** and Parag Chaudhuri. Unsupervised incremental learning for hand shape and pose estimation. In *SIGGRAPH Posters*, 2019. [Paper]
- **Pratik Kalshetti**, Manas Bundele, Parag Rahangdale, Dinesh Jangra, Chiranjoy Chattopadhyay Antara: An Interactive 3D Volume Rendering and Visualization Framework In *arXiv*, 2018. [Paper]
- **Pratik Kalshetti**, Manas Bundele, Parag Rahangdale, Dinesh Jangra, Chiranjoy Chattopadhyay, Gaurav Harit, Abhay Elhence. An Interactive Medical Image Segmentation Framework using Iterative Refinement. In *Computers in Biology and Medicine*, 2017. [Paper] [Project]

Relevant Course Projects

Fit Mesh to PointCloud *C++ (Eigen, Open3D, OpenSubdiv)* *Computer Graphics, Computer Vision, Optimization*

Use Levenberg-Marquardt to iteratively adjust a mesh with subdivision surfaces to register/fit to a sparse point cloud at interactive speeds.

Leverage joint optimization of model parameters and correspondences between observed data points and model surface to achieve faster convergence.

Fast Point Cloud Sampling *C++ (OpenMP, Pybind11)* *Graph Theory, Signal Processing*

Sample point cloud using graph signal processing by preserving application-dependent features.

Substantially reduces computation time for downstream tasks without compromising accuracy.

Object Detection *Python (Tensorflow, OpenCV, Scipy)* *Deep Learning, Image Processing*

Real-time object detection using *Single Shot MultiBox* architecture to solve the classification + regression task using anchor boxes for handling outputs of varying dimension.

First publicly available implementation of YOLOv2 in Tensorflow with Eager Execution API from scratch.

Volunteer Activities

- Student volunteer at [SIGGRAPH 2021](#), virtual
- Student volunteer at [SIGGRAPH 2018](#), Vancouver
- Head, Public Relations and Hospitality, [IGNUS](#) 2015, IIT Jodhpur
- Coordinator, Electronics Club, IIT Jodhpur (2013)

Hobbies

Swimming, badminton, yoga, drawing, and music.

References

Available upon request.