Priyanka Patel

Personal Information

Tübingen, Germany
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Technical Skills

Language: Python, C++, C
Libraries: PyTorch, NumPy, Pandas, OpenCV, OpenGL, Trimesh, Pyrender
Others: Bash, Git, VisualStudio, Vim

Research Interests

Computer Vision, Computer Graphics, Image processing, Deep Learning, 3D Registration, Virtual Avatar animation, 3D human pose and shape estimation, Synthetic data

Languages

English (fluent), German (B1.1), Hindi (native)

References

Dr. Michael J. Black
Max Planck Institute for Intelligent Systems
Max-Planck-Ring 4
72076 Tübingen, Germany
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Work Experience

Max Planck Institute for Intelligent Systems, Tübingen
(Research Engineer since Oct 2018)

- Implemented scalable code to register different models like SMPL, SMPL-X, SMIL to 3D scans.
- Implemented code to fit SMPL-X model to clothed 3D scans.
- Trained models for human pose and shape estimation from monocular images using synthetic data; BEDLAM.
- Implemented Convolutional Mesh Autoencoder code in Pytorch.
- Evaluation benchmark for 3D human pose estimation methods.
- Interface for 3D body pose correction via overlay adjustments.

Zapr Media Labs, Bangalore
(Data Scientist Feb 2018 - Aug 2018)

- Anomaly Detection in Time Series TV Viewership data.
- User profile generation using Topic Modelling.

Samsung R&D Institute, Bangalore
(Lead Engineer Aug 2015 - Feb 2018)

Blur Detection in captured images. Real time style transfer for Camera. Bixby grammar generation and training. Salient object detection for Camera.

Publication

BEDLAM: A Synthetic Dataset of Bodies Exhibiting Detailed Lifelike Animated Motion
Michael J. Black, Priyanka Patel*, Joachim Tesch*, Jinlong Yang**
* Equal Contribution* ***CVPR 2023***

AGORA: Avatars in Geography Optimized for Regression Analysis
Priyanka Patel, Chun-Hao P. Huang, Joachim Tesch, David T. Hoffmann, Shashank Tripathi and Michael J. Black ***CVPR 2021***

TraceMove: A data-assisted interface for sketching 2D character animation
Priyanka Patel, Heena Gupta, Parag Chaudhuri ***GRAPP 2016***

Education

IIT Bombay, Mumbai
Advisor: Prof. Parag Chaudhuri
(M.Tech in Computer Science and Engineering, June 2015) **9.01/10**
Thesis: Data assisted interface for hand drawn 2D animation

MANIT Bhopal
(B.Tech in Computer Science and Engineering, May 2013) **8.68/10**

IIT Guwahati
Advisor: Dr. Shivashankar B. Nair
(Summer Intern, May 2012)
Project: Implemented Mobile-C on a Real Network

Coursework

Data Structures and Algorithms, Software Design, Machine Learning, Deep Learning, Probability and Statistics, Linear Algebra, Computer Graphics, Computer Vision

Course Projects

Animated film using OpenGL (link)
Implemented ray tracing in C++ (link)
Stop motion animation film (link)

Key Personality Traits

- Strong interpersonal skills
- Hard working
- Growth mindset
- Self motivated

Hobbies and Interests

Board games, Table Tennis, Table Soccer, Travelling, Hiking, Painting, Yoga and Meditation, Reading,

Awards and Recognitions

- Employee of the month award in Samsung R&D Bangalore.
- Talented student of the department award in MANIT Bhopal.

Relevant Projects

Registration pipeline

Description: *Designed and implemented a modular and scalable pipeline for registering different body models (including SMPL, SMPL-X, and SMIL) to 3D scans.*
Python, PyTorch, OpenDR, OpenCV, OOP, Openpose
Key Features:

- Render 3D scans with various camera viewpoints.
- Estimate 2D keypoints in each view.
- Optimize model pose by minimizing projected 2D keypoints loss in all views.
- Utilize point to surface distance for precise alignment of model and scan after initial proximity.

Fitting SMPL-X to clothed human scans

Description: *Implemented optimization technique to accurately fit SMPL-X to clothed scans by effectively segmenting skin and cloth regions from the 3D scan.*
PyTorch, Graphonomy, OpenDR, OpenCV, Mesh
Key Features:

- Render 3D scans from multiple view and perform pixel-level segmentation (skin, clothing, and others)
- Back-project information from all views to determine vertex probabilities for skin or cloth on the 3D scan.
- Optimize for pose and shape while minimizing point-to-surface distance for skin and ensuring body containment within clothing.

3D human pose and shape estimation (HPS)

Description: *Showed for the first time that training only on synthetic data achieves SOTA performance on real image benchmarks for 3D HPS from monocular images.*
PyTorch Lightning, TensorBoard, Albumentations
Key features:

- Implemented and trained CLIFF/HMR; 3D HPS models on large synthetic data.
- Extensive experiments on multiple benchmarks to test the generalization capability of the model.
- Created an evaluation benchmark to evaluate different HPS methods

Interface for manual pose correction

Description*: Manually adjust the 2D overlay on the image to correct the predicted 3D SMPL-X mesh from a regressor.*
PyTorch, PyTorch3D, Pyrender, Trimesh
Key features:

- Explored inverse kinematics and optimization based solutions