

EDUCATION

Max Planck Institute for Intelligent Systems, Tübingen

Germany

Ph.D., Computer Science

Feb 2021 -

Advisor: Prof. Michael Black

Carnegie Mellon University, School of Computer Science

Pittsburgh, USA

Master of Science in Computer Vision (MSCV)

Dec 2018

GPA: 4.15/4.33, Advised by Prof. Kris Kitani

Birla Institute of Technology and Science (BITS), Pilani

Hyderabad, India

Bachelor of Engineering with Honors in Electronics and Communication

July 2016

Engineering, Minor in Finance

GPA: 9.16/10 (top 2% among 1500 students, Merit scholarship recipient)

PUBLICATIONS

· **AGORA: Avatars in Geography Optimized for Regression Analysis**

P Patel, P C Huang, J Tesch, D T Hoffman, S Tripathi, M J Black. CVPR 2021

<https://cvml.page.link/agora>· **PoseNet3D: Unsupervised 3D Human Shape and Pose Estimation**

S Tripathi, S Ranade, A Tyagi, A Agarwal. 3DV 2020 (oral)

<https://cvml.page.link/pose>· **Learning to Generate Synthetic Data via Compositing**

S Tripathi, S Chandra, A Agarwal, A Tyagi, J Rehg, V. Chari. CVPR 2019

<https://cvml.page.link/learn>· **C2F: Coarse-to-fine Vision Control System for Automated Microassembly**

S Tripathi, D Jain, H Sharma. Nanotechnology and Nanoscience Asia, 2018

<https://cvml.page.link/c2f>· **Sub-cortical morphology and voxel based features for Alzheimer's disease classification**

S Tripathi, SH Nozadi, M Shakeri, S Kadoury. ISBI 2017

<https://cvml.page.link/shape>· **Deep spectral-based shape features for Alzheimer's Disease classification**

M Shakeri, H Lombaert, S Tripathi, S Kadoury. MICCAI-SESAMI, 2016

<https://cvml.page.link/spec>

PATENTS

· **Learning Temporally Consistent 3D Human Pose via Knowledge Distillation.**

S Tripathi, S Ranade, A Tyagi, A Agarwal. US Patent 16/814,526

· **VBC: Task aware synthetic data generation by inserting 3D avatars in real world images and videos.**

S Tripathi, S Chandra, A Agarwal, A Tyagi, J Rehg, V. Chari. US Patent 16/450,499

· **Reconstruct-Embellish-Misclassify: Synthetic data generation to fill gaps in data distribution**

S Tripathi, S Chandra, A Agarwal, A Tyagi, J Rehg, V. Chari. US Patent 16/192,433

RESEARCH
EXPERIENCE**AGORA: Avatars in Geography Optimized for Regression Analysis**

Aug 2020 – Dec 2021

Advisor: Prof. Michael Black

MPI-IS, Tübingen

- Developed a 3D human shape and pose estimation model trained on synthetic data that generalizes to real scenes using various 2D and 3D losses
- Added robustness to occluded scenes and support for the SMIL child model
- Evaluated our model on several 2D and 3D datasets and ran ablation studies

PoseNet3D: Unsupervised 3D Human Shape and Pose Estimation

Feb 2019 – Nov 2019

Collaborators: Dr. Amit Agarwal, Dr. Amrith Tyagi

Amazon Lab126

- Proposed self-consistency and adversarial losses to train a novel unsupervised teacher model to estimate 3D human pose from RGB videos
- Weak supervision from the teacher was used to train a student model for estimating SMPL body mesh
- Solved issues such as occlusion, domain-gap and temporal jitter leading to realistic and smooth 3D sequence reconstructions on multiple in-the-wild video datasets

Learning to Generate Synthetic Data via Compositing

May 2018 – Nov 2018

Advisors: Prof. James Rehg, Dr. Amit Agrawal, Dr. Amrith Tyagi

Amazon Lab126

- Proposed a network for generating novel composite images that retain scene context and realism
- Developed algorithms for efficient training of object detection and image classification models on synthetic composite data, using an online hard-positive mining approach
- Improved baseline Faster-RCNN mAP by 3.5% and baseline SSD mAP by 2.7% on various datasets.

ClassPaths: Weakly supervised class-specific subnets for faster-inference

Dec 2017 – Dec 2018

Advisors: Prof. Kris Kitani, Dr. Amrith Tyagi, Dr. Varsha Hedau

CMU

- Exploited class-wise parameter redundancy and activation map sparsity for finding class-specific subnets (ClassPaths) for faster inference
- Proposed an auxiliary supervisor network trained on a multi-loss formulation to jointly optimize accuracy, sparsity, pair-wise selectivity and quantization on the learned class-specific subnets

- Deep-networks employing ClassPaths achieved similar performance as a full capacity network, with 40%-60% FLOPS reduction during inference

Deep Spectral-based Shape Features for Alzheimer's Disease Classification

Feb 2016 – Jul 2016

Undergraduate Thesis, Advisor: Dr. Samuel Kadoury

Univ. of Montreal

- Developed an unsupervised framework for classification of Alzheimer's disease patients using noisy T1-weighted MRI brain images
- Proposed a combination of grey-matter voxel-based intensity variations and 3D structural (shape) features parameterized with a spherical-harmonics representation
- Results presented near state-of-the-art accuracies (>89%) – outperformed conventional MRI shape-based strategies by 22%-27%

C2F: Coarse-to-Fine Vision Control System for Automated Microassembly

May 2014 – Dec 2014

Advisor: Dr. H D Sharma

Central Electronics Engineering Research Institute, Pilani

- Developed a completely automated, visual-servoing based closed loop system to perform 3D micromanipulation and microassembly tasks
- Solved challenges around object recognition/tracking, scene understanding, path planning and obstacle avoidance
- Results led to a ~75% reduction in setup and run time as compared to manual operation, while mitigating any risk of collision during grasp-and-drop experiments

ACADEMIC PROJECTS

Learning Scene Saliency Maps Using Superpixel-augmented Convolutional Neural Networks

Aug 2017 – Dec 2017

- Extracted SLIC superpixel segmentations in input images and defined a range and color separation vector as input to a Siamese Convolutional Neural Network (CNN)
- Trained the network on the ECSSD saliency dataset. Superpixels allow for significant speedup (4x) in training while capturing a larger spatial context, leading to more precise saliency maps

Towards Integrating Model Dynamics for Sample Efficient Reinforcement Learning

Jan 2017 – May 2017

- Developed a principled approach for solving sample inefficiency issues while deploying model-free reinforcement learning in real environments
- Learned a dynamics model of the world by assuming domain-specific priors on real-world episodes. Used the learned dynamics model to augment real-world episodes as the training progressed
- Established that augmenting real-world data using an approximate world-model tends to be significantly more sample efficient than naïve model-free reinforcement learning

SCHOLARSHIPS AND AWARDS

- IISc Bangalore Summer Research Fellowship – top 20 across India 2015
- *Best Technical Association Award*, BITS-Pilani 2014
- Tournament Winner, Cricket, Arena'13 National Sports Festival 2013
- Undergraduate MERIT scholarship, BITS Pilani – top 2% students 2012
- Founder President's Scholarship, Amity International – School topper for 6 years 2011
- Junior Science Talent Search Examination (JSTSE) Scholarship – Ranked 22 in 20,000 applicants 2008

ACADEMIC DUTIES

Reviewer – International Conference on Computer Vision (ICCV), 2021
 Reviewer – Conference on Computer Vision and Pattern recognition (CVPR), 2021
 Reviewer – European Conference on Computer Vision (ECCV), 2020 (*Outstanding reviewer award*)
 Reviewer – Conference on Computer Vision and Pattern recognition (CVPR), 2020
 Reviewer – Association for the Advancement of Artificial Intelligence (AAAI), 2020

TEACHING EXPERIENCE

Teaching Assistant – 16-720: Computer Vision, Prof. Kris Kitani Fall 2018, CMU
 Head Teaching Assistant – 16-385: Computer Vision, Prof. Ioannis Gkioulekas Summer 2018, CMU

PROFESSIONAL EXPERIENCE

Amazon Lab126 Sunnyvale, USA
 Applied Scientist Feb 2019 – Present
 Improved 3D human activity reconstruction from 2D videos for enhancing action recognition/detection.
 Supported Computer Vision algorithm development for the new Echo Show. Worked on virtual try-on.

Amazon Lab126 Cupertino, USA
 Applied Scientist Intern May 2018 – Aug 2018
 Worked on task-aware generation of synthetic image composites for training deep networks

Franklin Templeton Investments Hyderabad, India
 Summer Intern | Project: Financial Modelling for Tactical Asset Allocation May 2015 – Aug 2015
 Built machine-learning models for capturing statistical associations like lead-lag correlation and one directional causality which achieved a 12% improvement in hit-rate for forecasting yield-spreads (US-OAS)

TECHNICAL SKILLS

Programming Languages Python, C++/C, MATLAB
Tools and Frameworks Pytorch, Tensorflow, Caffe, Blender, Unity

RELEVANT COURSES

16-826 Visual Learning and Recognition, CMU 10-601 Introduction to Machine Learning, CMU
16-822 Geometry Based Methods in Vision, CMU 16-811 Mathematical Fundamentals for Robotics, CMU
16-720 Computer Vision, CMU

LEADERSHIP

- Member, External Affairs Committee (Graduate Student Assembly), CMU
- Secretary, Electrical and Electronics Association, BITS Pilani
Led a team of 37 members. Organised 25 major events, 6 during the technical festival
- Computer Vision Mentor, Student Mentorship Program (SMP), BITS Pilani
Conducted evening classes for teaching 30 junior batch students
- Represented BITS Pilani cricket team in inter-college cricket tournaments and sports festivals
- Organizer of National Seminar on Indian Space Technology (NSIST-2014)

EXTRA-CURRICULAR

- Teaching volunteer at Nirmaan – BITS Pilani | www.nirmaan.org Mar 2014 – Dec 2015
- Teaching volunteer at LaSalle Boys and Girls Club, Montreal | www.bgclasalle.com Mar 2016 – Jul 2016
- Teaching volunteer at Amitasha – Teaching the girl child | www.amity.edu/amitasha Mar 2009 – Mar 2010