SHASHANK **TRIPATHI**

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EDUCATION	**Carnegie Mellon University, School of Computer Science**	Pittsburgh, PA
	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 Engineering, Minor in Finance	July 2016
	GPA: 9.16/10 (top 2% among 1500 students, Merit scholarship recipient)	

PUBLICATIONS

· *PoseNet3D: Unsupervised 3D Human Shape and Pose Estimation*
S Tripathi, S Ranade, A Tyagi, A Agarwal. *in submission ECCV 2020*   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

RESEARCH EXPERIENCE

PoseNet3D: Unsupervised 3D Human Shape and Pose Estimation   Feb 2019 – Nov 2019
Collaborators: Dr. Amit Agarwal, Dr. Ambrish 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. Ambrish 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. Ambrish 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 – European Conference on Computer Vision (ECCV), 2020 (invited)
Reviewer – Conference on Computer Vision and Pattern recognition (CVPR), 2020 (invited)
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
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