

EDUCATION

Carnegie Mellon University, School of Computer Science

Pittsburgh, PA

Master of Science in Computer Vision (MSCV) | Advised by Prof. Kris Kitani

Dec 2018

- Cumulative GPA: 4.15/4.33
- Relevant Courses: Introduction to Machine Learning, Computer Vision, Visual Learning and Recognition, Deep Reinforcement Learning and Control, Geometry-based Methods in Vision, Comp. Photography

Birla Institute of Technology and Science (BITS), Pilani

Hyderabad, India

Bachelor of Engineering, Electronics and Communication Engineering

July 2016

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

RESEARCH
INTERESTS

Computer Vision, Computer Graphics, 3D understanding, Machine Learning, Robotics, Medical Imaging

RESEARCH
PROJECTS**Learning to Generate Synthetic Data via Compositing**

May 2018 – Aug 2018

Supervisors: Prof. James Rehg, Dr. Amit Agrawal, Dr. Ambrish Tyagi | Amazon Lab126, Cupertino, CA

- 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
- Surpassed current state-of-the-art on the AffNIST benchmark, with just half the number of synthetic training examples, without using any training data from the AffNIST dataset
- 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 (Neural Network/ Model Compression)

Dec 2017 – Dec 2018

Supervisors: Prof. Kris Kitani, Dr. Ambrish Tyagi, Dr. Varsha Hedau | Carnegie Mellon University

- 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

Supervisor: Dr. Samuel Kadoury, Associate Professor and Canada Research Chair | University 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%) especially for the challenging discrimination tasks (Outperformed conventional MRI shape-based strategies by 22%-27%)

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

May 2014 – Dec 2014

Supervisor: Dr. H D Sharma, Scientist | 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

PUBLICATIONS

- **Learning to Generate Synthetic Data via compositing**, Computer Vision and Pattern Recognition (CVPR), 2019. | Full Paper: <http://bit.ly/2J1n8Le>
S. Tripathi, S. Chandra, A. Tyagi, J. Rehg, V. Chari, A. Agarwal, K. Kitani
- **ClassPaths: Weakly-supervised class-specific subnets for faster inference**, in submission to International Conference on Computer Vision (ICCV), 2019. | Full Paper: <https://goo.gl/bV1gB3>
S. Tripathi, G. Mittal, V. Hedau, A. Tyagi, X. Wang, K. Kitani
- **C2F: Coarse-to-fine Vision Control System for Automated Microassembly**, Nanotechnology and Nanoscience – Asia, 2018. | Full paper: <https://goo.gl/YDr4hK>
S. Tripathi, D. Jain, H. Sharma
- **Sub-cortical morphology and voxel based features for Alzheimer's disease classification**, IEEE

International Symposium on Biomedical Imaging (ISBI) 2017. | Full paper: <https://goo.gl/4WAAZb>
S. Tripathi, S.H. Nozadi, M. Shakeri, S. Kadoury

- **Deep spectral-based shape features for Alzheimer's Disease classification**, MICCAI workshop on Spectral and Shape Analysis in Medical Imaging (SESAMI), 2016. | Full paper: <https://goo.gl/56yPjA>
M. Shakeri, H. Lombaert, **S. Tripathi**, S. Kadoury

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

PROFESSIONAL EXPERIENCE

Amazon Lab126

Sunnyvale, CA, USA

Applied Scientist

Feb 2019 – Present

Improved 3D human activity reconstruction from 2D videos for enhancing action recognition/detection

Amazon Lab126

Cupertino, CA, 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)

Robotics Institute, Carnegie Mellon University

Pittsburgh, USA

Graduate Teaching Assistant – Computer Vision (16-720)

Aug 2018 – Dec 2018

Graduate Teaching Assistant – Computer Vision (16-385)

Jan 2018 – May 2018

LEADERSHIP

- Member, External Affairs Committee (Graduate Student Assembly), CMU
- Secretary, Electrical and Electronics Association, BITS Pilani
Led a team of 37 nucleus member. 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 the inter-college cricket tournaments and sports festivals
- Organizer of National Seminar on Indian Space Technology (NSIST-2014)

AWARDS

- Awarded the MERIT scholarship at BITS Pilani for being in the top 2% based on CGPA
- Received the *Best Technical Association Award, 2014* as Secretary, PHoEnix (Electrical and Electronics Association), BITS-Pilani, Hyderabad Campus
- Secured a rank of 22 in the Junior Science Talent Search Examination (JSTSE) Scholarship, 2008, awarded by Directorate of Education, Government of NCT-Delhi
- Awarded the Founder President's Cup with a complete tuition fee waiver plus scholarship at Amity International School, Saket for receiving the academic scholarship for 6 consecutive years
- Was among the 24 students selected across India for the IISc Bangalore Summer Research Internship Programme, 2015 at Center for Nano Science and Engineering (CeNSE)
- Winner at the cricket tournament in Arena'13 (Sports Festival of BITS Pilani Hyderabad Campus)

COMMUNITY SERVICE

- 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