

Tejas Khot

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Location : Pittsburgh, PA

EDUCATION

- **Carnegie Mellon University, School of Computer Science** Pittsburgh, PA
Master of Science in Robotics [Research based]; GPA: 4.00/4.33 08/2017 – 05/2019
- **University of Mumbai** Mumbai, India
Bachelor of Engineering in Computer Engineering; GPA: 8.91/10.0 08/2012 – 07/2016

PUBLICATIONS

- **Learning Unsupervised Multi-View Stereopsis via Robust Photometric Consistency**
 - Fast 3D reconstruction from a collection of images without using any annotations for learning.
 - Under review, CVPR 2019
- **Point Completion Network**
 - Estimating complete shape geometry from partial 3D point clouds.
 - Accepted to 3DV 2018 — Oral, **Honorable mention for Best Paper Award**
- **Making the V in VQA Matter: Elevating Role of Image Understanding in Visual Question Answering**
 - Overcoming language priors; counter-example based explanation; released new benchmark dataset VQA 2.0.
 - Accepted to CVPR 2017, IJCV 2018; **150+ citations**

EXPERIENCE

- **Carnegie Mellon University** Pittsburgh, PA
Research Assistant with Dr. Martial Hebert 09/2017 - Present
 - Developing deep learning methods for scene understanding and segmentation of 3D point clouds (LIDAR, stereo)
 - Combining camera geometry with deep learning for multi-view stereo reconstruction
 - Serving as a reviewer for CVPR 2019
- **Virginia Tech** Blacksburg, VA
Research Intern with Dr. Dhruv Batra, Dr. Devi Parikh 07/2016 - 05/2017
 - Developed a novel data-collection interface for large scale data annotations via Amazon Mechanical Turk
 - Benchmarked state-of-art VQA models on the VQA 2.0 dataset with an explanation module for interpretability
 - Served as Teaching Assistant, Introduction to Machine Learning taught by Dr. Stefan Lee, Fall 2016
 - Organized the VQA Workshop at CVPR 2017; helped setup website, web demos
- **University of Malaya** Kuala Lumpur, Malaysia
Research Intern with Dr. Chu Kiong Loo 06/2015 - 07/2015
 - Developed a system for emotion classification based on deep learning and built a web interface for real-time usage
- **Google Summer of Code**
Google Contract Developer, The OpenCog Foundation 05/2015 - 08/2015
 - Implemented the Deep Spatio-Temporal Inference Network (DeSTIN) framework using Theano utilizing GPUs
 - Improved accuracy of DeSTIN by **21%** using stacked convolutional auto-encoders with variable noise
- **InvenZone** Mumbai, India
Software Development Intern Dec 2014 - Jan 2015
 - Deployed a model for time series forecasting to determine which scientific research topics are trending
- **Silverleaf Capital Services Ltd.** Mumbai, India
Software Development Intern June 2014 - Aug 2014
 - Developed a model predicting stock splits with **94%** accuracy; deployed a Stock Portfolio Management application
- **ACM XRDS**
Department Editor April 2015 - April 2017
 - Wrote articles for the Pointers and Hello World columns introducing algorithms and software tools

TECHNICAL SKILLS

Python, Pytorch, Blender, Meshlab, MATLAB, Javascript, Amazon Mechanical Turk, Flask, Redis

SELECTED PROJECTS

- **3D Volumetric Primitives Based Spatial Map**

- Representing buildings from aerial LIDAR point clouds using lightweight parameterized shapes; obtained over **90%** reduction in number of points required compared to 3D meshes; performed sim2real transfer deep learning

- **Instance-level Semantic Segmentation of 3D Point Clouds**

- Generated candidate object proposals in a learned metric space and refine them using a top-down classification and segmentation network. The result is a scene-level semantic representation. Demonstrated for real 3D indoor scans.

- **Prioritized Hindsight Experience Replay : Deep RL for Robot Manipulation**

- Developed a new technique which uses importance sampling to prioritize selection of transitions from experience replay buffer to improve exploration in sparse reward tasks; performs better than HER on many robotics tasks.

- **Efficient Exploration and Navigation in Unknown Environments with External Spatial Memory**

- Combined deep reinforcement policy learning algorithms (A2C, A3C) with an external memory architecture (Neural Map, LSTM) to train an agent in simulation for: 1) exploration of full map, 2) returning to start position.

- **Learning Point Correspondences With Wider Viewpoints**

- Using CNN features as local feature descriptors and comparing against SIFT on Pascal Keypoint Dataset based on detection accuracy over planar rotations

LEADERSHIP AND ACHIEVEMENTS

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| • Philips Sleep Challenge Competition - Winner (3rd place) | <i>11/2018</i> |
| • STARS Space Innovation Competition - Winner (1st place) | <i>09/2017</i> |
| • Board member, Futurist Club, CMU | <i>09/2018 - present</i> |
| • Junior Board member, Graduate Entrepreneurship Club, CMU | <i>09/2017 - 09/2018</i> |
| • Founder and Chairperson, Association of Computing Machinery(ACM) Student Chapter | <i>08/2014 - 08/2015</i> |

SELECT COURSEWORK

Introduction to Machine Learning, Introduction to Computer Vision, Deep Reinforcement Learning, Geometry Methods for Computer Vision, Mechanics of Manipulation