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 — *12/2014 - 01/2015*
  - Deployed a model for time series forecasting to determine which scientific research topics are trending
- **Silverleaf Capital Services Ltd.** — Mumbai, India
  Software Development Intern — *06/2014 - 08/2014*
  - Developed a model predicting stock splits with **94%** accuracy; deployed a Stock Portfolio Management application
- **ACM XRDS**
  Department Editor — *04/2015 - 04/2017*
  - 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 reply 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

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

Select Coursework

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