Debidatta Dwibedi

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EDUCATION

Carnegie Mellon University, USA

M.S. in Robotics — Aug 2015 – May 2017

- Adviser: Prof. Martial Hebert
- Research areas: Computer Vision, Machine Learning
- Thesis: Synthesizing Scenes for Instance Detection

Indian Institute of Technology - Kanpur, India

B.Tech.-M.Tech. in Electrical Engineering — Jul 2009 – Jun 2014

- Adviser: Prof. Amitabha Mukerjee
- Thesis: Observational Learning Of Rules Of Games
- Cumulative GPA: 8.7/10 (B.Tech.), 9.6/10 (M.Tech)

RESEARCH EXPERIENCE

Google Brain, Mountain View

Google Brain Resident — Jul 2017 – Present

- Project: Visual imitation learning for robotics
- Supervisors: Pierre Sermanet, Jonathan Tompson

Magic Leap, Inc, Mountain View

Deep Learning Intern — Aug 2016 – May 2016

- Project: Detecting cuboids in scenes and localizing their corners using deep learning
- Supervisors: Andrew Rabinovich, Tomasz Malisiewicz, Vijay Badrinarayanan

Robotics Institute, Carnegie Mellon University

Graduate Research Student — Aug 2015 – May 2017

- Project: Leveraging videos and 3D models for object detection and pose estimation.
- Adviser: Prof. Martial Hebert

Personal Robotics Lab, Carnegie Mellon University

Robotics Institute Summer Scholar — May 2012 – Jul 2012

- Project: Object Segmentation in RGBD Images
- Adviser: Prof. Siddhartha Srinivasa

PUBLICATIONS

- Debidatta Dwibedi, Ishan Misra and Martial Hebert, *"Cut, Paste and Learn: Surprisingly Easy Synthesis for Instance Detection"*, ICCV, Oct 2017
- Debidatta Dwibedi, Tomasz Malisiewicz, Vijay Badrinarayanan and Andrew Rabinovich, *"Deep Cuboid Detection: Beyond 2D Bounding Boxes"*, Arxiv Preprint, Nov 2016
- Debidatta Dwibedi and Amitabha Mukerjee, *"Characterizing predicate arity and spatial structure for inductive learning of game rules"*, International Workshop on Computer Vision and Ontology Applied Cross-Disciplinary Technologies, ECCV, Sep 2014

ACADEMIC ACHIEVEMENTS

- Awarded a scholarship to attend INRIA's Visual Recognition and Machine Learning Summer School 2013 at ENS, Paris
- Selected for Robotics Institute Summer Scholar Program 2012 at CMU
- Secured All India Rank 538 among 400,000 candidates in IIT-JEE 2009

KEY PROJECTS

VISUAL IMITATION LEARNING — May 2016 – Nov 2016

Residency Project at Google Brain

- Designed an architecture to understand human-object interactions in videos and achieved state-of-the-art results on the Something Something dataset
- Leverage self-supervised learning for robust transfer of actions from humans to robots

DEEP CUBOID DETECTION May 2016 – Nov 2016

Internship Project at Magic Leap, Inc

- Designed and implemented a deep learning based cuboid detector that jointly finds boxy objects in a scene and localizes its corners
- Our detector is trained in an end-to-end fashion and is suitable for real-time applications in augmented reality (AR) and robotics

GENERATING ANNOTATIONS FOR OBJECT DETECTION Oct 2015 – May 2017

Part of Masters thesis at CMU under Prof. Martial Hebert

- The objective of the project is to forego the tedious and expensive step of humans annotating images with labels that are required today to train deep learning models
- We leverage videos and CAD models to generate annotations for the tasks of object detection and pose estimation
- The project brings together many ideas from geometry based techniques like Visual Structure From Motion and deep learning based approaches for semantic segmentation to create large datasets

PLAYING GAMES WITH DEEP REINFORCEMENT LEARNING Mar 2016 – May 2016

Course Project for Machine Learning under Prof. Tom Mitchell at CMU

- The objective of the project was to explore recent advances in deep learning based approaches in a reinforcement learning setting
- We implemented variants of Deep Q-Networks(DQN) which learn to play Atari games

OBSERVATIONAL LEARNING OF RULES OF GAMES Jan 2013 – Jun 2014

Part of Masters thesis under Prof. Amitabha Mukerjee at IIT-K

- Worked on integration of computer vision and inductive logic programming to learn rules of puzzles from Kinect videos
- Built semantic graphs from point cloud scenes and used changes in their structure to automatically discover game states
- Converted semantic graphs to clauses in Prolog so that ILP can be performed to learn the rules

MULTIMODAL IMAGE SEGMENTATION USING SUPERPIXELS Jan 2013 – Jun 2014

Internship under Prof. Siddhartha Srinivasa at CMU

- Implemented Structure Discovery in Multi-modal Data in C++ by generating regions and sub-regions from indoor scenes using SLIC Superpixels
- This was used by the robot HERB to find interesting objects in its environment

WORK EXPERIENCE

Two Roads, Bangalore, India

Data Scientist Dec 2014 – Jul 2015

- Used machine learning and statistics for writing financial strategies in Python
- Developed a simulator to backtest the strategies, a data pipeline to handle daily financial data and an autoscaling system on AWS to simulate many strategies in parallel.

GRADUATE COURSEWORK

Computer Vision, Visual Learning and Recognition, Geometry-based Methods in Computer Vision, Data Mining, Machine Learning, Math Fundamentals for Robotics, Convex Optimization

SKILLS

- *Languages*: Python, C, C++, MATLAB, Java, SQL, R
- *Machine Learning* : TensorFlow, Caffe, PyTorch
- *Computer Vision* : OpenCV, Point Cloud Library
- *Others*: AWS, Sci-kit Learn, Pandas, Celery, RabbitMQ, Flask, LaTeX

EXTRA-CURRICULAR ACHIEVEMENTS

- Won 1^{st} place in Hack-A-Startup (Fall 2015) at CMU
- Won prize for *Best Capture of Business Plan* at Startup Bootcamp 2012
- Participated in Microsoft Appathon and developed an app for one shot gesture learning based on Microsoft Kinect SDK