Nirbhay Modhe

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EDUCATION

Georgia Tech, PhD in Computer Science 2017-present

IIT Kanpur, B. Tech in Computer Science, CGPA: 9.7/10 2013-2017

PUBLICATIONS

Nirbhay Modhe, Prithvijit Chattopadhyay, Mohit Sharma, Abhishek Das, Devi Parikh, Dhruv Batra, Ramakrishna Vedantam. Unsupervised Discovery of Decision States for Transfer in Reinforcement Learning *Pre-print* **(arXiv)**

Vikas Jain*, **Nirbhay Modhe***, Piyush Rai. Scalable Generative Models for Multi-label Learning with Missing Labels. *International Conference on Machine Learning (ICML),* 2017 **(pdf)**

RESEARCH EXPERIENCE

Georgia Tech, Prof. Dhruv Batra & Prof. Devi Parikh
Towards Smarter Q-Bots in Visual Dialog **(video , pres)**

- Explored ways of making the Questioner Bot ask more discriminative questions in the visual dialog task where two agents play a cooperative image-guessing game

IIT Kanpur, *Prof. Amitabha Mukerjee*
Reconstructing Unique Inversions for Deep Model of Motion

- Extended the Convolutional Chair Generation model by Dosovitsky et. al. for reconstructing poses of a 3 DOF robotic arm.
- Obtained a labelled dataset of the CRS Robot Arm using 6 cameras and used the proposed CNN to learn the robot image representations.

IIT Kanpur, *Prof. Raghunath Tewari*
Probabilistic Polynomial Method in Circuit Complexity

- Studied the application of the probabilistic polynomial method by Ryan Williams in the All Pairs Shortest Path and Boolean Orthogonal Detection problem.
- Proposed the application of this method to solve min-plus matrix multiplication faster by using the tensor product decomposition of the two matrices.

INTERNSHIPS

SRI International, Giedrius Burachas Summer 2018
Stochastic Video Prediction for Navigation

- Applied disentangled representations for stochastic video prediction in a virtual Unity3D environment and the KITTI dataset.

University of Texas at Dallas, *Prof. Vincent Ng* Summer 2016
Event Coreference Resolution

- Explored the use of recurrent neural networks for event coreference resolution

TEACHING EXPERIENCE

Teaching Assistant, Deep Learning, Georgia Tech

- Served as TA for CS 7643/4803 in Fall 2018 and Fall 2019.
- Gave an introductory lecture on dynamic programming methods for solving MDPs and an introduction to Reinforcement Learning in Fall 2019. **(slides pdf)**

Tutor, Fundamentals of Computing (ESC101), IIT Kanpur

- Taught in weekly tutorial classes for ESC101 in Fall 2016 and Spring 2017.
- Recorded video lectures in Hindi and partly in English as a part of the course offering to aid students sturggling with understanding English. **(YouTube playlist)**

OPEN SOURCE

VisDial-RL in PyTorch, Prof. Dhruv Batra — July 2018
batra-mlp-lab/visdial-rl

- Lead the open source project for implementing VisDial RL - *Learning Cooperative Visual Dialog Agents using Deep Reinforcement Learning* by Das and Kottur et. al., 2017, in PyTorch.

COURSE PROJECTS

Generative Image Modelling using DRAW — July '16 - November '16
Recent Advances in CV, Prof. Gaurav Sharma **(code)**

- Analysed the generative RNN model "DRAW" by Gregor et. al. by experimenting with the parameters and design choices of the enocder-decoder framework on the MNIST and Street View House Numbers (SVHN) cropped dataset.
- Implemented and evaluated three new modifications to DRAW which incorporate convolutional features, supervised learning and fully convolutional networks on the MNIST dataset.

Image Colorization by Patch Inference — Jan '16 - April '16
Computer Vision, Prof. Vinay Namboodiri **(code)**

- Implemented and evaluate a novel image colorization model inspired by the idea of "Fast Direct Super-resolution by Simple Functions" by Yang et. al. The model learns to color images by training on the luminance and chrominance values of local patches.
- Evaluated the model on a set of scene images from the Sun Database.

Word Sense Disambiguation in Hindi — March '15 - April '15
Artificial Intelligence,Prof. Amitabha Mukerjee **(code , poster , report)**

Perl Compiler — Jan '16 - April '16
Compiler Design, Prof. Subhajit Roy **(code)**

ACADEMIC ACCOLADES

- Received **Academic Excellence Award** twice for outstanding academic performance (awarded to top 7% students in the institute) from 2013-15
- Received an **A* grade** in 8 courses (awarded to top 1-2% students in a course)
- Secured **All India Rank 414** (among 150,000 students) in JEE Advanced 2013
- Secured **All India Rank 313** (among 5,000,000 students) in JEE Mains 2013

TECHNICAL SKILLS

Languages : Python, BASH, C, C++, R
Software & Tools : PyTorch, TensorFlow, LaTeX, Git