Nirbhay Modhe

CONTACT INFORMATION	Fourth Year Undergraduate Dept. of Computer Science and Engineering Indian Institute of Technology Kanpur	email: nirbhaym@iitk.ac.in home.iitk.ac.in/~nirbhaym

EDUCATION

IIT Kanpur, Bachelor of Technology. CPI - **9.8/10.0**   2013-Present

R. N. Podar School, Mumbai. CBSE (AISSCE) - 95.6%   2013

Maneckji Cooper School, Mumbai. ICSE - 93.4%   2011

RESEARCH EXPERIENCE

University of Texas at Dallas, *Prof. Vincent Ng*   May '16 - Ongoing
Event Coreference Resolution
- Working on a recurrent neural network for event embedding learning and event coreference resolution on the KBP '15 Event-linking dataset.

IIT Kanpur, *Prof. Amitabha Mukerjee*   May '15 – August '15
Reconstructing Unique Inversions for Deep Model of Motion   (**report** ☑)
- 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*   Dec '15 - April '16
Probabilistic Polynomial Method in Circuit Complexity   (**pres** ☑ , **report** ☑)
- 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.

COURSE PROJECTS

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

Sentence Level Grammatical Error Identification   July '16 - November '16
Intro to Natural Language Processing, Prof. Harish Karnick   (**report** ☑)
- Worked on identifying sentence level grammatical errors (those arising from missing or incorrectly placed words) using a RNN model on the NUCLE corpus of the CoNLL-2013 shared task. Error identification was also performed on the NIPS 2015 dataset.
- Evaluated a RNN model which uses lexical features to either identify regions in a sentence where a gramamtical error might be present, or identify exactly which error (insertion, deletion or replacement) exists in a particular region of a sentence.

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

Object Tracking in Surveillance Videos   Jan '16 - April '16
Machine Learning Tools, Prof. Harish Karnick   (**pres** ⍐ , **report** ⍐)
- Adapted the tracking model by Sam Hare in his paper "Structured Output and Tracking with Kernels" for use in the IIT Kanpur Surveillance Video Dataset, 2016.
- Performed classification of the localized objects using various classification algorithms such as Random Forest, AdaBoost with stumped decision trees and linear SVM.

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** ⍉)

NachOS   July '15 - Nov '15
Operating Systems, Prof. Mainak Chaudhuri

TEACHING EXPERIENCE	**Fundamentals of Computing**, Tutor *Semester I and II, 2016-17*

Fundamentals of Computing, Tutor   *Semester I and II, 2016-17*
- Taught in weekly tutorial classes, devised and graded lab exams, supervised weekly lab sessions, for two consecutive semesters.

Fundamentals of Computing, Academic Mentor, Counselling Service   *2014-15*
- Mentored academically deficient students in the course ESC101 (Fundamentals of Computing) through personal tutoring and doubt clearing sessions.

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

RELEVANT COURSES
- Recent Advances in Computer Vision
- Computer Vision & Image Processing
- Machine Learning Tools & Techniques
- Artificial Intelligence Programming
- Theory of Computation
- Data Structures & Algorithms
- Principles of Programming Languages
- Compiler Design
- Natural Language Processing
- Algorithms - II
- Probability and Statistics
- Operating Systems
- Logic in Computer Science
- Abstract Algebra
- Fundamentals of Computing
- Discrete Mathematics

TECHNICAL SKILLS
Languages : Python, C, C++, R, BASH, Perl
Software & Tools : TensorFlow, Theano, Caffe, Matlab/GNU Octave, LaTeX, Git

OFFICIAL POSITIONS

Group Leader, Rubik's Cube Hobby Group, IIT Kanpur   *2015-16*
- Held workshops for various puzzles such as the Rubik's Cube, 4x4x4 cube, 5x5x5 cube, 2x2x2, Pyraminx and Megaminx
- Coordinated all Blindfolded Rubik's Cube Solving projects done by first year students in the summer of 2015

Event Coordinator, IORC (Indian Open Rubik's Cube)   *March '15*
- Appointed judges for all events as well as invigilated over all of them
- Acted as a judge for timing individual solves and provided official scrambles for puzzles

Student Guide at Counselling Service, IIT Kanpur   *2014-15*
- Helped 7 freshmen adjust to campus life on their arrival to campus, provided emotional support and academic guidance to them during their first year