

Amlan Kar

Education

- 2017(Ongoing) **IIT Kanpur**, *B.Tech - Computer Science*, 9.7/10.0.
2012 **D.A.V. Chandrasekharapur**, *AISSCE (CBSE)*, 93.4%.
2010 **D.A.V. Chandrasekharapur**, *AISSE (CBSE)*, 10.0/10.0.

Research Experience

- May '16 - **University of Toronto**, *Prof. Raquel Urtasun & Prof. Sanja Fidler*.
Ongoing Working on Visual Semantic Embeddings and Neural Style in separate projects
- May '15 - **IIT Kanpur**, *Prof. Amitabha Mukerjee*.
Jul '15 Reconstructing Unique Inversions of a Robotic Arm using a Deep Model of Motion
- Extended the Convolutional Chair Generation model by Dosovitskiy et al. for a 3-DOF CRS Robot
 - The deep model of motion is learnt only by looking at the robot with minimal priors regarding its internal parameters. The reconstruction is done given joint angles and viewpoint only
 - After impressive performance on a synthetic toy dataset, a real dataset is scheduled to be filmed

Major Course Projects

- Jan '16 - **Computer Vision and Image Processing**, *Prof. Vinay Namboodiri*.
Apr '16 Semantic Attentional Models for Visual Question Answering
(**Code|Report**)
- Implemented a model for Visual question answering(VQA) which used the question embedding to produce a feature importance weighting vector on the VGG16 last fc layer features of the image
 - The final model performed worse than the corresponding model without feature importance weighting. We hypothesize that features from a classification network do not encode intra-class interactions and must be learnt by the model due to which soft feature selection for classification performs poorly
- Jan '16 - **Machine Learning Tools and Techniques**, *Prof. Harish Karnick*.
Apr '16 Vehicle Detection and Classification and Automatic Number Plate Recognition
(**Code|Report**)
- Implemented a detection and classification pipeline for the IITK road data for vehicle classes and humans. We also implemented an ANPR pipeline following instructions from ANPR (freely available on github)
 - Experimented with object proposal methods (Morphological, LPO(Krahenbul et al.) etc.) and feature extractors (SIFT, HOG, ConvNets) for detection and classification.
 - Received highest grades in the class for the project
- Aug '15 - **Introduction to NLP**, *Prof. Amitabha Mukerjee*.
Dec '15 Sentiment Classification using Convolutional Neural Networks.
(**Code|Report**)
- Implemented a slightly modified version of Yoon Kim's Convolutional Neural Networks for sentence classification paper. Also tested the model on a Hindi dataset for movie review sentiment analysis
- Jan '15 - **Introduction to AI**, *Prof. Amitabha Mukerjee*.
Apr '15 Artist and Genre classification using learnt Deep Neural Network features and traditional classifiers
(**Code|Report**)
- Attempted classification of music into genre and artists using a simple feed-forward NN architecture and inspected other methods used in tandem with the NN or independently, comparing their performance
 - Our final framework (Neural Network + RF classifier) worked very well for artist classification
 - It was seen that the network learnt good musical features when it confused Eric Clapton and the band Cream, which Eric Clapton headed as the lead guitarist

Other Projects

- Jan '16 - **Introduction to Cognitive Science**, Prof. Amitabha Mukerjee & Prof. Devpriya Kumar.
Apr '16 Analysing Mathematical abilities in Infants (**Report**)
- Jan '16 - **Applied Game Theory**, Prof. Vimal Kumar.
Apr '16 Recurrent Neural Network model of E-Bay auction bidding to study sniping behaviour (**Report**)
- Jan '16 - **Compiler Design**, Prof. Subhajit Roy.
Apr '16 Wrote a compiler from scratch for Ada95
- Aug '15 - **Operating Systems**, Prof. Mainak Chaudhuri.
Dec '15 Implemented syscalls and memory management in the NachOS operating system
- Apr '14 - **Summer Project**, Programming Club.
Aug '14 Multimodal Emotion Recognition in Videos (**Code**)

Technical Proficiency

Basic	CUDA, Lua, Caffe, Torch
Intermediate	C, C++, MATLAB, Bash, HTML/CSS, JavaScript, PHP, \LaTeX , OpenCV, NLTK, SKLearn
Advanced	Python, Theano, Tensorflow

Teaching Experience

- Aug '16 - **Introduction to Computing**, Teaching Assistant.
Ongoing Taking tutorial classes, setting and grading question papers and supervising lab sessions
- Aug '14 - **Introduction to Electrodynamics**, Academic Mentor, Counselling Service.
Apr '15 Took doubt clearing sessions and personally mentored students

Academic Achievements

- Apr '16 **Academic Excellence Award**, IIT Kanpur, Dean's List.
Apr '15 **Academic Excellence Award**, IIT Kanpur, Dean's List.
- Nov '14 **Best Sectional Award**, Course Project for TA - 201.
Received the award for building a Mechanical Object Elevator
- Jun '13 **IIT-JEE**, All India Rank - 271 (99.998 Percentile).
Apr '13 **Indian National Physics Olympiad**, Selected in Top 35 in India.
Awarded gold medal and attended selection camp for Indian team to IPhO '13
- Dec '12 **National Standard Olympiads**, Selected in Top 300(1%) in India.
Selected in Top 1% in National Standard Olympiads in Physics, Chemistry and Astronomy
- Aug '12 **Kishore Vaigyanik Protsahan Yojana(KVPY)**.
One of 300 recipients of KVPY - 2012 scholarship for higher studies in Basic Sciences
- Aug '12 **All Rounder of the Year Award**, D.A.V. CSPur.
- Aug '08 **National Talent Search Examination**.
One of 800 recipients of NTSE - 2008 scholarship
- Aug '07 **All Rounder of the Year Award**, D.A.V. CSPur.
- Aug '06 **National Cyber Olympiad**, All India Rank - 1.
- Aug '06 **Junior Mathematics Olympiad**, Rank - 1.
Secured Rank-1 in JMO-2006, Odisha (for grades 6-8) in grade 6

Relevant Coursework

- Recent Advances in Computer Vision*
- Optimization Techniques* **

- Computer Vision and Image Processing
- Introduction to NLP
- Introduction to Cognitive Science
- Probability and Statistics
- Introduction to Logic
- Complex Numbers*
- Advanced Algorithms
- Applied Game Theory
- * - ongoing, ** - audited
- Machine Learning Tools and Techniques
- Introduction to AI
- Introduction to Psychology
- Linear Algebra
- Abstract Algebra
- Partial Differential Equations*
- Theory of Computation
- Introduction to Economics

Positions of Responsibility

- 2015 **Operations Core Team**, *Counselling Service*.
- 2014 **Student Guide**, *Counselling Service*.
- 2014 **Academic Mentor**, *Counselling Service*.