

Amlan Kar

Education

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

Research Experience

- Aug '16 **IIT Kanpur**, *Prof. Gaurav Sharma & Dr. Karan Sikka.*
- Ongoing Video Understanding
 - Working on parsimonious frame selection for Video Action Recognition
 - The proposed model selects and pools discriminative frames in an online fashion in a single temporal scan of a video, and shows improvements over different baseline pooling methods
 - It beats published results that use deep LSTM architectures with a simple and interpretable recurrent formulation. When combined with complementary features, it achieves results comparable with the state of the art results on the UCF-101 and HMDB-51 datasets
 - The work done is currently submitted for review at **CVPR-2017**

May '16 **University of Toronto**, *Prof. Raquel Urtasun & Prof. Sanja Fidler.*
- Ongoing Visual Semantic Embeddings
 - Working on generating visual semantic embeddings that simultaneously satisfy multiple relations
 - Formulating novel relation and loss functions such that multiple relations(ordered/unordered) can be inferred simultaneously from a single embedding space

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

Publications

- Nov '16 Amlan Kar*, Nishant Rai*, Karan Sikka, Gaurav Sharma, AdaScan: Adaptive Scan Pooling in Deep Convolutional Neural Networks for Human Action Recognition in Videos
arXiv report, submitted for review to CVPR-2017

Major Course Projects

- Aug '16 **Recent Advances in Computer Vision**, *Prof. Gaurav Sharma.*
- Nov '16 Visual Storytelling
 - Implemented an attention based seq2seq model and baseline models for the recently released Visual Storytelling task (NAACL '16)
 - Plan to open-source the code(built upon Google's Show and Tell model code) in the near future

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 necessary for QA and these need to be learnt explicitly by the model

- Jan '16 **Machine Learning Tools and Techniques**, Prof. Harish Karnick.
- Apr '16 Traffic Video Surveillance and Automatic Number Plate Recognition(**Code|Report**)
 - o 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)
 - o Experimented with object proposal methods (Morphological, Selective Search, LPO(Krähenbühl et al.) etc.) and feature extractors (SIFT, HOG, ConvNets) for detection and classification.
 - o Received highest grades in the class for the project

Other Projects

- Aug '15 **Introduction to NLP**, Prof. Amitabha Mukerjee.
- Dec '15 Sentiment Classification using Convolutional Neural Networks(**Code|Report**)
- Jan '15 **Introduction to AI**, Prof. Amitabha Mukerjee.
- Apr '15 Artist and Genre classification using Deep Neural Networks (**Code|Report**)
- 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**)

Teaching Experience

- Upcoming **Topics in Computer Vision**, CS698U, IITK.
Preparation of course material and assignments
- Aug '16 **Introduction to Computing**, ESC101A, IITK.
- Ongoing Taking tutorial classes, setting and grading question papers and supervising lab sessions
- Aug '14 **Introduction to Electrodynamics**, PHY103A - Academic Mentor, Counselling Service.
- Apr '15 Took doubt clearing sessions and personally mentored students

Academic Achievements

- Apr '15,'16 **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,'07 **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 '06 **National Cyber Olympiad**, All India Rank - 1.

Relevant Coursework

Recent Advances in Computer Vision, Visual Recognition**, Computer Vision and Image Processing, ML Tools and Techniques, Introduction to NLP, Introduction to AI, Introduction to Cognitive Science, Probability and Statistics, Linear Algebra, Game Theory, Multi Agent Systems: Games, Algorithms, Evolution**

* - ongoing, ** - next-semester

Technical Proficiency

Advanced Python, Tensorflow, Theano

Intermediate C, C++, MATLAB, Bash, HTML/CSS, JavaScript, PHP, \LaTeX , OpenCV, NLTK, SKLearn

Basic CUDA C, Lua, Caffe, Torch

Extra Curriculars

2015-2016 **Operations Core Team**, *Counselling Service*.

2014-2015 **Student Guide and Academic Mentor**, *Counselling Service*.

2013- **Member**, *Music Club, IIT Kanpur*.