# Archit Sharma

Junior Undergraduate, IIT Kanpur
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## Education

**2018 Expected** — **Bachelor of Technology, IIT Kanpur**
Major: *Electrical Engineering*
Minor: *Artificial Intelligence and Linguistic Theory*
CPI: 9.8/10

**2014** — **DAV Public School, Amritsar**
AISSCE, XII Board: 95/100
AISSE, X Board: 10/10

## Achievements

- 2017 Departmental Rank 3 out of 140 undergraduates in Electrical Engineering.
- 2017 Awarded Sri Singhasan Singh Scholarship for highest CPI in Electrical Engineering, IIT Kanpur.
- 2017 Awarded $A^*$ for exceptional performance in seven courses.
- 2017 Shortlisted for the prestigious Rhodes Scholarship by IIT Kanpur.
- 2017 Selected for the MITACS Globalink Research Internship.
- 2016 Awarded Academic Excellence Award by IIT Kanpur for the academic year 2015-16.
- 2016 Secured 63 rank in online round for ACM ICPC India Regionals.
- 2016 Selected for Texas A&M-IITK Summer Research Internship Program, only sophomore to accomplish this.
- 2015 Awarded Academic Excellence Award by IIT Kanpur for the academic year 2014-15.
- 2014 Secured All India Rank 376 in JEE Advanced among 150,000 students.
- 2012 Secured first position in IX-X category in NASA Ames Space Settlement Design Contest worldwide.
- 2010 Awarded National Talent Search Scholarship (NTSE) by Govt. of India.

## Work Experience

**May-Aug 2017** — **Research Intern at Montreal Institute of Learning Algorithms (MILA)**
*Dr. Yoshua Bengio, Professor, University of Montreal* | Github

- Investigated and evaluated performance of different gradient estimators (REINFORCE/Policy Gradients, Straight Through and Gumbel-Softmax) for computational graphs with discrete latent variables in a half and half MNIST generation problem.
- Based on the idea of synthetic gradients, evaluated the benefits and limitations of a novel gradient estimator for discrete latent variables, with potential use in reinforcement learning and GANs for discrete data (such as language modelling) among others.

**May-Jul 2016** — **Research Intern at Texas A&M University, USA**
*Dr. Srinivas Shakkottai, Associate Professor, ECE Department*

- Worked on analyzing privacy of the user in DSRC enabled cars, which allows vehicle to vehicle/infrastructure communication.
- Broke down 229 GB BSM dataset from Ann Arbor, Michigan in 6 hours by processing on 20 cores of IBM's Ada Cluster, reducing from expected computation time of 4 days.
- Successfully demonstrated the lack of privacy in Random ID Switching protocol by reconstructing car routes with 98.37% accuracy. Other driving behaviour based protocols under test.

**May-Jul 2015** — **Android Application Development Intern**
*Hughes Systique, Gurgaon, India*

- Worked on GoSuraksheit, an android based application for women safety. Integrated the new Facebook API for quick status updates containing custom message and user location in case of emergency.

## Projects

**Jan-Apr 2017** — **Visual Dialog**
*Undergraduate Project under Dr. Vinay P. Namboodiri* | Github

- Implemented encoder-decoder framework based deep learning models for visual dialog, with the aim to answer sequence of questions based on an image.
- Created a memory network based encoder for the input image, questions and the past conversation. The embeddings are fed into deep LSTM based decoder to generate the answers.
- Also implemented a late fusion encoder. The performance for both the encoders was comparable to those reported in the original paper.

Mar-Apr 2017 | **GANs for Single Image Dehazing**

*Course Project for Visual Recognition under Dr. Vinay P. Namboodiri*

- Following the implementation of pix2pix for image-to-image translation, designed a GAN based architecture for image dehazing. This was the first work to try dehazing images in a GAN based setup. Tested the effect of reweigthing L1 and Adversarial loss. Stacking of generators was also explored as a part of this project.
- Visually appealing results were obtained for 256x256 images, which were comparable to state-of-the-art techniques for dehazing images.

Sep-Nov 2016 | **Video Summarization**

*Course Project for Machine Learning under Dr. Piyush Rai* | Github

- Implemented VSUMM, a *clustering based algorithm* using features extracted at frame level. Features tested upon include color histograms and fc7 layer features of VGG16 architecture.
- Implemented a *deep learning model* using two opposite moving LSTM layers combined using a 1D convolution layer.
- Implemented a custom version of VGRAPH and SIFT based algorithm.

Dec 2015 | **Visual Question Answering using Deep Neural Nets**

*under Dr. Vinay P. Namboodiri* | Github

- Implemented a *deep learning model* for VQA Dataset. Used the VGG16 Architecture to extract visual features. word2vec was used to convert questions to into word vectors, which are fed into a LSTM network. The results are combined using a fully connected MLP, giving a softmax distribution over 1000 most frequent answers.

May 2016 | **Tagged Location Data Collection**

*Android Application developed at Texas A&M University* | Github

- Minimalistic application to collect location data from users tagged with their mode of transport, developed from scratch.
- Pushes locally written files, containing location data, using FTP to remote server in a multi-threaded environment.

## Coursework

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|---|---|---|---|---|---|
| Visual Recognition | A | Machine Learning | A | Probabilistic Machine Learning | # |
| Fundamentals of Computing | A* | Data Structures and Algorithms | A | Image Processing | # |
| Digital Signal Processing | A | Probability and Statistics | A* | Algorithms-II | # |
| Introduction to Real Analysis | A | Partial Differential Equations | A | | |
| Linear Algebra and ODE | A | Digital Electronics | A | | |
| Priniciples of Communication | A | Control Systems | A* | | |

A* ≡ Outstanding

# ≡ Fall 2017

## Technical Skills

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|---|---|
| Proficient | C++, C, Python, LaTeX |
| Comfortable | JAVA, Shell (Bash), MATLAB |
| Tools | Theano, Git, Keras, NumPy, Scikit-Learn, Matplotlib |
| Operating Systems | Mac, Linux, Windows, Android |

## Miscellaneous

### Software Corner Manager, Techkriti'16

Handled logistics for software events in Techkriti, annual technical festival of IIT Kanpur. *Managed a team of six* for conducting events and interacting with prospective participants. Conducted an onsite *Appathon* with over 50 participants from colleges across India. Hosted the *Algorithmic Programming Contest IOPC* with over 400 teams registered across India.

### Competitive Programming

Codechef Long Challenge Rating: 8190.89. Over 80 problems solved on SPOJ.

Appeared in Amritapuri and Chennai regionals of ACM ICPC 2017 and Round 2 of Facebook Hackercup 2017

### Student Guide, Counselling Service
*Mentored* seven freshmen for their first year. Assisted in arranging a *six day orientation* for incoming freshmen.

### Secretary, Programming Club
Organized lectures, workshops and contests for over 200 freshmen.

### Music
Performed in *Musical extravaganza* and *Fresher's Day* as lead guitarist for Music Club.
Stood *second* in eastern music competition in Galaxy'15, cultural event of IIT Kanpur.