Archit Sharma

Senior 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 2 out of 140 undergraduates in Electrical Engineering, IIT Kanpur.
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

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

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.