

EDUCATION

- **The Johns Hopkins University** Baltimore, Maryland, USA
Ph.D. in Computer Science September 2018 - Present
 - Advisor: *René Vidal*
 - Relevant Courses: *Non Linear Optimization, Mathematics in Deep Learning, Introduction to Convexity*
- **Indraprastha Institute Of Information Technology Delhi** Delhi, India
B.Tech. in Computer Science and Engineering; **CGPA**: 9.88/10 July 2014 - May 2018
 - Relevant Courses: *Artificial Intelligence, Machine Learning, Computer Vision, Advanced Pattern Recognition and ML, Reinforcement Learning, Advanced Linear Algebra, Probability and Statistics, Competitive Programming, Modern Algorithm Design, Calculus, Game Theory*

RESEARCH EXPERIENCE

- **Methods for Survival Analysis** May 2017 – August 2017
[University of Southern California](#) (Dr. Yan Liu)
 - Explored the area of Survival Analysis with Censored Data, surveying existing work.
 - Proposed a smooth differentiable approximation of a commonly used evaluation metric.
 - Analysed Deep Learning approaches to cancer prediction in a small data domain.
- **Describing Objects in Context: Generating Captions for Novel Objects** May 2016 – May 2017
[IIT Kanpur](#) (Dr. Gaurav Sharma, Dr. Chetan Arora(IIT Delhi))
 - Studied a setting of Image Captioning where the test images contain objects unseen during training.
 - Proposed a dual LSTM based approach to incorporate information about the Novel classes.
 - Analysed how increase in lexical quality leads to drop in the novel-recall evaluation metric and vice-versa; proposed methods to neutralise the two trends.
- **Hacking Deep Neural Networks** July 2015 – May 2016
[IIIT Delhi](#) (Dr. Chetan Arora)
 - Explored the problem of generating Fooling Images for DNNs trained for image classification.
 - Proposed an algorithm that generates Fooling Images with high noise robustness.
- **Automated Differential Attack on SHA-2** August 2016 – Dec 2016
[IIIT Delhi](#) (Dr. Somitra Sanadhya)
 - Studied differential attacks on the cryptographic hash function, SHA-2 using searching techniques.
 - Implemented fast attacks, extensively documenting carry graph formation and difference propagation.
- **Planar Support for Hypergraphs** August 2017 – Current
[IIIT Delhi](#) (Dr. Rajiv Raman)
 - Looking at the problem of finding planar supports for hypergraphs where the hyperedges correspond to non-piercing regions on a plane.
 - We have developed methods to construct planar supports for some classes of hypergraphs in polynomial time, a significant improvement over existing exponential time algorithms.
- **Improving the Hough Transform Subspace Segmentation Algorithm** Dec 2014 – Feb 2015
[IIIT Delhi](#) (Dr. Chetan Arora)
 - Worked to improve the Hough Transform Algorithm for detecting planes in a set of given points in 3D.
 - Introduced negative voting in the HT Algorithm for modelling points voting against a plane.
- **Structure and Security in the Internet of Things** April 2015 – May 2015
[IIIT Delhi](#) (Dr. H. B. Acharya)
 - Attempted to characterise IoT into well defined hierarchies by proposing the concept of “cells” as units of structure and context. [[PDF](#)]
 - Surveyed existing literature on RFID and WSN security, compiling all known attacks and defenses relevant to IoT. [[PDF](#)]

PUBLICATIONS & REPORTS

- “Making Deep Neural Network Fooling Practical” [[PDF](#)]
Authors: Ambar Pal, Chetan Arora
Full Paper Accepted at 25th IEEE International Conference on Image Processing (ICIP), 2018
- “An Empirical Evaluation of Visual Question Answering for Novel Objects” [[PDF](#)]
Authors: Santhosh Kumar R, Ambar Pal, Gaurav Sharma, Anurag Mittal
Full Paper Accepted at Computer Vision and Patter Recognition(CVPR), 2017
- “Cells in the Internet of Things” [[PDF](#)]
Authors: Ayush Shah, H. B. Acharya, Ambar Pal
Arxiv Report 1510.07861
- “The Internet of Things: Perspectives on Security from RFID and WSN” [[PDF](#)]
Authors: Ayush Shah, Ambar Pal, H. B. Acharya
Arxiv Report 1604.00389

AWARDS & SCHOLARSHIPS

- IUSSTF-Viterbi Scholarship 2017 - Funded by the Indo-US Science and Technology Forum to undertake a research internship at the Viterbi School of Engineering, University of Southern California.
- AICTE INAE Travel Grant 2017 - Funded by the All India Council of Technical Education - Indian National Academy of Engineering to present our paper at CVPR 2017.
- Dean’s Award for Research and Development 2017 - Awarded for our work on Hacking Deep Neural Networks.
- Dean’s List for Academic Performance 2016 and 2017

SKILLS

- **Programming Languages** - Python, Lua, C++, C, R
- **Tools and Libraries** - Tensorflow, Torch, Caffe, Nvidia DIGITS, OpenCV

ACADEMIC PROJECTS

- **Gesture Detection Glove** [[SITE](#)]
 - Created a glove capable of detecting and transforming hand gestures from sign language to english.
 - Used Arduino Uno as the microcontroller and manufactured flex sensors in-house at a cost less than 10% of the Market Price.
- **Digitised Document Fraud Detection**
 - Created a system using core CV techniques achieving 90% accuracy on fake document identification.
 - The work was funded by the Ministry of Electronics and Information Technology, Govt. of India. [[LINK](#)]
- **Pocket Git Server**
 - Used Open Source software to build a standalone Git server that can be deployed on a Mobile Phone.

CO CURRICULAR ACTIVITIES

- **Competitive Programming**
 - ACM ICPC - Represented IIIT Delhi thrice in the ACM ICPC South Asian Regionals at the Amritapuri and Chennai Sites.
 - IOITC - Ranked among the 22 Indian students selected for International Olympiad of Informatics Training and Team Selection camp for IOI, 2013. The IOI is the most prominent global programming contest conducted at the school level.
- **Teaching**
 - Teaching Assistant, Discrete Mathematics - Course taken by 60 second year undergraduates.
 - Teaching Assistant, Deep Learning - Course taken by 20 PhD, M.Tech. and B.Tech. students.
 - INOI Workshop - Taught techniques in Competitive Programming to a group of ~100 school children to prepare them for the Indian National Olympiad in Informatics.

- **Talks**

- Zero Knowledge Proofs[PDF] - Delivered at Theory Group, IIT Delhi.
- Code Obfuscation[PDF] - Delivered at Theory Group, IIT Delhi.
- Novel Image Captioning[PDF] - Delivered at the Computer Vision group, IIT Kanpur.

- **Positions of Responsibility**

- Theory Group - Have been a coordinator for IIITD's Theory Group since 2016.
- Foobar - Have been a coordinator for IIITD's Programming Club, Foobar since 2015.
- Esya - Have been the lead organiser for Programming events in IIITD's annual technical fest, Esya.

- **Chess**

- I am an active member of the Chess Club and frequently play on online Chess websites.
 - Our team won the chess event conducted as a part of the inter-college sports meet, Triquetra 2017.
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