

Mrigank Raman

Undergraduate Researcher
Computer Science

Linkedin Mrigank Raman



+91 8617043733



Mrigank Raman



mt1170736@iitd.ac.in

Skills

Python



C\C++



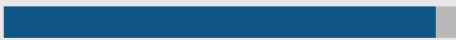
MATLAB



Tensorflow



Pytorch



Java



Education

2017 - 2021 **B.Tech in Mathematics and Computing**
New Delhi, India, GPA: 9.625/10
Minor in Computer Science and Engineering

IIT Delhi

Research Experience

05/20 - **Research Intern INK Lab - Prof Xiang Ren** USC Viterbi

- Working on the robustness of current models that leverage Knowledge Graphs(KGs) Question Answering and Recommendations.
- We come up with a validation function that measures the semantic correctness of a KG and coupling this with an RL framework we perturb the KG without impacting the downstream performance.
- Our targeted perturbation over KGs tries to shed light into how the KG is being leveraged in current systems, and reveal potential concerns that, even if the system seems to be working well (i.e., improve over non-KG baselines), it is not sensitive to semantic changes of the KG. In particular, such changes might be factually incorrect or ethically harmful.
- We are also working on building a Question Answering System that is robust to such perturbations on the KG.

06/20 - **Research Assistant - Prof Prathosh AP** IIT Delhi

- Working on the problem of Domain Generalization in the field of Computer Vision on the PACS, VLCS and Rotated MNIST Datasets.
- We leverage a very strong concept of latent search and a novel Domain Discrepancy Minimization Network to improve performance on the unknown test domain without making use of Domain Labels.
- We achieve state of the art numbers on all the test domains of all datasets. We achieve an average accuracy of **85.22%** on PACS dataset. The previous SOTA was an average accuracy of 83.1%.

08/19-12/19 **Research Assistant - Prof Arpan Chattopadhyay** IIT Delhi

- Worked on the energy efficient estimation of a Markov Chain with unknown dynamics.
- We used a variant of the Online EM Algorithm to estimate the dynamics and use the Kalman Filter to estimate the Markov Chain
- We used Gibbs sampling to bound the mean number of active sensors thus making our algorithm energy efficient. Our algorithm is very efficient in terms of time complexity and it also achieves a very low MSE.

Projects

02/20-03/20 **Biomedical Image Segmentation** IIT Delhi

- Implemented a linknet which uses the principle of information bottleneck to achieve the best segmentation results on a novel spine dataset in a class of 75 students. The task was to separate 8 different parts of a spine as can be seen in our report.

03/20 **Struc2Vec Benchmarking Presentation** IIT Delhi

- Performed various experiments that showcase the potential of struc2vec as a Graph Embedding Technique. We perform novel experiments in this presentation on real world datasets such as PPI, Proteins and Brightkite.

- Implemented my own version of InceptionNet along with state of the art techniques like cutmix and some image processing techniques like Unsharp Masking to achieve an accuracy of 75.9 on the test set which was the best result among a class of 100 students considering a limit of 6hrs on training on a GPU.

Achievements

- Ranked **1st** in the whole class with a GPA of 9.625/10.
- Was one among 13 all over India to be awarded the **IUSSTF Viterbi-India scholarship** for a research internship at USC Viterbi
- Awarded the IIT Delhi Academic Merit Award for **4** consecutive semesters
- Awarded with the prestigious KVPY Scholarship with an AIR of **222**
- Achieved an AIR of **183** in the prestigious Joint Entrance Examination

Publications

Mrigank Raman, Ojal Kumar, Arpan Chattopadhyay, 2019. Centralized active tracking of a Markov chain with unknown dynamics. Submitted to IEEE MASS 2020.

Relevant Courses

Mathematics : Probability and Stochastic Processes, Statistical Methods, Optimization Methods, Functional Analysis, Linear Algebra and Applications, Numerical Methods, Abstract Algebra, Real and Complex Analysis, Differential Equations, Discrete Mathematics, Calculus

Computer Science : Machine Learning, Data Structures and Algorithms, Theory of Computation*, Analysis and Design of Algorithms, Operating Systems*, Computer Networks*, Computer Architecture, Digital Logic, Introduction to Programming

Graduate Level : Advanced Machine Learning, Special Topics in Database Management Systems(Graph Neural Networks), Natural Language Processing*, Cryptography and Computer Security, Digital Image Analysis

MOOCs and Self Study : Deep Learning Specialization by Andrew Ng(Coursera), Reinforcement Learning Specialization by University of Alberta(Coursera), Deep Reinforcement Learning* by Sergey Levine(CS 285 UC Berkeley), Artificial Intelligence by Pieter Abeel(CS 188 UC Berkeley)

* Courses pursuing currently