GAURAV GUPTA
Electrical and Computer Engineering
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Education

Rice University, Houston TX, United States **(Aug 2018 - Expected 2023)**
Ph.D. in Large Scale Machine Learning
Advised by Prof. Anshumali Shrivastava

Indian Institute of Technology, Hyderabad, India **(Aug 2010 - May 2014)**
B.Tech, Major in Electrical Engineering

Interests and skills

Hashing, Information Retrieval, Machine Learning, Large Scale Data Structures, Randomized Algorithms, Natural Language Processing, Python, C++, Pytorch, High Performance Computing, Image Processing

Professional experience

Amazon Web Services (AWS), Palo Alto , *Applied Scientist Intern* **(June 2020 - Aug2020)**
Manager – Dr. Alexander Smola (VP/Distinguished Scientist), Advisor- Prof. Anshumali Shrivastava
Worked on large scale near neighbour problem using Deep Learning. Reduced number of distance computations while beating state of the art methods.

Amazon Search Labs (A9), Palo Alto, *Applied Scientist Intern* **(May 2019 - Aug2019)**
Manager - Vijai Mohan (Senior Principal Applied Scientist) , Advisor- Prof. Anshumali Shrivastava
Worked on efficient sublinear and low memory indexing method for constraint filtering. Proposed a novel idea of repeated and merged Bloom filter.

TCS Innovation Labs, Delhi, *Researcher R&D* **(July 2014 - Aug 2018)**
Manager - Dr. Gautam Shroff, Advisor - Dr. Lovekesh Vig, Dr. Ehtesham Hassan
Worked on document reading, object recognition and classification for retail businesses, marker based head motion tracker. Other research projects on indoor localization systems for Google Glass and augmented reality based reconfigurable Inspection framework for head mounted devices. Learnt key technologies of image processing (motion tracking, text detection and object detection), convolutional neural networks, machine learning, reinforcement learning, algorithms and android app development.

Uurmi Systems, Hyderabad (Later acquired by MathWorks), *Research Intern* **(June 2013 - July 2013)**
Worked on video object tracking in aerial views.

Academic research

Rice University, Houston TX

- STORM: Empirical Risk Minimisation using compressed sketches **(Ongoing research project)**
- NeuralKNN: 10M -Billion scale near neighbour using Deep Learning **(Ongoing research project)**
- RAMBO: Terabyte scale ultrafast search index **(Ongoing research project)**
- Rank aggregation from pairwise comparison (MCMC sampling) **(PhD Qualifier)**
- A review of Matrix Sensing **(Course Project)**
- What2eat- Diet behaviour analysis using Transformer models **(Course Project)**
- Profiling -RAMBO on multi core architecture **(Course Project)**
- Biobeam - Simulation for Confocal Microscopy **(Course Project)**

Indian Institute of Technology, Hyderabad

- Low complexity N-Dimensional Matrix determinant calculator **(Jan 2013 - April 2013)**
- Isolated word Recognition from speech signal **(Aug 2012 - Nov 2012)**

Achievements

- Ranked first at Neilsen's Image Recognition Hackathon- 2017 for "Hole detection/ product out of stock" retail store challenge.
- Ranked among top 0.4 % in IIT-JEE engineering entrance exam, 2010.

Publications/Preprints

- **STORM: Foundations of End-to-End Empirical Risk Minimization on the Edge (In review)**
  G Gupta*, B Coleman, J Chen, A Shrivastava*
- **RAMBO: Repeated And Merged BloOm Filter for Ultra-fast Multiple Set Membership Testing (MSMT) on Large-Scale Data (In review)**
  G. Gupta, M. Yan, B. Coleman, R. A. Elworth, T. Medini, T. Treangen, A. Shrivastava
- **To Petabytes and beyond: recent advances in probabilistic and signal processing algorithms and their application to metagenomics, Nucleic Acids Research, 2020**
  RA Elworth, Qi Wang, PK Kota, CJ Barberan, B. Coleman, A. Balaji, G. Gupta, R G Baraniuk, A. Shrivastava, T. Treangen
- **Siamese Networks for chromosomes classification**, BIC, ICCV, 2017
  Swati, G. Gupta, M. Yadav, M. Sharma, L. Vig
- **Information Extraction from Hand-marked Industrial Inspection Sheets,** CBDAR**,** IAPR ICDAR, 2017
  G. Gupta, Swati, M. Sharma, L. Vig
- **Indoor Localisation and Navigation on Augmented Reality Devices,** IEEE ISMAR, 2016
  G. Gupta, N. Kejriwal, P. Pallav, E. Hassan, S. Kumar, R. Hebbalaguppe
- **An AR Inspection Framework: Feasibility Study with Multiple AR Devices,** IEEE ISMAR, 2016
  R. Perla, R. Hebbalaguppe, G. Gupta, G. Sharma, E. Hassan, M. Sharma, L. Vig, G. Shroff

Relevant coursework

Rice University, Houston TX: Probabilistic Data structures, NLP seminar, Multi-Core Processing, Random Processes, Machine Learning, Optimization, Imaging through scattering medium, Statistical Signal Processing.

Indian Institute of Technology, Hyderabad: Calculus, Complex variables and Linear Algebra , C/C++ Programming Lab, Differential Equations, Linear Optimisation, Probability and Random Processes, Digital Signal Processing, Speech Signal Processing, Digital System Design, Computer Organisation, Image and Video Processing, Organisational Behaviour and Work Psychology, Economics

Academic services and extra-curricular

- Teaching assistant- Introduction to Deep Learning (Fall 2020)
  (Prof. Ankit Patel, ELEC-COMP 516, ∼80 students)
- Teaching assistant- Probabilistic Algorithms and Data-structures (Spring 2020)
  (Prof. Anshumali Shrivastava, COMP 480/580, ∼50 students)
- Reviewer at AISTAT, 2021 (2020)
- Student volunteer at Neural Information Processing Systems (NeurIPS-2019), Vancouver, Canada (2019)
- Academic Mentor for Rice ECE Graduate Student Association (2020)
- Media Head (photography and videography) at Indian Students at Rice (ISAR) (2019-20)
- Student Coordinator at Training and Placement Cell IIT Hyderabad. *(2013-14)*
- Coordinator of Electronics Club IIT Hyderabad. *(2012-13)*
- Participated at national level ABU ROBOCON- 2013 Pune. *(2013)*
- Active member of National Service Scheme Team-IIT Hyderabad (2011)

Conferences/Workshops talks

Presented RAMBO: Repeated And Merged BloOm Filter at

- Genome Informatics, 2020
- Rice Oil & Gas High Performance Computing conference, 2020

Presented Document reader at

- IAPR International Conference on Document Analysis and Recognition (**ICDAR-2017**), Kyoto, Japan.

Presented AR Inspection Framework and Indoor Localisation and Navigation at

- IEEE International Symposium on Mixed and Augmented Reality (**ISMAR-2016**), Mexico.