

VIPUL RATHORE

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PhD Student, Dept. of Computer Science and Engineering

Indian Institute of Technology Delhi, New Delhi, 110016, India

EDUCATION

PhD

July 2019 - Present

Advisor [Mausam](#) (Co-advising with [Parag Singla](#))
Dept. Computer Science and Engineering
College Indian Institute of Technology Delhi
CGPA 8.73/10

MTech.

August 2017 - June 2019

Advisor [Partha Pratim Talukdar](#)
Dept. Computational and Data Sciences
College Indian Institute of Science Bangalore
Course CGPA 8.5/10
Project GPA awaited till the IISc convocation

BTech.

July 2012 - May 2016

Dept. Electrical Engineering
College Indian Institute of Technology Bombay
CGPA 7.79/10

PUBLICATIONS

- Keshav Kolluru, Samarth Aggarwal, Vipul Rathore, Mausam and Soumen Chakrabarti. *IMOJIE*: Iterative Memory-Based Joint Open Information Extraction. In Proceedings of the Association of Computational Linguistics (**ACL**) , Seattle, Washington, USA, July 2020.

WORK EXPERIENCE

Current PhD project - *Mitigating gender bias in Machine Learning models* *Aug. 2020 - Present*

- Identified the limitations of existing notions of fairness as they do not take into account the distribution of labels w.r.t. sensitive attributes in the training corpus.
- Proposed our own notion of bias and mitigation technique using constrained learning framework to remove model bias overamplification.

1st year PhD Project - *Open Knowledge Graphs for Multi-Document Summarization* *Aug. 2019 - July 2019*

- Identified the issue of coverage of relevant entities in summaries of existing state-of-the-art baseline on Multi-News dataset, a large scale dataset for multi-document summarization of news articles.
- Proposed a graph-based approach in which we apply Graph Neural Network (GNN) on top of Open IE based dynamic knowledge graphs to select sentences covering important entities in summarization. Our implemented approach for even extractive summarization beats the previous abstractive state-of-the-art approach.

Teaching Assistant, Indian Institute of Technology Delhi

2019 - Present

Assisted with course material preparation, evaluation and grading for the following courses:

- Natural Language Processing - Responsible for designing and evaluating assignments and exams, preparing course material etc.
- Artificial Intelligence - Responsible for designing AI board game assignment and evaluating student bots by designing and running 3 tournaments each with different board configurations.
- Data structures and algorithms - Responsible for java interface design and writing driver code and testcase generation scripts for an assignment upon application of BST and Heap in real life.

Masters Project - *Ericsson Research Fellow*, Ericsson Research Bangalore 2018 - 2019

Devised solutions to automating troubleshooting using NLP techniques on Ericsson docs, using ideas from the field of reasoning over procedural documents. Demonstrated the efficacy of Graph Convolution Network (GCN) on top of Semantic Role Labeling (SRL) graph applied over procedural documents for tracking entity state (physical location) at each time step.

Research Engineer, Aruba Networks, HPE

August 2016 - July 2017

Responsible for *Next-Gen Mobility Controller* evaluation involving board-bringup of Intel, ARM and MIPS processor, carrying out comparative analysis using performance benchmark tools for CPU and network latency. Subsequent data analysis on these results for decision-making on next-gen controller.

AWARDS/ACHIEVEMENTS

- All India Rank 567 in IIT-JEE amongst 500K students, 2012.
- **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship, 2010-11.
- Rank 4 in KVS Junior Mathematics Olympiad, 2010.
- **Ericsson Research Fellowship** for Masters Project at IISc Bangalore (2018-19)

COURSE PROJECTS

COVID-19 Open Research Dataset Challenge (CORD-19), Information Retrieval Course Project

Prof. Srikanta Bedathur, IIT Delhi

Proposed our own algorithm that achieved a rank in top-20 in the Round 1 leaderboard of [CORD-19](#). Further showed that although BM25 doesn't achieve top-50 but, when used on top of BERT's wordpiece tokenizer, gets into top-50 with significant gains in accuracy.

Text Summarization, NLP Course Project

Prof. Partha Talukdar, IISc Bangalore

Proposed a deep learning model using Bi-LSTM and attention mechanism with pre-trained word embeddings, namely ConceptNet Numberbatch. Experimented on the *Amazon Fine Food Reviews* dataset to show that our algorithm performed competitively to the state of the art.

Adversarial attacks on LDA Topic Modelling, ML Course Project

Prof. Chiranjib

Bhattacharyya, IISc Bangalore

Aim was to minimally manipulate the corpus in a way as to fool the topic distribution generated by Latent Dirichlet Allocation. Posed the problem as a bi-level optimization one and successfully changed the rank of target words for particular topics in the *CONG* corpus.

Multi-class Document Classification, Data Analysis and Visualisation Course Project

Prof.

Anirban Chakraborty, IISc Bangalore

A thorough implementation of a variety of machine learning models and subsequent analysis on accuracy vs training time trade-off on *20 Newsgroup* dataset, having 20,000 documents and 20 classes.

SKILLS

- Proficient in Bash scripting, C++, Python, Pytorch.

- Knowledgeable in linear algebra, probability, convex optimization, machine learning etc.

GRADUATE COURSEWORK

- Advanced Data Structures
- Advanced NLP
- Information Retrieval
- Compiler Design
- Natural Language Processing
- Machine Learning
- Practical Data Science
- Numerical Linear Algebra
- Numerical Methods
- Numerical Optimization

OTHER ACTIVITIES

- Attended *Amazon Research Days* at Bangalore, 2019.
- Attended CoDS-COMAD Conference at Hyderabad, 2020.
- Attended ICML 2020 conference.
- Organizer at IISc AI Day 2019, inauguration event for AI Department at IISc Bangalore.
- Organizer at TechFest 2012 and 2013, IIT Bombay's technological festival.
- Performed script-writing, direction and acting in many theatre-level dramatic plays at IIT Bombay.
- Professionally trained for racquet games such as table tennis, badminton and squash.