

AREAS OF INTEREST

Machine Learning, Deep Learning, Self-Supervised learning, Natural Language, Reinforcement Learning.

EXPERIENCE

- **Machine Learning Research Engineer II** *Verisk Analytics* *Sep 2019 - Current*
 - **VQ-Flows**: Manifold Learning over non-trivial topologies using vector quantized mixture of local Normalizing Flows. [UAI 2022](#)
 - **Document Intelligence**: Framed information extraction from doc as QA task. Created a novel decoder based extractive model. Improved accuracy by ~ 20 pts on fragmented extractive datasets. [Proceeding of EMNLP 2022](#)
 - **Sub-seasonal Weather Prediction**: MLM based self-supervised learning & transfer to downstream tasks.
 - **Active learning**: Sped up training of large-sized Language models (by 2.5x) via novel acquisition fn composed of a proxy model to score datapoints.
 - **Entity Resolution**: Converted to correlation-clustering problem, formulating it as weighted set-packing problem in ILP form & accelerated solution via column generation.
 - **Optimal Transport**: Tractably solved (approx.) optimal transport problem using a dual formulation with NN.
- **Master Thesis, Prof. Yann Lecun** *New York University* *Oct 2018 - April 2019*
 - **Text-based games using RL**: Developed world models for text-based games in tandem with exploration techniques via memory-based Neural Networks.
- **Research, Prof. Rob Fergus** *New York University* *Oct 2017 - Sept 2018*
 - **Multi-Agent Communication**: Developed novel architecture for multi-agent controlled continuous communication over cooperative, competitive and mixed tasks in RL set-up. [ICLR 2019](#)
- **Research, Prof. Sam Bowman** *New York University* *Feb 2018 - May 2019*
 - **Morphology Inflection**: Improved low-resource cross-lingual morphology inflection used Transformer networks with reverse augmentation for for SIGMORPHON 2019, ACL.
 - **Question Generation**: Survey research project on question generation via machine comprehension and achieved SOTA results for the task using attention with seq-to-seq with beam search.
- **Research Internship, Prof. Lawrence Sirovich** *Rockefeller University* *June 2018 - Sep 2018*
 - **Genomics Trait & Disease Prediction**: Research on genomics data (GWAS), where $\#$ input features \gg $\#$ training examples, making it difficult to avoid overfitting, for disease prediction on SNPs.
- **Udacity Reviewer & Mentor for ML, DL, Deep RL Nanodegrees** *May 2017 - Jan 2018*
- **Indian Institute of Technology** *Research Assistant, Prof. Aditya Nigam* *Feb 2017 - June 2017*
 - **Biometric Data Synthesis Using GAN**: Research on using multiple generators and discriminators to speed-up GAN training. Multiple discriminators with varying architecture provided empirical speedup during training time.
- **Innovation Lines** *Machine Learning Intern* *Dec 2015 - Feb 2016*
 - **Smart Retail**: Using object detection developed automated personalised video adverts.

PUBLICATIONS

- VQ-Flows: Vector-Quantized Local Normalizing Flows: [Proceedings of UAI 2022](#)
- DeCopy: Decoder-Copy Mechanism for Information Extraction. [Proceedings of EMNLP](#)
- Learning when to Communicate: **Tushar Jain***, Amanpreet Singh*, Sainbayer Sukhbaatar; [ICLR 2019](#)
- Question Generation from Machine Comprehension: Rajat Agarwal, **Tushar Jain**, Kumar Mehta; [Report](#)

EDUCATION

- **Courant, New York University** Manhattan, NY
Master of Science in Computer Science; *Sep 2017 - June 2019*
- **Indian Institute of Technology** Mandi, India
Bachelor of Technology in Electrical Engineering; *Aug 2013 - June 2017*

AWARDS

- **Kaggle**: Secured 2nd position in NYU Traffic Sign Competition.
- **Capgemini Hackathon**: Secured 1st position for our novel health monitoring solution using deep learning, Aug 2018.
- **Siemens Data Science Hackathon**: Secured 1st prize among 60 teams the held at LMU, Munich
- **Siemens-CKI Hackathon**: Secured 1st runner-up held at TU, Munich in Mar. 2017.
- **National Maths Talent**: Won the GOLD medal at 25th ManavSthali National Maths Talent held at Delhi, India.