Rahul Kumar Tiwary

Final Year Undergraduate
Department of Computer Science and Engineering

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2018 - Present	B.Tech	Indian Institute of Technology, Kanpur	8.4/10
2018	CBSE(XII)	Jamshedpur Public School, A.I.W.C	94.6%
2016	CBSE(X)	Jamshedpur Public School, A.I.W.C	10/10

Scholastic Achievements

- Received **Academic Excellence Award** given to top 10% students at IIT Kanpur for the academic session 2018-19 odd semester
- Secured **A* grade for exceptional performance** in the course **MTH 101A, Real Analysis and Advanced Calculus**
- Secured **AIR 122** in Joint Entrance Examination Advanced 2018 among 0.2 million candidates
- Secured **AIR 22** in Joint Entrance Examination Mains 2018 among 1.1 million candidates and emerged as the **State Topper**
- Secured **AIR 432** in Kishore Vaigyanik Protsahan Yojana (KVPY) 2016
- Secured **State Top 1%** in National Standard Examination in Junior Science(NSEJS) 2014
- Expert coder on **Codeforces** with a max rating of **1633** and a best of **4-star** on **Codechef**

Work Experience

- **Nomura Structured Finance Pvt. Ltd.** (*June'21 - July'21*)
  Algo Strategist, Global Markets Division *(Remote)*
  Portfolio Game:
  - Given an initial notional of **US $ 1m**, assigned weights weekly to a list of 10 securities, which included **S&P 500, Nasdaq**, etc.
  - Obtained **positive** return at the end of the period and a **Sharpe Ratio** greater than one
  - Beat the benchmark by a considerable margin over the full period ranging over six weeks

  Strategy for **Asian Swaps/Basis Swaps:**
  - Used time-series forecasting techniques and investigated returns and other metrics of multiple cross-currency swaps
  - Filtered out top 5 trades based on **mean-reverting** returns and compared them on their **Z-scores, MDDs**
  - Migrated the strategy to Python from MATLAB and achieved optimizations wherever possible

Key Projects

- **Neural Machine Translator: Hindi to English** (*Jan'21 - Apr'21*)
  Mentor: Prof. Ashutosh Modi, *Course Project, Statistical Natural Language Processing*
  - Constructed a vocabulary of 40,000 sentences from the provided dataset of more than 1 lakh sentences
  - Implemented a **Seq2Seq** model from scratch, which employed the **Encoder-Decoder** Archictecture, using **GRU**
  - Optimized convergence of model using **Teacher forcing**, and used NLL loss for evaluating current performance
  - Evaluated model performance using **METEOR** and **BLEU** scores
- **AUTO WGAN: Zero Shot Classification** (*Jan'21 - Apr'21*)
  Mentor: Prof. Ashutosh Modi, *Course Project, Statistical Natural Language Processing*
  - Came up with a novel approach of generating text for unseen classes and use them to train our classifier
  - Used **Auto-Encoders** and **GAN**'s incorporated with class embeddings for the unseen classes
  - Trained the model on a unified emotion dataset consisting of sentences with more than 10 emotions
- **Building GemOS** (*Aug'20 - Nov'20*)
  Mentor: Prof. Debadatta Mishra, *Course Project, Operating Systems*
  - Implemented **file syscalls** including open, write, pipe, etc.
  - Implemented message queue mechanisms that facilitate inter-process communications using features like broadcasting
  - Designed a simple **debugger** supporting setting/removing breakpoint, getting register information, etc.

Technical Skills

- **Interests:** Quantum Computing, Machine Learning, Deep Learning, Natural Language Processing, Competitive Programming
- **Programming Languages:** C, C++, HTML, LaTeX, MATLAB, Python, SQL
- **Software and Libraries:** Pytorch, Tensorflow, Keras, Matplotlib, Git, Pandas, Numpy, Qiskit

Positions of Responsibility

- **Academic Mentor, Counselling Service Team** (*July'19-May'20*)
  - Providing Academic support to students in **MTH101/102** by conducting remedial classes and one-to-one mentoring
  - Helped them with their academics by arranging meetings and still maintain a good rapport with them
- **Zonal Manager**, **Techkriti Open School Championship(TOSC)** (*Sep'18-Oct'18*)
  - Coordinated with schools and helped smooth conduction of the exam in my hometown Jamshedpur for the very first time
  - Witnessed a staggering participation of about 500 participants from many schools thereby encouraging future involvement

Relevant Courses

Data Structure and Algorithms	Advanced Algorithms	Quantum Computing
Introduction to Machine Learning	Statistical Natural Language Processing	Data Mining (Ongoing)
Computer Organization	Compiler Design	Operating Systems
Probability and Statistics	Theory of Computation	Real Analysis and Advanced Calculus
Discrete Mathematics	Linear Algebra and Ord.Diff.Eqns.	Computational Methods in Engineering