VIBHHU SHARMA | EE19B128

Department of Electrical Engineering | IIT Madras

Educational Qualifications

Examination	University	Institute	Year	CPI/%
Graduation	IIT Madras	IIT Madras	2023	9.48
Intermediate/+2	CBSE	Army Public School, Kirkee	2019	97.6
Matriculation	ICSE	The Bishops Co-Ed School, Kalyaninagar, Pune	2017	97.8

Scholastic Achievements

- Secured **All India Rank 539** in **JEE (Advanced)** out of **200,000+** candidates *(2019)*
- Secured **All India Rank 421** in **JEE (Mains)** out of **1.5 million+** candidates *(2019)*
- Recipient of the prestigious **KVPY (Kishore Vaigyanik Protasahan Yojana)** scholarship in the SX stream with an **All India Rank 421** out of **50,000+** students *(2019)*
- Among the **top 30** students from Maharashtra to clear the **NSEC**, hence qualifying for **INChO**, as a part of the **International Olympiads** selection procedure *(2019)*
- Among the **top 30** students from Maharashtra to clear the **NSEP**, hence qualifying for **INPhO**, as a part of the **International Olympiads** selection procedure *(2019)*
- School topper in **ICSE Class 10** and **CBSE Class 12** board exams *(2017, 2019)*

Work Experience

Counterfactual Explanations for Multi-Modal Recommender Systems *(May 2022-July 2022)*

Summer Research Internship: Adobe Research, Bangalore [Patent Pending]

- Worked on a model to generate **counterfactual explanations** for recommendations generated by a **blackbox recommender system** that utilizes both **image and review data** for its decision.
- The model would find the **minimum perturbation** to an item's features such that it would no longer be recommended to a user and frame it as a counterfactual explanation.
- Model **outperformed existing state of the art** on metrics like **Probability of Necessity**(PN) and **Probability of Sufficiency**(PS).

Deep Learning for Extreme Multilabel Classification (XMC) *(June 2021-Nov 2021)*

Summer Research Internship: Aalto University, Finland

- **Extreme Multi-label Classification** (XMC) is a task of finding the **most relevant** labels for an input text from an extremely large label set. Explored and reviewed multiple papers on short-text Extreme Classification where the input text is limited to only around 15 words on average.
- Studied the use of different deep learning architectures and methods such as **Probabilistic Label Trees**, **Graph Convolutional Networks** and **Generative Cooperative Networks** for Label Clustering, Instance to Cluster Matching, Sampling Negatives and Label Ranking to correctly annotate short text while also attempting to lower the amount of computation required.

Recommender Systems for Video Games on Amazon *(May 2020-Jul 2020)*

Guide: Aniket Patil — vRhythms Software Pvt Ltd:

- Worked in a team of 4 to **analyse recommendation algorithms** to infer which performed well on various ranking metrics like **Average Reciprocal Hit Rate, Diversity and Novelty.**
- Analysed **Collaborative Filtering, Matrix Factorization, Auto-encoders and Hybrid models** and and performed **sentiment analysis** on the reviews for products.

Selected Projects

Reinforcement Learning Agent *(Apr 2021-May 2021)*

Course Project under Prof. LA Prashanth

- Designed a Reinforcement Learning Agent in Python using conventional RL algorithms, primarily **Q-learning with exploration**.
- **Tested** out the agent successfully in **3 different environments** and their noisy counterparts from BSuite in all the environments.

Multi-Armed Bandit in a game of Cricket *(Mar 2022-Apr 2022)*

Course Project under Prof. Chandrashekar Lakshmi Narayanan

- Used the Upper-Confidence Bound(UCB) algorithm to come up with effective batting and bowling strategies in a game of cricket.

Tabular Data: Deep Learning is not all you need *(Mar 2022-Apr 2022)*
Course Project under Prof. Sheetal Kalyani
- Replicated results from the paper "Tabular Data: Deep Learning is not all you need" by Shwartz-Ziv and Armon .
- Implemented XGBoost and deep learning models like TabNet, DNF-Net, NODE and 1D-CNN from scratch on 11 different tabular datasets and compared the results to show the efficacy of tree-based ensemble models on tabular data.

Software Engineer | **Electronics and Software Subsystem** *(Apr 2020-Aug 2021)*
Team Anveshak, IIT Madras' Mars Rover Team
- Implemented algorithms for **autonomous navigation and path planning** (Bug2, Vector Field Histogram, Dynamic Window Approach), and **object detection** (spiral searching maneuvre, YOLOv3) on a **ROS Based Framework** for a rover capable of withstanding Mars-like conditions and carrying out scientific tasks effectively.
- Tested approaches to the above tasks extensively using **Gazebo** and **RViz**

Technical Skills

Programming Languages	Python, C
Web Development	HTML5, CSS3
Data Analysis	MATLAB, Octave, NumPy, Pandas, Matplotlib, Keras, TensorFlow, PyTorch
Other Libraries and Tools	ROS, Eagle, Arduino, LaTeX

Key Courses

Electrical Engineering	Microprocessors, Digital Systems, Signals and Systems, Digital Signal Processing, Applied Programming Lab, Information Theory, Control Engineering, Sensing Techniques and Sensor Systems, Communication Systems
Computer Science	Numerical Methods in C, Reinforcement Learning, Multi-Armed Bandits, Intro to Machine Learning, Deep Learning for Imaging*
Mathematics	Multivariable Calculus, Differential Equations, Linear Algebra, Probability and Statistics
Miscellaneous	Game Theory, Principles of Economics, French*
MOOCs	PH125.3x:Data Science:Probability (HarvardX), Divide and Conquer, Sorting and Searching, Randomized Algorithms(Stanford on Coursera), Graph Search, Shortest Paths and Data Structures(Stanford on Coursera), Design and Analysis of Algorithms

(*To be completed by Nov 2022)

Positions of Responsibility

Executive Editor | **The Fifth Estate** | **IIT Madras** *(May 2022-Present)*
- **Lead and manage a team of 50 students** at the helm of the official campus publication of IIT Madras.
- Supervise the regular rollout of quality written articles, podcasts, research surveys and videos covering campus life at IIT-Madras.

Coordinator | **Quiz Club** | **IIT Madras** *(Apr 2020-June 2021)*
Regularly **participate in and conduct** quizzes both inside and outside the institute as a part of one of the most successful teams in the college quizzing circuit.

Associate Manager | **Entrepreneurship Cell** | **IIT Madras** *(Oct 2019-Apr 2020)*
- Handled the social media pages of ECell, IIT Madras and generated publicity for upcoming events.
- Organised a **press conference** for the publicity of **E-Summit**, India's biggest student run Entrepreneurship Conference.
- As part of the D-Well team, organised a campaign for **Digital Wellness** that included surveying SME's on their use of digital technology and the assistance they needed.

Extracurricular Activities

- Mentor at **Avanti Fellows**
  Provided quality **mentorship** as a part of Avanti Fellows to **underprivileged students** in Jawahar Navodaya Vidyalaya Puducherry with regard to their academics and entrance exam preparation.Both have cleared JEE Main-2020 with >**99 percentile**. *(2019-20)*
- Conducted a public workshop on **"Python Algorithms for Robotics"** as a part of Shaastra 2020. *(2021)*
- Write articles as a **press correspondent** for The Fifth Estate, the official campus publication of IIT Madras. *(2020-22)*
- Elected as **House Captain** by teachers on the basis of overall academic and extracurricular performance. Led the House in sports and cultural events throughout the year. *(2016-17)*
- Shortlisted among the top 20 students in the country for Indian contingent selection for **World Schools Debating Championship** *(2016)*