

# VIBHHU SHARMA

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## EDUCATION

<b>Indian Institute of Technology (IIT), Madras , Chennai, India</b> <i>Bachelor of Technology in Electrical Engineering; CGPA: 9.48/10</i>	Aug 2019 - Jun 2023
<b>Army Public School Kirkee, Pune, India</b> <i>Higher Secondary School, Central Board of Secondary Education(CBSE); Percentage: 97.6</i>	Jun 2017 - May 2019
<b>The Bishop's Co-Ed School, Kalyaninagar Pune, India</b> <i>Secondary School, Indian Certificate of Secondary Education(ICSE); Percentage: 97.8</i>	Jun 2015 - May 2017

## SCHOLASTIC ACHIEVEMENTS

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

## RESEARCH EXPERIENCE

<b>Natural Language Counterfactual Generation for Indic Languages   Bachelor Thesis, IIT Madras</b> <i>Guide: Prof. Mitesh Khapra</i>	Aug 2022- Present Chennai, India
<ul style="list-style-type: none"><li>◦ Developed a <b>general-purpose counterfactual generator for Indic Languages</b> that allows for control over both perturbation types and locations.</li><li>◦ Created a dataset of diverse counterfactuals for 11 Indian Languages.</li></ul>	
<b>Counterfactual Explanations for Multi-Modal Recommender Systems   Adobe Research</b> <i>Guide: Dr. Gaurav Sinha</i>	May 2022-Jul 2022 Bangalore, India
<ul style="list-style-type: none"><li>◦ Devised a method to generate <b>counterfactual explanations</b> for recommendations generated by a <b>blackbox recommender system</b> that utilizes both <b>image and review data</b> for its decision.</li><li>◦ Used CLIP Tokenization and phrase level sentiment analysis to discover the <b>minimum perturbation</b> to an item's image or features such that it would no longer be recommended to a user and framed it as a counterfactual explanation.</li><li>◦ Model <b>outperformed the existing state of the art</b> on metrics like <b>Probability of Necessity(PN)</b> and <b>Probability of Sufficiency(PS)</b>.</li></ul>	
<b>Deep Learning for Extreme Multilabel Classification (XMC)   Aalto University</b> <i>Guide: Prof. Rohit Babbar</i>	Jun 2021-Nov 2021 Espoo, Finland
<ul style="list-style-type: none"><li>◦ Explored and reviewed multiple papers on short-text <b>Extreme Classification</b> where the input text is limited to only around 15 words on average.</li><li>◦ Devised a model that made use of a deep <b>Probabilistic Label Tree</b> for label clustering and a <b>Graph Convolutional Network</b> based on document-document similarity for label ranking.</li></ul>	

## KEY COURSES

- **Artificial Intelligence/Machine Learning:** Introduction to Machine Learning | Deep Learning for Imaging | Reinforcement Learning | Multi-Arm Bandits | Information Theory
- **Mathematics:** Probability, Statistics and Stochastic Processes | Linear Algebra | Functions of Several Variables | Series and Matrices | Differential Equations
- **Programming:** Numerical Methods | Design and Analysis of Algorithms | Applied Programming Lab
- **Electrical Engineering** Control Engineering | Microprocessors | Communication Systems | Signals and Systems | Digital Systems | Analog Systems | Sensing Techniques and Sensor Systems,
- **Miscellaneous:** Introduction to Game Theory | Econometrics | Principles of Economics

## KEY TECHNICAL PROJECTS

### 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.

### 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 decide effective batting and bowling strategies in a game of cricket.

### Reinforcement Learning Agent

Apr 2021-May 2021

Course Project under Prof. LA Prashanth

- Designed a RL 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.

### Analysis of Recommendation System

May 2020- Jul 2020

vRhythms Software Pvt Ltd [\[Code\]](#) [\[Report\]](#)

- Worked in a team of four to analyze recommendation algorithms' performance on ranking metrics.
- Optimized collaborative filtering & matrix factorization performance on ranking metrics by 22%
- Analyzed models performance against popularity bias & cold start issue using novelty/coverage metrics.

### Software Engineer, Team Anveshak

Apr 2020- Aug 2021

Mars Rover Team, IIT Madras

- Implemented algorithms for autonomous navigation and path planning (Bug2, Vector Field Histogram, Dynamic Window Approach), and object detection (spiral searching manoeuvre, 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.

## SKILLS

- **Languages:** Python, Java, Bash, C++, MATLAB, C, Octave
- **Web Development:** HTML5, CSS3, Javascript
- **Data Analysis:** MATLAB, Octave, NumPy, Pandas, Matplotlib, Keras, TensorFlow, PyTorch
- **Other Libraries and Tools:** ROS, Eagle, Arduino,  $\text{\LaTeX}$

## POSITIONS OF RESPONSIBILITY

### Executive Editor | The Fifth Estate, IIT Madras

May 2022- Present

- **Oversaw and led a team of 50** correspondents, editors, designers, analysts and coordinators at the official student news media body of IIT Madras
- Supervised the regular rollout of quality written articles, podcasts, research surveys and videos covering campus life at IIT-Madras.

### Coordinator and Contingent Member | Quiz Club, IIT Madras

Apr 2020- Present

- 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.

## EXTRA CURRICULAR ACTIVITIES

- Conducted a public workshop on "**Python Algorithms for Robotics**" as a part of Shaastra 2020. 2021
- Provided quality **mentorship** as a part of Avanti Fellows to **underprivileged students** in JNV Puducherry with regard to their academics and entrance exam preparation.Both have cleared JEE Main-2020 with **>99 percentile**. 2019-20
- Wrote articles as a **press correspondent** for The Fifth Estate, the official campus publication of IIT Madras. 2020-22
- Organised a campaign for **Digital Wellness** that included surveying SMEs on their use of digital technology and the assistance they needed as part of the PR team of the Entrepreneurship Cell at IIT Madras. 2020
- 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