Kunind Sahu 190110039

Metallurgical Engineering and Materials Science **B.Tech.**

Indian Institute of Technology Bombay **Gender: Male**

DOB: 12/27/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	HSC	Pace Jr. Science College	2019	92.46%
Matriculation	ICSE	Smt. Sulochanadevi Singhania School	2017	96.83%

Pursuing a **Dual Minor** in **Computer Science** and **Artificial Intelligence & Data Science**

SCHOLASTIC ACHIEVEMENTS

- Currently **Ranked 3rd** in a department of **110+** undergraduates *(2021)*
- Conferred with an **AP** grade (Advanced Performer) in the course MM 203 : Mechanics of Materials (**2 out of 114** students) for scoring the highest points in the course *(2021)*
- Ranked in the top **1.17** percentile in the **JEE Advanced** exam among 0.24 million candidates. *(2019)*
- Achieved **99.32 percentile** in the **JEE Main** exam among 1.18 million candidates *(2019)*
- Nominated for the **INSPIRE Scholarship** by the Department of Science & Technology, Government of India for being in the top 1 percentile of the HSC Board Examinations *(2019)*
- Awarded a **Silver Medal** in **Dr. Homi Bhabha Balvaidnyanik Competition** *(2016)*

RESEARCH EXPERIENCE

Graph Similarity Computation | TU Delft, The Netherlands *(May 2021 - Jul 2021)*

Guide: Prof. Miguel Bessa | Summer Research Internship

- Performed a **literature review** of the present State of the Art in Graph Similarity Computation
- Implemented a **batched** and **parallelized** version of the current State of the Art using **PyTorch Geometric**, replicated its results and **critiqued** the choices of the various layers used by the model
- Carried out fundamental improvements in the feature engineering of the data and the model to achieve an **improvement in performance** over the current State of the Art - **SimGNN**

KEY PROJECTS

Financial Fraud Detection | Course Project *(Apr 2021)*

Guide: Prof. Biplab Banerjee | Introduction to Machine Learning

- **Visualized** data obtained from **275,000+** credit card transactions made by European cardholders using the **t-SNE** algorithm to check the validity of modelling the problem statement as an **Anomaly Detection**
- Built a **Gaussian Anomaly Detection** model combined with **power transforms** to detect fraud
- Implemented ensemble methods - **Random Forests Classifier**, **LightGBM** and **XGBoost** to better model the fraudulent transactions - achieved the best results with LightGBM out of the 3 ensembles
- Leveraged the power of an **Undercomplete Autoencoder** to learn hidden representations of non-fraud transactions to detect fraudulent ones in an unsupervised manner: **F2 Score - 0.962**, **F1 Score - 0.917**

Data Science to Analyze a Bank Marketing Campaign | Course Project *(Nov 2020)*

Guides: Prof. Amit Sethi & Prof. Manjesh K Hanawal | Programming for Data Science

One of the only 3 projects to receive a perfect grade among 30+ project submissions

- Analyzed the marketing campaign of **Banco de Portugal** after the **Great Recession** of 2008 with the focus of **increasing client subscriptions** to Term Deposit Accounts
- Performed **EDA** and **Hypothesis Testing** to determine the key drivers of the campaign
- Carried out feature engineering and used machine learning models - **Random Forest Classifier, SVM Classifier and Neural Network** with 4-fold cross validation to predict success for a particular client
- Restructured the data by **oversampling of the minority class** to deal with class imbalance, leading to the best results with the Random Forest Classifier : **F1 Score = 0.894** and **Accuracy = 89.41%**

Digit Recognition using Neural Networks | Self Project *(Jun 2020)*
- Coded a **Neural Network** Classifier **from scratch** in Python
- Used **NumPy** library to implement the **Forward Propagation** & **Backpropagation** Algorithm
- Achieved a digit classification **accuracy of 95.4%** with the Neural Network architecture

Image Compression using Unsupervised Learning | Self Project *(Jun 2020)*
- Designed and implemented a **K-means Clustering Algorithm** from scratch in Python using **NumPy** and **SciPy** libraries to recreate a user given image with the **best 16 colours** possible
- Achieved a **compression** of the image by approximately **6 times** as compared to the original size

Intelligent Agent for 2048 Game | Seasons of Code, IITB *(Jun 2021)*
- Employed the **Expectimax Algorithm** to play the game, reaching a score of **11,500+**
- Attempted a **Deep Q Network** to improve upon the baselines set by the Expectimax Algorithm

Options Pricing | Finsearch, Finance Club IITB (Ongoing Project) *(Jul 2021)*
- Extensively read about options pricing and the mathematical theory behind **Brownian Motion**
- Coded the **Black-Scholes Model** in Python to **predict** the options prices of Tesla and Microsoft and investigated the relationship between strike price and option price for a given security

TEACHING EXPERIENCE

Teaching Assistant | Linear Algebra *(Mar 2021 - May 2021)*
Prof. Dipendra Prasad & Prof. Sudhir Ghorpade, Department of Mathematics, IIT Bombay
- Responsible for academically mentoring a batch of **43** freshmen students for the course
- Conducted **weekly tutorial sessions** to solve their difficulties and evaluated their examination papers

POSITIONS OF RESPONSIBILITY

Academic Mentor | Department Academic Mentorship Programme *(May 2021 - Present)*
Part of a team aiming to play a facilitative, supportive and developmental role for junior students
- Selected from **70+ applicants** on the basis of rigorous interviews, social behaviour and peer reviews
- Mentoring **8 sophomores**, catering to their academic needs and helping them achieve overall stability
- Involved in revamping and updating the DAMP Blog with course reviews & minor elective reviews

Head | Data Analytics and Visualization Team *(Jun 2021 - Present)*
Leading a team of 11 responsible for analyzing and presenting insights about institute related data
- Selected on the basis of a rigorous assignment and interviews about teamwork and machine learning skills.
- Executed a **2-step** recruitment procedure comprising a programming assignment followed by an interview round to form a team of **11** from a pool of **70+ applicants**

TECHNICAL SKILLS

- **Languages:** Python, C++, Java, SQL, MATLAB, R, LaTeX
- **Softwares and Frameworks :** PyTorch, PyTorch Geometric, NetworkX, Solidworks, MS Office

KEY COURSES UNDERTAKEN

CS & AI	Computer Programming & Utilization, Programming for Data Science, Introduction to Machine Learning, Foundations of Intelligent Learning Agents*, Computer Networks*, Introduction to Number Theory and Cryptography*
Mathematics	Linear Algebra, Data Analysis & Interpretation, Differential Equations, A First Course in Optimization, Numerical Analysis, Calculus

*To be completed by Nov 2021

EXTRACURRICULAR ACTIVITIES

- Bagged **2nd place** in the **Supply-Demand Simulation** Game organized by EnB Club, IITB *(Aug 2019)*
- Awarded **3rd position** in the **Strategy Wars** Competition organized by Finance Club, IITB *(Sep 2019)*
- Successfully completed a course on **Financial Modelling** under Learner's Space by Career Cell, IITB *(Jun 2020)*
- Volunteered as a writer for **ICSE Board Exams 2016** for special needs students of Singhania School *(Apr 2016)*
- Completed a year-long sports programme in **Lawn Tennis**, organized by NSO, IITB *(Aug 2019 - Mar 2020)*