



Vishal Kumar	200110118
Metallurgical Engineering and Materials Science	B.Tech.
Indian Institute of Technology Bombay	Gender: Male
	DOB: 15/11/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	D.A.V Centenary Public School Jaipur	2020	95.00%
Matriculation	CBSE	D.A.V Centenary Public School Jaipur	2018	94.60%

Pursuing a Minor Degree in **Artificial Intelligence and Data Science** under the department of C-Minds, IIT Bombay

SCHOLASTIC ACHIEVEMENTS

- Awarded **Institute Cultural Organizational** Special Mention for exemplary efforts in organizing cultural events ('23)
- Achieved AFSB interview candidacy through exceptional NDA performance, surpassing **4.62 lakh+** candidates ('19)
- Cleared level 1 in VVM, India's largest Digital-based Talent Search exam and represented **Jaipur in state camp** ('19)

PROFESSIONAL EXPERIENCE

Data Scientist Intern l'mbesideyou Inc., Japan	(May'23 - Jul'23)
<i>Tokyo-based video analysis AI service company with 110+ filed international patents / Awarded a letter of recommendation</i>	
Objective	• Developed a pipeline for real-time heart rate prediction from video or webcam data at every 0.1 seconds
Approach	• Employed MTCNN for precise face ROI extraction & signal estimation enhancing peak detection accuracy • Extracted blood flow signal using Eulerian Video Magnification & analyzed frequency spectrum with FFT
Impact	• Improved E.V.M RMSE by achieving 20% reduction using 68 facial landmarks for dynamic face detection • Attained 6.278 RMSE for heart rate detection by optimizing ICA+CNN algorithm on 60+ PURE dataset

Operations Analyst Intern Mahindra Powerol	(Dec'21 - Jan'22)
<i>Contributed to the telecommunication subdivision / Awarded a letter of recommendation for exemplary performance</i>	
• Pioneered a 10% reduction in cellular base station alarms through rigorous fault cause analysis and trend evaluation • Presented a case-study analysis report by cleaning & analysing a dataset of Mahindra's past 2yrs operations record • Proposed AI/ML applications including Predictive Maintenance anticipating a 20% reduction in redundant tasks	

RESEARCH AND DEVELOPMENT EXPERIENCE

Self Driving Car (SeDriCa) Unmesh Mashruwala Innovation Cell	(Sep'21 - Present)
<i>Leading a technical team of 33 students to build India's first self-driving car with level 4 autonomy customized for Indian Roads</i>	
Impact	• Achieved Level 3 autonomy , through rigorous testing, attaining a speed of 30 kmph in auto-drive mode
Research	• Developing a pipeline for PALIS eco vehicle to work autonomously for IGVC'24 Self Drive Challenge • Leading the Localisation Subsystem to provide real-time location of the car, 10x more accurate than GPS • Integrated Lidar and Camera sensors for enhanced object detection, classification, and depth estimation • Employed EKF to fuse real-time IMU and GPS data, extracting state vector for precise vehicle position • Converted 3D point cloud to 2D laserscan, forming occupancy grid for obstacle detection and lane merging

Machine Learning Guided Synthesis Research Project	(Jul'23 - Present)
<i>Project Guide: Prof. Debabrata Maiti, Department of Chemistry, IIT Bombay</i>	
• Creating an ML model to optimize product yield in cross-coupling reactions by suggesting the most effective ligand • Utilizing PCA & UMAP algorithm for dimensionality reduction enhancing exploration of ligand-defined chemical space • Engineering ligands based on physiochemical descriptors followed by using K-means clustering for cluster formation	

KEY TECHNICAL PROJECTS

Musify Summer of Code, Web and Coding Club	(May'22 - Jun'22)
<i>Constructed a face recognition model featuring Spotify music recommendation system based on an individual's emotion</i>	
• Implemented MTCNN to recognise face according to ROI and then classified the embeddings using SVM algorithm • Leveraged the ResNet50 model on the FER13 dataset to detect emotions with 75% accuracy SOTA score 76.8	

Anime Face Generation Course Project - Machine Learning for Remote Sensing - II	(Sep'22 - Nov'22)
<i>Project Guide: Prof. Biplab Banerjee, C-Minds, IIT Bombay</i>	
• Validated the CVPR 2020 paper StyleALAE : An adversarial latent autoencoder that uses a StyleGAN-based generator • Developed a relativistic Generative Adversarial Network (GAN) enabling the discriminator to predict relative realness	

ML Assisted Stock Price Prediction Finsearch, Finance Club	(Jun'22 - Aug'22)
<i>Spearheaded a team of 4 to study time series data and estimated S&P 500 stock price spanning from 1993 to 2022</i>	
• Implemented ARIMA, SMA20 & Naive model on S&P500 stock's time series data for precise stock price forecasting • Developed an LSTM model with a 30-day look-back period with an MAE of 2.817 to improve predictive performance	

Credit Card Fraud Detection | Self Project

(May'23 - Jun'23)

Detected fraudulent credit card transaction using anomaly detection algorithms like Isolation Forest & Local Outlier Factor

- Performed exploratory data analysis and applied synthetic minority oversampling for dealing with unbalanced data
- Used Support Vector Classifier, K-Nearest Neighbour & Decision Tree algorithms to achieve final AUROC score of **0.98**

Interactive Personality Clustering | Course Project: Statistical Machine Learning

(Sep'22 - Nov'22)

Project Guide: Prof. Asim Tewari, C-Minds, IIT Bombay

- Developed a model using an **unsupervised learning** algorithm for grouping people based on their personality traits
- Performed evaluation on the **Big-5 Personality data** of over **1 million** people using **K-Means** clustering algorithm

Power Plant Optimization | Course Project - Simulation and Optimisation

(Jul'20 - Dec'20)

Project Guide: Prof. Sumit Saxena, Metallurgical Engineering and Materials Science, IIT Bombay

- Developed an **optimization model** to maximize efficiency and minimize operational costs of a thermal power plant
- Employed **PCA** for dimensionality reduction and used multi-objective optimization for achieving **pareto** optimality

Weather Classification Model | Datathon, Analytics Club

(May'22 - Jun'22)

Processed the image dataset and classified it into 5 types with the help of Convolutional Neural Networks

- Built the deep Neural Network using Tensorflow and tuned hyperparameters to obtain a maximum accuracy of **83%**
- Applied and compared models like **VGG16**, **ResNet101** and **DenseNet201** to classify the weather condition in images

Car Sales Prediction | Winter in Data Science, Analytics Club

(Dec'21 - Jan'22)

Predicted resale value of pre-owned cars using various regression models & data-driven insights on the features of dataset

- Engineered key relevant attributes via Seaborn visualizations followed by optimizing **Ridge**, **Random Forest** & **ANN**
- Achieved an **R2 Score** of **0.94** on the test dataset by fine-tuning the hyperparameters through **Grid Search CV**

POSITIONS OF RESPONSIBILITY

Finance Manager, SeDriCa | Unmesh Mashruwala Innovation Cell

(Jun'23 - Present)

Spearheading a key project at the highest funded tech team of **50+** at IITB / Winner in multiple international competitions

- Managing a budget of **INR 4.45 Million+** for IGVC self drive challenge for procurement, development of eco vehicle
- Cultivated partnerships with industry experts and sponsors such as **Nvidia**, ensuring latest R&D facilities in the lab
- Spearheading exchanges between the team and institute's finance bodies strengthening relations and information flow

Institute Humour Nominee | Institute Cultural Council, IIT Bombay

(May'22 - Apr'23)

First ever representative of humor genre for 10,000+ students to lead a team of 20 hostel secretaries and 4 conveners

- Managed a budget of approximately **INR 0.4M** to conduct **25+** events, mics and workshops throughout the year
- Organized Annual Standup Showcase with a **200% YoY** viewership growth by conducting it in the convocation hall
- Conducted Standup & Improv workshops worth **INR 0.1M** inviting **10+** professional artists on a **zero-budget policy**

Convenor | Comedy Cons, IIT Bombay

(May'21 - Apr'22)

Among 3 selected from 30+ applicants representing interests of 4000+ students in the genre of speaking arts

- Facilitated faculty-student engagement, featuring **Prof. Amit Sethi** as a standup comedy performer | **500+** audience
- Launched **Tripod Mic** uniting top performers from IITB, KGP and Kanpur, fostering cross-institute talent exchange

Department Academic Mentor | Student Mentorship Program, IIT Bombay

(May'23 - Present)

Selected in a 35-member team out of 75+ based on ethical assessment, peer reviews, SOPs & a stringent interview process

- Mentoring **five sophomores** to guide them with their academic issues, time management, and extra-curricular activities
- Organizing events addressing academic and career needs for **300+** MEMS department undergraduates over the year

KEY TECHNICAL SKILLS

- **Programming:** C/C++, ROS, Python, R, SQL, OpenCV, MATLAB, Tensorflow, Power BI, Tableau, Pivot Table
- **Softwares:** SolidWorks, Linux, GAZEBO, AnyLogic, Unity 3D, MS Office, Git, L^AT_EX, Premier Pro, After Effects
- **Certifications:** Harvard University: Data Science-Inference & Modeling, Probability, Visualization, Productivity Tools

EXTRA-CURRICULAR ACTIVITIES

Inter-IIT	<ul style="list-style-type: none">▪ Won Gold medal at Inter-IIT Cultural Meet 5.0 in Improv Comedy competition at IIT Madras▪ Led the first-ever Inter-IIT genre to create record-setting wins of 2 gold, 1 silver & 2 bronze▪ Represented SeDriCa with a technical report in Engineer's Conclave, Inter IIT Tech Meet 10.
Mentorship	<ul style="list-style-type: none">▪ Mentored 10+ students in developing a Netflix Recommendation System as a part of WIDS▪ Guided a team of 4 students in building an autonomous bot as part of the S.T.A.R program▪ Mentored 20+ students in virtual film making and standup comedy as a part of club orientation
Competitions	<ul style="list-style-type: none">▪ Acquired 1st position in Invaso Investment challenge at IIT Madras E-Summit Case Competition▪ Secured 3rd place among 100+ teams in a consult case study competition by Property Pistol▪ Attained 3rd Rank in En it to Win it an entrepreneurship quiz in a team of 3 out of 35+ teams
Culturals	<ul style="list-style-type: none">▪ Attained 1st position in Acto Mania a Vine-Video Competition organized by Dramatics club of IITB▪ Secured 2nd position in a music video-making competition in Freshiezza out of 1400+ freshmen▪ Featured in the Timeliners YouTube video with 1.6M+ viewership alongside Ambrish Verma