



Vishal Kumar
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Indian Institute of Technology Bombay

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B.Tech.
Gender: Male
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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)

Tokyo-based video analysis AI service company with 110+ filed international patents | Awarded a **letter of recommendation**

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)

Contributed to the telecommunication subdivision | Awarded a **letter of recommendation** for exemplary performance

- 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)

Leading a technical team of 33 students to build India's first self-driving car with level 4 autonomy customized for Indian Roads

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)

Project Guide: Prof. Debabrata Maiti, Department of Chemistry, IIT Bombay

- 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 formaton

KEY TECHNICAL PROJECTS

Musify | Summer of Code, Web and Coding Club (May'22 - Jun'22)

Constructed a face recognition model featuring Spotify music recommendation system based on an individual's emotion

- 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)

Project Guide: Prof. Biplab Banerjee, C-Minds, IIT Bombay

- 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)

Spearheaded a team of 4 to study time series data and estimated S&P 500 stock price spanning from 1993 to 2022

- 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 obtained 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 MadrasLed the first-ever Inter-IIT genre to create record-setting wins of 2 gold, 1 silver & 2 bronzeRepresented SeDriCa with a technical report in Engineer's Conclave, Inter IIT Tech Meet 10.0
Mentorship	<ul style="list-style-type: none">Mentored 10+ students in developing a Netflix Recommendation System as a part of WIDSGuided a team of 4 students in building an autonomous bot as part of the S.T.A.R programMentored 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 CompetitionSecured 3rd place among 100+ teams in a consult case study competition by Property PistolAttained 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 IITBSecured 2nd position in a music video-making competition in Freshiezza out of 1400+ freshmenFeatured in the Timeliners Youtube video with 1.6M+ viewership alongside Ambrish Verma