Tejas Bhosale
Mechanical Engineering
Indian Institute of Technology Bombay
210100159@iitb.ac.in

210100159
B.Tech
Gender — Male
(+91) 9673016092

Examination	University / Board	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	7.9
XII	MH. State Board	Vyankatrao Jr. College	2021	90.40
X	CBSE	JNV Kolhapur	2019	93.4

Scholastic Achievements

- Secured **All India Rank 1698** in **JEE Main** among 1.15 million aspirants, showcasing exceptional aptitude *(2021)*
- Earned **All India Rank 1395** in **JEE Advanced** out of 0.25 million candidates, proving strong merit *(2021)*
- Cleared stage 1 of **NTSE** scholarship by NCERT, Government of India, a notable academic milestone *(2019)*

Professional Experience

Supply Chain Intern — Eris Lifesciences Ltd *Jun'24 - Jul'24*

Part of Supply Chain Management team, end-to-end planning for Anti-Diabetes & Cardiovascular products

- Optimized inventory management for critical and high-demand drugs, cutting stockholding period by 5% and saving 10% in operational costs, by assessing key performance indicators and collaborating closely with cross-functional marketing teams.
- Streamlined the consensus forecasting process significantly, enhancing planning efficiency by 10% for 15+ pharmaceutical products, by integrating diverse cross-functional data inputs from sales, production, and marketing departments.
- Streamlined the consensus forecasting process for pharmaceutical planning, enhancing operational efficiency by 10% for 15+ products, by integrating real-time, cross-functional data inputs from sales, production, and marketing departments.

Railway Cabin CCTV AI Monitoring System — AUGMEN.IO / INDIAN RAILWAYS *Jan'25 – Apr'25*

Built a multi-model AI pipeline to monitor pilot alertness in real time using cabin CCTV footage and behavioral cues.

- Achieved **90% accuracy** in detecting pilot alertness using CNN-LSTM, YOLOv8-Pose, and Transformer-based fusion, deployed across 50 trains to improve safety compliance, reduce incidents, and support driver behavior analysis.
- Reduced false positives in micro-sleep detection by 30% using advanced, context-aware Transformer-based filtering techniques, significantly enhancing overall system reliability for uninterrupted 24/7 surveillance in locomotive cabins.
- Decreased video processing latency by 50% by optimizing deep learning inference with ONNX and multiprocessing, enabling fast and reliable real-time alert generation across 100+ high-speed locomotive cabin environments.

Research

EGD Optimizer — Research Paper in Progress *Ongoing*

Designed a novel optimizer to accelerate deep learning model training through adaptive gradient methods

- Achieved **15% faster convergence** than Adam on 5 benchmark datasets by developing the Exploratory Gradient Descent (EGD) optimizer with dynamic learning rate scheduling and perturbation-based update strategies for deep networks.
- Reduced training time by **20%** for 3 CNN architectures on non-convex optimization problems by extensively benchmarking the EGD optimizer against RMSProp across varied datasets, neural architectures, and hyperparameter tuning cycles.

Key Projects

Multi-Agent AI Scientist System — Self Project *Ongoing*

- Built an autonomous multi-agent AI research platform, automating 80% of the academic research lifecycle—from ideation to manuscript—by integrating Gemini API for seamless, adaptive task orchestration across 7 modular components.
- Engineered 7 specialized collaborative AI agents, boosting research pipeline efficiency by 50% across 10 multidisciplinary projects, by designing reusable modules for code generation, and automated manuscript drafting with scalable workflows.
- Produced 5 high-quality research papers with reproducible code and datasets, achieving 100% submission readiness to top-tier journals, by leveraging Gemini API for LLM-driven content generation, fact validation, and automated formatting.

VideoGPT — Independent Research Project *May'24 - Jul'24*

- Developed the VideoGPT system, instantly generating detailed, notes within 2 minutes from 1.5-hour-long educational videos for 20+ lectures, by combining keyframe extraction and RRDB-enhanced multimodal vision-language embeddings.
- Outperformed GPT-4o in end-to-end processing speed, reducing latency by 30% across 15 video categories and formats, by building a custom multimodal LLM pipeline with optimized data loaders and lightweight attention modules.

Language Translation-Using Transformers — Course Project *Nov'23 - Feb'24*

Guide: Prof. Amit Sethi *IIT Bombay*

- Built a GPT-based neural translation model, achieving 95% accuracy on 10 multilingual NLP language pairs, by implementing multi-head attention and advanced transformer-based encoder-decoder architectures for sentence-level semantics.
- Enhanced model robustness and generalization capability, reducing overfitting by 10% on complex multilingual linguistic datasets, by designing a two-layer feed-forward network with ReLU activations and effective normalization techniques.

Few Shot ML — Course Project *Jul'23 - Nov'23*

Guide: Prof. Balamurugan Palaniappan *IIT Bombay*

- Developed a hybrid few-shot learning model, achieving 85% accuracy on 5 novel image categories, by integrating deep neural networks with binary SVMs and feature embedding techniques for efficient small-sample training.
- Optimized model performance significantly, cutting training time by 25% for 3 benchmark datasets, by designing a custom loss function blending transformation constraints, similarity metrics, and performance-based regularization.

Stock-Market Prediction Using Pattern Recognition — Web and Coding Club, IIT Bombay *Jun'23 - Oct'23*

- Built a robust deep learning-based stock prediction model, achieving 68.9% test accuracy on 5 major stocks, by training CNN-LSTM networks on the Reliance dataset with rigorous cross-validation and temporal feature extraction techniques.
- Enhanced the end-to-end financial data processing pipeline, reducing analysis time by 40% across 10 real-world financial datasets, by leveraging Pandas and custom preprocessing scripts for efficient historical stock data retrieval and formatting.

Corporate Finance — Summer of Science — Maths and Physics Club *May'23 - Aug'23*

- Conducted advanced geometric square coverage research, establishing a theoretical lower bound of 2 for rotated squares, by performing in-depth literature reviews, analytical modeling, and geometric case analysis.
- Proved efficient unit square coverage using 3 aligned squares, setting a practical upper bound for restricted cases, by constructing rigorous geometric proofs and validating through computational simulations and algorithmic evaluations.

Hand Gesture Project — Web and Coding Club, IIT Bombay *Nov'22 - May'23*

- Developed a robust Python-based gesture control system, achieving 95% detection accuracy for 8 hand gestures, by integrating Mediapipe for precise real-time hand tracking and landmark detection in varied lighting conditions.
- Enhanced user interface functionality, improving usability by 20% for 50 users, by designing an intuitive Tkinter-based GUI with customizable control mode selection, gesture feedback, and accessibility support.

Deep Learning - Digit Classification — Web and Coding Club, IIT Bombay *Jun'22 - Sept'22*

- Built a 4-layered deep neural network for digit classification, achieving 99.1% test accuracy on MNIST dataset, by training using forward-backward propagation, batch normalization, and gradient descent optimization techniques.
- Integrated real-time gesture detection module, enhancing model versatility by 15% across 5 application domains, by incorporating Mediapipe for accurate hand tracking, preprocessing, and live input stream handling.

Positions Of Responsibility

Research Analyst — Investment Team — Finance Club, IIT Bombay *Jul'23 – Mar'24*

Contributed to a 25-member finance research team managing a student-led investment initiative.

- Crafted a diversified investment portfolio strategy, yielding 12% projected annual returns on INR 5 lakh fund, by performing detailed equity research across 10 sectors using financial models and technical analysis tools.
- Evaluated 20 early-stage startup investment opportunities, identifying 3 high-potential ventures for strategic funding, by collaborating with a venture capital firm and applying in-depth market, risk, and trend analysis.

Sports Head — Aavhan, IIT Bombay *Jun'23 – Mar'24*

Led a team responsible for organizing IIT Bombay's flagship intercollegiate annual sports fest.

- Organized a two-day nationwide chess tournament, attracting 400+ participants from 10 institutes, by securing Grandmaster sponsorship and ensuring smooth operations through vendor coordination and scheduling logistics.
- Managed INR 50k prize pool distribution, ensuring 100% on-time delivery to 20 winners, by optimizing financial tracking systems and negotiating vendor payments for enhanced budget utilization and transparency.

Technical Skills and Extra-Curriculars

Programming	Python, C++, C, Bash, Java, Prolog, HTML, CSS, JavaScript, Django
Data Science	TensorFlow, PyTorch, NumPy, R, OpenCV, MATLAB/GNU Octave, R Studio
Software	LaTeX, Git, Android Studio, ROS, Gazebo, Solidworks, AutoCAD
Sports	Represented Maharashtra in **Shot Put** at the **National Games**, qualifying through district and state-level athletic trials. Also participated in the **Inter-IIT Sports Meet (Shot Put)**, representing IIT Bombay after competitive institute selections and training.
Miscellaneous	Completed 1 year of NCC Military Training at IIT Bombay; practiced with 0.22 rifle at Colaba Firing Range. Built Bluetooth-controlled RC bot and optimized RC plane prototypes. Presented Business Model Canvas for agro-tourism startup at EnB Buzz 2022.