



Bhavesb subhash sandbhor
Metallurgical Engineering and Materials Science
Indian Institute of Technology Bombay

22B2446
B.Tech.
Gender: Male
DOB: 08/08/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	7.66
Intermediate	HSC	pratibha junior college	2022	78.17%
Matriculation	SSC	shri shiv chhatrapati shivaji raje high school	2020	96.60%

Pursuing a Minor Degree in Computer Science and Engineering, IIT Bombay

SCHOLASTIC ACHIEVEMENTS

- Secured **97.41** percentile in **JEE Advanced** examination out of over 0.25 million qualified candidates ('22)
- Achieved percentile of **98.2** in **JEE-Mains**, surpassing more than 1 million candidates across the country ('22)
- Achieved **99.49%**ile in the Maharashtra Common Entrance Test (**MHT-CET**) amongst 6,00,000 candidates ('22)
- Awarded the **Pre-Secondary Scholarship** Examination by the Maharashtra State Education Board ('18)

TECHNICAL PROJECTS

Deep Generative Models: An Odyssey to a new generative model (Jun'24-Present)
*Specializing in advanced deep learning techniques, including developing and implementing neural networks (U-Net, Encoder-Decoder), VAEs, GANs, flow-based models, and diffusion models | **Season of Code IIT Bombay***

- Diffusion Model for Image Denoising and Partial Noise Inpainting**
 - Built and trained a **diffusion model** to remove noise and reconstruct missing image areas on **CIFAR-10** datasets
 - Achieved significant **noise removal** and **image reconstruction** for data corrupted with **various noise levels**
 - Visualized the **loss landscapes** associated with different **hyper-parameters** configurations, gaining valuable insights into the model's training behavior and identifying **optimal parameter** settings for robust performance
- Realistic Human Face Generation Using Optimized GANs Architectures**
 - Trained on a large dataset of **50,000 celebrity faces** from Kaggle to generate **realistic human face** images
 - Implemented and compared **two architectures** one meticulously designed for **efficiency** and simplicity, and another strategically engineered for **increased capacity**, enhanced robustness, and superior **performance metrics**
 - Optimised the number of layers in both **generator** and **discriminator** for the larger model, enhancing performance
 - Achieved a **5%** improvement in image quality and accuracy through the implementation of the larger architecture
- Enhancing Variational Autoencoder (VAEs) performance through Encoder-Decoder Architectures**
 - Implemented a **vanilla VAE** with a standard encoder-decoder architecture on **60,000** image anime face dataset
 - Optimized VAE performance by integrating an **encoder-decoder architecture** in both encoder and decoder architecture, enhancing both **feature extraction** and **image reconstruction capabilities** for model efficiency
 - Conducted a comprehensive comparative analysis of accuracy and output image quality across all VAE configurations to determine the optimal architecture that achieved the highest levels of model efficiency and image reconstruction

AI-Powered Chatbot Development Project | Self Project (Jan'24)
Developed a chatbot using the Bag-of-Words model for Natural Language Processing (NLP) tasks

- Developed a chatbot with Python, leveraging **NLTK** for **NLP tasks** and **PyTorch** for building the **neural network**
- Converted **tokenized** sentences into numerical vectors, enabling accurate processing and interpretation of user queries
- Incorporated basic conversational features such as greeting, querying, and fare-welling to enhance user engagement
- Created a **multi-layer neural network** with **ReLU** activation and **CrossEntropyLoss** for intent classification
- Trained the model to recognize intents with a probability **threshold of 75%**, ensuring contextually relevant responses

Self-Driving Car Simulation using NVIDIA research paper & Udacity | Self Project (Feb'24)

- Utilized the **NVIDIA CNN** architecture from the **End to End Learning for Self-Driving Cars** research paper for simulating self-driving cars, employing **30,000 pre-processed** and **augmented** driving images with **OpenCV**
- Implemented **image augmentation techniques** such as random cropping, flipping, and brightness adjustments
- Trained CNN on images, incorporating **steering angle** and **front-facing camera images** for precise decision-making
- Used **OpenCV** to pre-process, augment and generate images, improving model robustness for diverse driving scenarios
- Tested trained model on **Udacity's Driving Simulator**, demonstrating real-world driving simulation capabilities

MNIST Digit Classification using custom CNN Architectures

(Jan'24)

Winter in Data Science Project | Analytics Club | IIT Bombay

- Designed, developed, and evaluated a custom convolutional neural network (**CNN**) architecture in **PyTorch** for classifying handwritten digits from the **MNIST dataset**, alongside established **AlexNet** and **LeNet** architectures
- Achieved an accuracy of **97%** using **AlexNet** and **96%** using **LeNet Architectures** on the **MNIST Dataset**

Streamlit-Powered AI Question & Solution Generator using LLM | Self Project

(Jun'24)

- Generates questions and solutions tailored to **user-defined topics**, difficulty levels, and desired number of questions
- Utilizes the power of **Gemini-Pro (API)**, a state-of-the-art large language model, for intelligent content generation
- Designed **multi-step prompts** using **LangChain** for **LLM**, enabling **targeted Q&A** pairs based on user input
- Developed a user-friendly web application with **Streamlit** for generating Q&A pairs based on **user input**

OTHER PROJECTS

CS50 Introduction to Artificial Intelligence with Python

(Jun'24)

Harvard University | CS50 AI

- Completed the **CS50 AI** course, executing **12 advanced projects** in **AI** and practical problem-solving skills
- Applied **search algorithm**, **classification**, **optimization**, and **machine learning** techniques in python projects
- Mastered core AI concepts like Uncertainty, knowledge, probability, **Bayesian networks**, **Markov models**
- Explored cutting-edge AI like **reinforcement learning**, **neural networks**, and **natural language processing**

Python for Data Science - Learner's Space

(Jul'24-Present)

Learner's Space | Web and Coding Club | IIT Bombay

- Learned **data handling** and **predictive modeling**, with a focus on regression analysis and **hypothesis testing**
- Applied statistical concepts and Python libraries like NumPy, Pandas, and Scikit-learn to build predictive models

Machine Learning - Learner's Space

(Jul'24-Present)

Learner's Space | Analytics Club | IIT Bombay

- Learned about various machine learning concepts like **Regression**, **Decision Trees**, **K-means clustering**
- Completed various assignments focused on implementing machine learning techniques using **Python** and **TensorFlow**
- Applied advanced ML techniques such as **CNNs**, **YOLO** and utilized **TensorFlow** in **image processing projects**

Machine Learning Specialization

(Mar'24)

Taught by Andrew Ng in collaboration with DeepLearning.AI and Stanford Online

- Developed and applied supervised learning techniques such as linear regression, logistic regression, and neural networks
- Explored and implemented unsupervised learning methods like **clustering algorithms** and **anomaly detection**
- Specialized in the development of **recommender systems** and **deep reinforcement learning** models

TECHNICAL SKILLS

Programming Languages	Python, C , C++, Arduino IDE
AI and ML	Supervised learning, Unsupervised learning, Natural language processing Deep learning, Reinforcement learning, Generative AI, LLM
ML Tools & Libraries	PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy, Matplotlib, MatLab, Stremlit, Langchain, NLTK, Keras, OpenCV
Others	L ^A T _E X, MS Excel, MS PowerPoint, MS Word, Linux, Git

RELEVANT COURSES

- **Key Courses :** AI and Data Science, Computer Programming and Utilization, Discrete Structures, Computation Lab, Game Theory and Economic Analysis, Economics, Design Thinking for innovation
- **Mathematics:** Real Analysis, Multi-variable Calculus, Linear Algebra, Differential Equations
- **Others:** Classical Mechanics, Quantum Physics, Organic and Inorganic Chemistry, Quantum Chemistry, Makerspace, Economics, Physics and Chemistry Labs, Biology

EXTRACURRICULAR

- Completed a year of rigorous training in the **National Cadet Corps (NCC)**, honing leadership skills and discipline
- Contributed to the **Kaggle** community by developing **ML notebooks**, gaining insights from **datasets**, participating in **competitions**, and actively engaging in forums. Continuously enhancing skills and contribute to the field