Gautam Prabhudesai | **200020055**
Chemical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 30/7/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	Maharashtra State Board	Pace Junior Science College	2020	
Matriculation	Maharashtra State Board	Balmohan Vidyamandir	2018	

Pursuing a **Minor** in **System and Control Engineering** and an **Honors** in **Chemical Engineering**.

Scholastic Achievements

- Awarded **Department Rank(DR) 10** for distinguished performance among the **150+ students**.[Present]
- Scored **99.4** percentile overall with a **rank** of **7003** in the JEE Mains among **1 million** candidates. [2020]
- Secured an **All India Rank(AIR)** of **1922** in JEE Advanced out of more than 2,50,000 candidates. [2020]
- Received Scholarship SHE under INSPIRE for ranking within the top 1 percentile in HSC board exam. [2020]

Professional Experience

Vegetable Price Forecasting using Machine Learning, Verve Consulting Pvt Ltd. [Dec'21 - Jan'22]
Guide: Vignesh V.J., COO – Verve Farmstay

- Created and cleaned a **database of vegetable prices** in the Ganjam district of Odisha considering factors such as rainfall, festivals, season, supply and demand using government websites and free online databases.
- Used **machine learning** models such as *Logistic Regression, KNN, SVM, Naive Bayes, Decision Tree* and *Random Forest* to predict prices and analyzed the accuracy of the models for short and long-term data.
- Developed a forecasting model using Random Forest algorithm with **86%** accuracy in predicting prices.

Key Projects

Determining Partition Coefficient in Biphasic system | Research Project [May'22 - Present]
Guide: Prof. Jhumpa Adhikari, Department of Chemical Engineering, IIT Bombay

- Predicting the value of **Partition Coefficient** of **Hinokitiol** in **water** and **hexane** solvents.
- Building the initial configuration of the **liquid biphasic system** using **Avogadro** and **Packmol** software.
- Learning an **Open-Source** software **GROMACS** to run **Molecular Dynamics(MD)** simulation.
- Running Molecular Dynamics simulations in **NVT** and **NPT** ensembles with different combinations of **barostats** like Berendsen, Parrinello-Rahman, etc and **thermostats** like Berendsen, nose-hoover, etc.
- Visualising the trajectories of molecules in **VMD** and plotting the graph of properties using **Grace**.

Self-optimized Reactor| ChemE TL, IIT Bombay [May'22 - Present]

- Building a system of **self-optimizing reactor** as the combination of a network of fluidic components.
- Connecting instruments to computers using sensors to read data from them, using which instruments are operated by a **Machine Learning** algorithm made using the **Nelder-Mead method** for specific reactions.
- Working in a team in lab using different types of sensors, reactors, pumps and other equipment.

Optimizing Polymer Electrolyte Cells | Course Project [Jan'22 - Apr'22]
Guide: Prof. P Sunthar, Department of Chemical Engineering, IIT Bombay

- Modelled the geometry of an industrial **PEM cell** and increased its efficiency using **different types, shapes and configurations of fins** and other techniques and played the role of solver in a team of 8.
- Analysed the effects of **annular parabolic fins** and various **liquid** and **air-based cooling systems**.
- Used heat transfer equations to compare cooling efficiency and find an appropriate system of cells and fins.

Computational Analysis of Numerical Methods | Course Project [Nov'21 - Dec'21]
Guide: Prof Sarika Mehra, Department of Chemical Engineering, IIT Bombay

- Analysed the impact of factors like step size on convergence of **numerical methods** by using **MATLAB**.
- Solved a third order non-linear ODE-BVP problem and compared the solutions with inbuilt ode solvers.
- Coded methods like **shooting method**, **Adam Moulton** and **Adam Bashforth** methods in **MATLAB**.

Biotechnology and Biophysics | Summer of Science, IIT Bombay [May'22 - Present]

- Learned principles of biotechnology, recombinant, cloning and editing DNA, applications of biotechnology.
- Studying on the structural organization of proteins, Ramachandran maps & energy landscape, cooperativity.

Machine Learning and Neural Networks | Summer of Science, IIT Bombay [Summer '21]

- Covered various machine learning models such as linear regression, logistic regression, neural networks, support vector machines, clustering, and principal component analysis and dimensionality reduction.
- Gained a comprehensive understanding of the use of model selection, test set error, bias and variance.

Stock Market Prediction Project | Winter in Data Science(WiDS) Project [Dec'21 - Jan'22]

- Learned about **stock market**, its functioning and gained insight into **market prediction** and its methods.
- Applied the knowledge gained of **LSTM models** and built a model using **Keras** library to predict prices.

Positions of Responsibility

Corporate Relations Coordinator | E-Cell, IIT Bombay, [2021]

Asia's Largest Entrepreneurship promoting student body recognized by NEN | Patronage from UNESCO

- Member of the principal team with the crucial responsibility of executing the various speaker sessions and networking events in the E-Summit which is Asia's largest Entrepreneurship and Business Conclave.
- Spearheaded the approach for **20+ speakers** from globally recognized consulting and fintech firms.
- With a footfall of more than thirty thousand participants, E-Cell is **Asia's largest student-run, non-profit entrepreneurial body** with a vision of developing an entrepreneurial mindset among India's youth.

Technical Skills

Programming Languages	C++, Python, MATLAB, LaTeX and Java
Software Packages and Technical Skills	OpenFOAM, Gmsh, Git, Gromacs, Paraview, FreeCAD, Excel, VMD, Avagadro, Packmol, DWSIM, Reinforcement Learning, Natural Language Processing, Data Analysis, Machine Learning and Deep Learning

Courses Undertaken *(*Ongoing)*

Chemical Engineering and Chemistry	Introduction to Transport Phenomena (CL203), Chemical Engineering Thermodynamics I and II (CL255 and CL250), Heat Transfer (CL246), Process Fluid Mechanics (CL254), Chemical Reaction Engineering* (CL324), Solid Mechanics* (CL305), Mass Transfer I* (CL319)
Mathematics and Programming	Computer Programming and Utilization (CS101), Calculus 1 and 2 (MA109 and MA111), Linear Algebra (MA106), Differential Equations (MA108), Introduction to Numerical Analysis (CL244), Differential Equations II (MA207), Introduction to Data Analysis (CL202)
Other	Quantum Physics and Application (PH107), Basics of Electricity and Magnetism (PH108), Biology (BB101), Economics (HS101)

Extracurriculars and Additional Learning

National Service Scheme(NSS), IIT Bombay [2020 - 2021]

- Volunteered 80+ hours of active participation under Green Campus in National Service Scheme(NSS), IITB and gained important skills like communication, team working, report making, presentation skills, etc.

Predictioneer Competition by AZeotropy, IIT Bombay [2021]

- Placed 4^{th} in Predictioneer competition held by Azeotropy, IITB and was given a certificate for appreciation.
- Performed data pre-processing and analysis on a dataset containing **33** physical and chemical properties.
- Compared accuracy of machine learning models and built a **Random Forest** model to predict LD_{50} values.

Winters in Data Science (WiDS) Bootcamp by Analytics Club, IIT Bombay [2021]

- Concluded WiDS Bootcamp learning **data science and machine learning** held by Analytics Club, IITB.
- Understood the various aspects of exploratory data analysis using *NumPy, Pandas, Matplotlib and Seaborn.*
- Learned about models like *regression models, ensemble methods, clustering*,etc in **scikit-learn** framework.

Deep Learning Bootcamp by DPhi and Analytics Club, IIT Bombay [2022]

- Completed Deep Learning Bootcamp conducted by DPhi and Analytics Club, IITB.
- Learned basics and uses of models like *Simple Neural Networks, CNN, LSTM, GRU, RNN and GAN.*
- Understood concepts of *epochs, batch size, callbacks, transfer learning and data augmentation* for images.
- Finished a project for classifying the weather condition using images into 5 classes using **CNN model**.