Jai Priyadarshi
Metallurgical Engineering and Materials Science
Indian Institute of Technology Bombay

210110054
B.Tech.
Gender: Male
DOB: 08/02/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	7.75
Intermediate	CBSE	S.K.P Vidya Vihar	2020	96.20%
Matriculation	ICSE	Mount Assisi School	2018	91.17%

Pursuing a **Minor** Degree in **Artificial Intelligence & Data Science** by **C-MInDS** Department, IIT Bombay

Professional Experience

Machine Learning Engineer | BluSim Tech, Bangalore *(May - July '24)*

*Awarded **PPO** (**Pre-Placement Offer**) for exemplary contributions to the AI-driven medical detection system*

- Developed **SleepNet**, an advanced **LSTM-CNN** architecture with **14** residual blocks and **2** bi-directional LSTM layers, to accurately detect medical **sleep poses**, achieving a classification accuracy of **85.74%** & **F1 score** of **0.83**
- Performed **Cepstrum analysis** of Ballistocardiogram (BCG) signals to generate **heatmap** images of the input signal, classifying various medical sleep poses using **ResNet**, with an achieved accuracy of **87.33%** & a **F1 score** of **0.86**
- Implemented techniques of the **Research Paper** *"A Piezoresistive Array-Based Force Sensing Technique for Sleeping Detection (IEEE 2023)"* using **Graph Neural Network** to improve accuracy upto **91.17%** & **F1 score** upto **0.9**
- Drafted an extensive technical document for **Patent application** to be filed for **HSA Class B** medical device certification

Research Experience

Smart Gloves : Hand Gesture Detection *(Aug - Dec '24)*

Supervised Learning Project | Guide: Prof. Prasanna Kumar S Mural

Develop **smart gloves** equipped with **piezoelectric sensors** to detect hand motion & gestures for **sign language recognition**

- **Design** & **3D** print *Polyvinylidene fluoride* polymer based **triboelectric** highly **shape adaptive sensor** for sensitive **joint motion monitoring** & **tactile sensing**, demonstrating it's application in real-time **human-machine interaction**
- Utilize an **Arduino micro-controller** to develop a custom sketch program file that interface with a piezoelectric sensor, enabling precise real-time **signal recording**, advanced **processing** and **data logging** for motion detection
- **Pre-Process** the signal using advanced **Signal Processing** techniques, apply **moving window** mechanism to construct input matrix and implement **hybrid LSTM-Transformer** model to achieve a proposed accuracy of **85**%

**Ongoing*

Key Projects

Conformal Time-Series Forecasting | Course Project *(Aug - Nov '23)*

Guide: Prof. P Balamurugan | Course: IE643 - Deep Learning

- Implement **Research paper** *"Conformal Time-Series Forecasting"*, generate **2000 static** & **time-dependent datapoints**
- Compared **CF-RNN** against 2 baseline models: **MQ-RNN** & **DP-RNN** for **uncertainty estimation** on **synthetic** dataset
- Obtained a **Coverage vs. Horizon** plot for CF-RNN, MQ-RNN, and DP-RNN using real brain **EEG** dataset

Hybrid Customer Churn Prediction Algorithm | Course Projet *(Jan - May '24)*

Guide: Prof. P Balamurugan | Course: IE506 - Machine Learning

- Performed **EDA** on the **Telecom-Customer-Churn** dataset to extract insights driving customer churn prediction
- Implement **Logit Leaf** (hybrid **decesion tree** & **logistic regression**), achieving **AUC** score of **0.79** and **TDL** of **2.8**

Ranking Algorithm Using SoftRank | Course Project *(Jan - May '24)*

Guide: Prof. P Balamurugan | Course: IE506 - Machine Learning

- *Implemented **Research paper** "SoftRank: Optimising Non-Smooth Rank Metrics" on **Microsoft LETOR** dataset*
- *Achieved **0.52 NDCG** score by optimizing with **L2 regularization**, **dropout** and **fine-tuning hyperparameters***
- *Implemented a **custom loss function** using **SoftNDCG** to optimize ranking metric, improving NDCG score to **0.56***

Chat with PDFs | *Self Project* *(Dec '23)*

- *Developed **chatbot** using **LangChain** that responds to **user queries** based on information extracted from PDF files*
- *Preprocessed PDF texts into **chunks**, generated **embeddings** & indexed and stored them on **FAISS vector** database*
- *Implemented a **RAG** pipeline that uses **Similarity Search** operation and generate responses with **Cohere LLM***

Image Generation | *Course Project* *(Aug - Nov '23)*

Guide: Prof. P Balamurugan | Course: IE643 - Deep Learning

- *Implemented **VAE** encoder-decoder architecture & **DCGAN**, employing **Adam optimizer** & **batch normalization***
- *Trained the models on a diverse dataset featuring boat and car images, evaluated using **mean-squared error** and **visual inspection**, showcasing conclusive results indicating the superior image quality achieved by DCGAN over VAE*

Brain Tumor Detection | *Self Project* *(Jun - Jul '23)*

- *Build a **CNN** model to detect brain tumour, using extensive **Kaggle** dataset containing **4600 images** of brain MRI*
- *Leveraged **transfer learning** to fine-tune pre-trained **MobileNet** architecture, achieving an accuracy of **93.72%***
- *Used **Gradio** to deploy the machine learning model, which can accurately **classify MRI images in real-time***

Position of Responsibility

Senior Engineer | *Software Subsystem* | *Rakshak, IIT Bombay* *(Jan '23 - Feb '24)*

Faculty Advisors: Prof. Krishnendu Haldar (Aero Dept.)

*Rakshak, IIT Bombay, is a **Tech-Team** that develops robust **UAVs** for Search and Rescue Operations (**SRO**)*

- *Utilized **Gazebo, RViz and Cartographer** to develop and test robotic algorithms in a simulated environment, implementing **SLAM** techniques using virtual **LiDAR** sensor for accurate mapping and simultaneous localization*
- *Trained **YOLOv8** model on a customized **DOTA** and **xView** dataset featuring **aerial views**, specializing in the **detection and localization** of cars, humans, and buildings, enhancing proficiency in **object detection** techniques*
- *Employed **DenseNet201** for letter and shape recognition, followed by segmentation using the **Segment Anything Model (SAM)** by **Meta AI**, on the **SUAS competition** dataset, showcasing proficiency in **image processing***

Department Convener | *Metals & Materials Association, IIT Bombay* *(Jul'22 - Jun'23)*

*Part of **16** member team spearheading all events & competitions of **MEMS** Department, catering to **1k+** people*

- *Organised the first-ever **Metals and Materials Summit**, a **2-day event** featuring seminars, PDs & Competitions*
- *Mentored **20** freshmen, catering their academic & co-curricular needs, helping them achieve stability during their first year*

Entrepreneurship Venture in AI

AI Hairstyling | *IDEAs* | *Desai Sethi School of Entrepreneurship, IIT Bombay* *(Apr '22 - Jun '22)*

*Level 1 Cohort 8 | **Pre -Incubator***

- *Awarded prestigious grant of **INR 50,000** from DSSE, IIT Bombay for **Customer Discovery** & **Product Validation***
- *Developed **AI-driven** concept for **3D** trial feature of hairstyles & an integrated **booking system** for salons & parlours*

Technical Skills & Key Courses

Languages	*Python , C++ , MATLAB , SQL , LaTeX, R*
Libraries/Framework	*NumPy , Pandas , Matplotlib , Scikit-Learn , SciPy , PyTorch , TensorFlow , OpenCV*
AI & DS Courses	***Deep Learning** - Theory and Practice , **Machine Learning**: Principles and Techniques* ***Data Analysis and Interpretation** , **Computer Programming and Utilization***
Mathematics Courses	***Probability & Stochastic Processes**, Introduction to Numerical Analysis, Calculus I, Linear Algebra , Differential Equations , Calculus II , Computational Laboratory*
MOOCs	***Data Structures and Algorithm** , Machine Learning Specialization by Stanford*

Extra-Curriculars

Accolades	• *Secured an **All India Rank 5** in the **SarvGyan National Scholarship Test** (**SNST**), 2021* • *Secured **2nd** Rank in Class 12th CBSE Intermediate Examination out of **400+** students, 2020*
Finance	• *Won **Venture Capital Investment Competition** conducted by Analytics Club , IIT Bombay* • *Won **Strategy Wars** simulated news-based trading game conducted by Finance Club, IIT Bombay*
Sports	• *Completed year-long training in Swimming under **(National Sports Organisation)**, IIT Bombay* • *Member of **Gold** winning team in **Cricket General Championship** 2023, conducted by MMA*
Mentor	• *Mentored **5** students with a **2 months** summer project on **AI & ML**, under MnP Club,IIT Bombay* • *Mentored **3** teams for Start-Up pitch deck competition, EnB Buzz conducted by E-Cell, IIT Bombay*
Social	• *Participated in the **Versova Beach clean-up** program organized by Abhyuday in November, 2022* • *Curated content for **Career Counselling Campaign**, impacting **25K+** students of **80+** schools*