Parth Pundalik Pai | **22B3305**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 07/11/2004

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	8.74
Intermediate	DPUE	The Learning Centre PU College, Mangalore	2022	95.33%
Matriculation	KSEEB	Vidya Bharati School, Bhatkal	2020	98.72%

Pursuing **Minor** degree in **Data Science and Machine Learning, C-MInDS**, IIT Bombay

Scholastic Achievements

- Received an **AP** grade in the MS101 course, achieved by only **7 individuals** out of **600+** students. *(2023)*
- Achieved a **Change of Branch** to the department of **Mechanical Engineering** (B.Tech) among **31** out of **1300+** students owing to excellent academic performance *(2023)*
- Secured **Karnataka State Rank 46** among **216k+** candidates who appeared for **KCET** examination *(2022)*
- Procured **99.65** in **Joint Entrance Examination Mains** among **0.94M+** candidates all across India *(2022)*
- Among **Top 2.13** percentile out of **0.16M+** candidates in **Joint Entrance Examination Advanced** *(2022)*
- Qualified for the **State level** Mathematics and Science Talent Search examination organized by **Karnataka Rajya Vijnana Parishat (KVRP)** *(2019)*

Key Technical Projects

Breakout Genius - AI game master using RL | Season of Code 2023 *(May'23 - July'23)*

Built a Reinforcement Learning game master to play Atari games *WnCC, IIT Bombay*

- Created **Atari Breakout Game** environment using **OpenAI's gym** package, NumPy and Pytorch
- Built a **DQNAgent** class having Convolutional Neural Networks to return relevant **q-values** and **sample-actions**
- Recorded **mean rewards** and **Temporal Difference(TD) losses** while training the model using Adam Optimiser
- Tested a pre-trained PyTorch model for **9M** steps and rendered the animation to output the gameplay as a video file

Language Translation model using NLP | Learner's Space 2023 *(June'23 - July'23)*

English to Italian Translation model using Natural Language Processing *UGAC, IIT Bombay*

- Built Language Translation model from English to Italian using **transformers, pipelines, and tokenizers**
- Preprocessed and tokenized data, splitting into 80-20 training and testing sets using **AutoTokenizer** and fine-tuned it
- Evaluated the accuracy of the model using **sacrebleu** score to check word matchings and hence give appropriate score
- Created an interactive app environment using **gradio** and tested the pre-trained model saved in Google drive

Mountain Cargo Challenge | MS101 Makerspace Course Project *(May'23 - June'23)*

Guide: Prof. Ankit Jain and Prof. Dinesh. K. Sharma, IIT Bombay

- Developed an autonomous Line-follower robot that can climb inclines up to **30 degrees** with a payload of **300 grams**
- Incorporated **3 IR sensors** into an Arduino UNO microprocessor, enabling it to **detect and track line**
- Crafted an operationally efficient design with a low COM by carefully selecting the position of the payload container
- Appreciated as one of the best MS101 bots among a batch of **600+** students and awarded certificates

Computational Linear Algebra | IITB Student Satellite Program *(Apr'23)*

A 50+ member student team with the vision of making IIT Bombay a center for excellence in space technology

- Explored the math behind various matrix decompositions like **LU,QR,Cholesky** and **SV** decompositions
- Implemented algorithms for **LU decomposition** with Partial Pivoting, **QR decomposition** using Householder reflections, the Gram-Schmidt Process, and **Cholesky decomposition** in **MATLAB**
- Developed a code to compute **Rank Approximation** and eigenvalues of a matrix using **Power Method**

MPC controller in CLS | IITB Student Satellite Program *(Sep'23 - Present)*

A 50+ member student team with the vision of making IIT Bombay a center for excellence in space technology

- Building **PID control** for an inverted pendulum on a motorized cart using Transfer Functions
- Implementing **MPC** in **Closed Loop Simulation (CLS)** code of by optimising quadratic objective functions

Impact Tester | ME218 Course Project *(Sep'23)*

Guide: Prof. V.Kartik, Department of Mechanical Engineering

- Part of a 5-member team which designed **pendulum based** experimental setup to measure **toughness of substances**
- Used **Tracker**, an **Image processing** software to determine the change in angle and hence the energy absorbed

Other Projects and Seminars

LaTex | Learner's Space, UGAC *(July '23)*

- Understood the basic LaTex syntax and created resumes, reports, newsletters, and beamer slides in **Overleaf**
- Incorporated **AMS Math package** to write complex mathematical equations and mathematical symbols

Differential Geometry | MA113 Course Project *(Jan'23)*

Guide: Prof. Sudhir Ghorpade, Department of Mathematics

- Taught the topics related to curves in higher dimensions like **curvature**, **torsion** intuitively using **vector calculus**
- Used **Serret-Frenet equations** to prove the **Fundamental Theorem of Space-Curves** and applied them on basic examples like circle and helix

Zara - Business Analysis | SOM101 Course Project *(Sept'23)*

Guide: Prof. Mayank Pareek, Shailesh. J. Mehta School of Management

- Discussed the Vision, Mission, and Goals along with the **SWOT analysis** of the company mentioning relevant sources
- Explained the various parts of Functional Levels, Management Levels, and the Recruitment Process of the company

EnB Buzz | Entrepreneurship Cell, IIT Bombay *(Dec'22)*

Startup pitch competition conducted by E-Cell, IIT Bombay

- Pitched an Ed-Tech startup **Scholizer** that lists local coaching centers in an **interactive app**, designed in **Canva**
- Implemented **Franchise Model** which integrates a union of **trustable** independent coaching centres
- Set course value propositions using **Standardised Rates** and Coaching review through **checkpoints method**

Smart India Hackathon | Govt. of India *(Sep'23 - Present)*

Adressing challenges faced by Ministry of Railways, Govt. of India

- Targeting issues like **Crowd management** using **AI/ML** in the existing CCTV network management
- Implementing **YOLO,DeepSort and Autoencoders** for crowd management, anomaly detection and crime prevention
- Selected among the **top 30 teams** in internal hackathon competition, among **80+ teams** registered from IIT Bombay

Technical Skills

Programming Languages	C++ | Python | LaTeX
Python Libraries	PyTorch | Pandas | Matplotlib | Numpy | Transformers | OpenAI's gym
Software	Autodesk Fusion 360, MATLAB

Courses Undertaken

Mechanical Engineering:	Solid Mechanics and Strength of Materials*, Thermodynamics* Makerspace, Structural Materials*, Solid Mechanics Lab*
Mathematics and Computing:	Linear Algebra, Differential Equations, Differential Calculus, Integral Calculus Computer Programming and Utilization, Programming in Data Science*, Statistical Machine Learning and Data Mining*
Other Courses:	Introduction to Classical Physics, Introduction to Quantum Physics, Chemistry, Biology, Introduction to Design, Introduction to Management

(* - to be completed by Nov 2023)

Positions of Responsibility

Class Representative | First Year B.S Mathematics *(Nov'22-June'23)*

- Handled classroom administration and mediated with professors for the smooth running of courses
- Organised Fresher's Party, Traditional Day, and Department Trip conducted by **Mathematics Association**
- Streamlined the doubts by making relevant **discussion groups** on online platforms.

Organizer | Mood Indigo *(Dec'22)*

Asia's largest college cultural festival | Footfall: 146,000+ | Colleges: 5000+ | Events: 240+

- Assisted in managing events conducted under the **Horizons** department, from managing travel to managing the venue for the artists.
- Helped in documenting the Contact Information of various artists from **India and Abroad** for inviting to perform in the events of Mood Indigo 2022

Extracurricular Activities

- Completed the **Junior Degree** in Hindustani Classical **Vocals** issued by **KSEEB**, Karnataka *('13-15)*
- Professionally trained to play Hindustani Classical **Flute** after a year-long training under NSO-Culturals *('22-23)*
- Bagged the **Best Outgoing Student** award in Class 10th owning to overall excellence *('19-20)*