Akshat Kumar Gupta 200100017
Mechanical Engineering **B.Tech.**
Indian Institute of Technology Bombay **Gender: Male**
DOB: 18/6/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	HSC	Pace Junior Science College	2020	94.31%
Matriculation	ICSE	St. Gregorios High School	2018	95.67%

Pursuing a **Minor** degree in **Management** from SJMSOM (Key Courses: Finance, Project Mgmt.)

SCHOLASTIC ACHIEVEMENTS

- Achieved an **All India Rank 919** in JEE-Advanced 2020 out of **160,000+** candidates
- Attained **99.66 percentile** in JEE-Main 2020 out of **1.1 million** candidates across India
- Secured **All India Rank 63** and provisional admission offer from **IIM Indore** for Integrated Programme in Management after clearing both IPMAT 2020 and subsequent video based assessment
- Qualified the written round of **National Defence Academy** exam among **530,000+** candidates

PROFESSIONAL EXPERIENCE

Winter Intern | Siemens Limited, Kalwa Factory *[Nov '21 - Dec '21]*

- Completed **technical training** on machine maintenance, advanced motor test field operations, transformer manufacturing and testing, assembly and testing of switchgear components
- Trained at **Siemens Technical Academy** to gain hands-on experience in various machining processes
- Developed sound understanding of operation and maintenance of lathe, milling and grinding machines

KEY PROJECTS

SeDriCa | Unmesh Mashruwala Innovation Cell, IIT Bombay *[Jan '21 - Present]*
A cross-functional team of 30+ students developing a self-driving car customized for Indian roads

- **Leading** the **Motion Planning Subsystem** to develop motion planning algorithms for a **UGV**
- Implemented a modified **A* algorithm** on discretised state-time plot for developing a **Dynamic Motion Planner** which finds collision-free trajectory based on velocity modulation of the ego vehicle
- Formulated a novel pipeline leveraging the **Hybrid A*** algorithm for real-time local motion planning of an Ackermann steering ground vehicle capable of collision-free navigation in unstructured environments
- Performed **sensor fusion** to combine obstacle and lane data to form a local **Occupancy Grid Map**
- Built an adaptive **Pure Pursuit controller** for lateral control to achieve real-time path tracking
- Developed a motion planner capable of path planning and trajectory generation with the help of **Model Predictive Control (MPC)** based on a linearised and discretised kinematic bicycle model
- Working on building a fully autonomous simulated vehicle based on **behavioural cloning** approach

Augmented Reality Sudoku Solver | Self-Learning Project *[Aug '21]*

- Designed an **image processing** pipeline to detect numbers from cells of sudoku using **OpenCV**
- Trained a **CNN model** for optical character recognition on MNIST dataset using **TensorFlow**
- Achieved **99.16%** testing accuracy while adding the feature to manually rectify any false identifications
- Utilised the iterative **backtracking** algorithm for solving the sudoku extracted from the image
- Reprojected the solution of sudoku on the original picture using **perspective transformations**

Path-Finding Algorithm Visualiser | Self-Learning Project *[Mar '21]*

- Added options to select between **A*** and **Dijkstra's Algorithm** using the **Tkinter** library
- Created an interactive graphical user interface for this project using the **Pygame** library in python
- Incorporated features such as the capability of user to **draw** obstacles, **select** start and end points
- Achieved **real-time visualisation** of nodes that are being explored by the chosen algorithm

Lasso Game | Course Project | Guide: Prof. Kameswari Chebrolu *[Feb '21]*
- Developed a two-dimensional coin catching game using **simplecpp** graphics library in **C++**
- Simulated **projectile motion** of both coins and lasso with controllable motion parameters
- Added **visual indicators** for score, coins, lives, timer and created a leaderboard of player scores

Web Developer | Radiance, IIT Bombay *[Sep '21]*
- Part of a 4-member team tasked with the development of a **search engine optimised** website
- Planned the design of the Campus Ambassador Portal with **server-side scripting** languages
- Designed the landing page of the website with extensive usage of **HTML** and **CSS**

Application of Corporate Finance Concepts | Course Project *[Nov '21]*
Guide: Prof. Rohan Chinchwadkar, SJMSOM
- Assessed Coal India's **corporate governance** structure and relationship between different stakeholders
- Identified the **average** and **marginal investors** in the company and developed a **risk profile**
- Estimated **cost of equity** using the **CAPM** equation and also the pretax **cost of debt**

Tendon-Driven Soft Robotic Finger | Academic Project *[Jun '22 - Present]*
Guide: Prof. Abhishek Gupta, Dept. of Mechanical Engineering
- Built a **voltage divider** circuit to measure the current flowing into the servo motor using **Arduino**
- Assisted in the collection of experimental data for measuring tension actuated deflection of the finger

2D Strain Measurement | Course Project *[Mar '22]*
Guide: Prof. K.N. Jonnalagadda, Dept. of Mechanical Engineering
- Designed and developed an inexpensive experimental setup for **biaxial tensile testing** of a thin sheet
- Validated theoretical predictions made by semi-inverse method for a biaxially tensed elastic specimen

POSITIONS OF RESPONSIBILITY

Team Manager | Unmesh Mashruwala Innovation Cell, IIT Bombay *[Apr '22 - Present]*
A team that aims to facilitate technical start-ups and foster a culture of innovation and entrepreneurship
- Member of the team in charge of **planning**, **organising** and **publicising** events under UMIC
- **Moderating** and **channeling** information between the Core and the Non-Core team members
- Implementing initiatives to facilitate communication, ease workflow, and ensure documentation
- Presented a yearly budget of **1.2 million INR** to the Student Technical Projects Committee, IRCC
- Conducted multiple **recruitment drives** to select 30+ freshers and sophomores from 250+ applicants

Teaching Assistant | Physics and Math Departments, IIT Bombay *[Dec '21 - Jun '22]*
Courses: Quantum Mechanics and Ordinary Differential Equations
- Created detailed solutions and presented them in hour-long tutorial sessions on a weekly basis
- Solved queries of **100+ students** and conducted extra doubt sessions for students facing difficulties
- Assisted with conducting weekly quizzes and the main exams for the entire course duration

EXTRACURRICULARS

Sports	• Bagged **2nd** position in **district level** karate championship - Mumbai Suburban • Secured **3rd** place in **National** Karate-Do Championship • Completed a one year course on general health and fitness under **NSO**
Culturals	• Won **1st** place in inter-school Annual Hindi Elocution competition • Received **special mention** at the city level of Bournvita Quiz Contest
Social Work	Awarded **Certificate of Appreciation** for the following: • Creating **awareness** and **raising funds** for the care of elderly by HelpAge India and for the care of blind people by National Association For The Blind • Resource mobilisation for humanitarian causes by Indian Development Foundation • **Transcriber** in class 10 board exams for the specially-abled children
Miscellaneous	• Engineered a **Line Follower Robot** as a part of workshop by **ERC** • Completed **Virtual Stock Market** - workshops and competition by **E-Cell** • Researched about **Algorithmic Trading** strategies and **Option Pricing** Models as a part of FinSearch organised by Finance Club, IIT Bombay