Manvi Bengani

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ACADEMIC QUALIFICATIONS

Year	Degree/Certificate	Institute	CPI
2022 - Present	BTech	Indian Institute of Technology Kanpur	**8.6**/10
2022	Class XII (HSC)	Pace Junior Science College, Andheri	93%
2020	Class X (ICSE)	Pawar Public School, Chandivali	98.33%

ACHIEVEMENTS

- Selected in top-5 in **Barclays Women in Banking Mentorship Programme 2024-25** among 200+ candidates   *Jul'24*
- Qualified for Round-2 in **American Express** Campus Challenge 2024 among 4,517 teams   *Jul'24*
- Selected among **Top 45, J.P.Morgan** Chase Quantitative Finance Research Mentorship Program, 2024 out of top 15 IITs   *Jan'24*
- **2 Silver** and **2 Bronze** Medals in individual events and relays at the **Inter-IIT Aquatics Meet 2023**, Gandhinagar   *Oct'23*
- Won **2 silver** medals at **The Sportz Hub Kanpur District** level Swimming competition for individual races   *Jun'23*
- **All India Rank 2877** in Joint Entrance Examination - Advanced, among **top 1%** of shortlisted 0.15 million candidates   *Sep'22*
- **All India Rank 3054** in Joint Entrance Examination - Mains among the top **0.3%** of 1.02 million candidates   *Jul'22*
- **100 Percentile** in MHT CET - Maharashtra Common Entrance Exam, among the 0.28 million shortlisted candidates   *Sep'22*
- **Represented India** in International Level of **Robocup** Junior competition held at **Leipzig, Germany**   *Jun'16*

WORK EXPERIENCE

Quantitative Finance Research Mentorship Program | *J.P.Morgan Chase & Co.*   *Jan'24-Jul'24*

Financial	• Introduced to topics like **Options, Derivatives, Equities, Risk** in workshops conducted by Senior Management • Implemented **Black-Scholes** equation in python to study effect of Strike Price, Expiry, Volitality on option prices • Calculated Value at Risk using **Historical Simulation** approach in different confidence intervals to test effectiveness
Data Science	• Studied, Implemented and tested **Bayes Classifier** on variety of script-generated **Guassian data sets** • Presented entire ML pipeline building strategy, covering steps like data pre-processing, model selection, deployment
Program-ming	• Exposed to application of OOPs, Linear Algebra, Probability and Statistics, SOLID in **Quantitative research** • Simulated an Order Management System based on Price-Time priority rule using Object Oriented Programming

RESEARCH EXPERIENCE

SLAM Algorithms for Autonomous Car Mapping | SURGE'24 | *Prof. Soumya Ranjan Sahoo*   *May'24-Present*

- Explored and evaluated various SLAM algorithms suitable for **autonomous** car **mapping** in unknown environments
- Implemented **ORB-SLAM** algorithm on a simulated car in **Gazebo** with ROS2 using multiple libraries like **Pangolin, g2o**
- Assessment of the performance of the selected SLAM algorithm in terms of accuracy, robustness, and computational efficiency

KEY PROJECTS

F1Tenth | Team IITKMS | *Prof. Manjesh Kumar Singh* | ⌗   *June'23-Jan'24*

- Worked in a two-tiered Formula Student team- **IITK Motorsports** of 50+ members as Junior Team Member.
- Actively participated in the **manufacturing** of IITK's **first EV** presented in Formula Bharat (EV category) 2024
- Working on the development of a simulated F1tenth car for fast racing, using **ROS2** and **Rviz** in a **Dockerised container**
- Employed navigation methods, namely **Automatic Emergency Braking**, **Follow-the-gap** based on LiDAR sensor data
- Integrated a **PID** control algorithm, fine-tuning K_p, K_i, K_d **gain** parameters for precise path following via **Wall following**
- Implemented Vanilla ICP- an **Iterative Closest Point (ICP) variant using a point-to-line metric** for localization through scan matching based on the research publication by **Andrea Censi, ETH Zurich** and visualized using Rviz marker plugins

Decision Science Track | *The American Express Campus Challenge 2024* | ⌗   *Jun'24*

- Predicted cricket match results using various **Boosting Algorithms** based on Primary Dataset of over 900+ match data
- Utilized **3 Secondary Datasets** for making **18 additional** features, and thereby multiple feature importance metrics
- Deployed Random Forest Classifier, Recursive Feature Elimination and Principle Component Analysis to fine tune the Model
- Achieved **65.7%** accuracy on unknown cricket datasets using the **LightGBM Boosting Algorithm** for classification

ISRO Robotics Challenge 2024 (IRoC-U) | *Team Shaurya | Robotics Club IITK*   *Jan'24-Present*

- Collaborated within a team to ideate the mechanical design, controls, vision, path planning modules of a **Mars Rover** Prototype
- Conducted **software identification** of the pick-and-place mechanism and simulated it to integrate on ROS network of Rover
- Successfully navigated through Pre-liminary round and Hardware Realisation Round to Quals-1 with robust submissions

Deep Blue Hackathon Challenge | *Electronics Club and AUV-IITK* | ⌗   *Dec'23*

- Designed a robust Image Processing pipeline to detect and label gates using a bounding box in underwater images
- Utilized **CLAHE** for **image enhancement** including contrast stretching and gamma correction
- Implemented edge detection using **Canny edge detector** and **Probabilistic Hough Line transform** to detect gate boundary
- Employed heuristics strategies based on the proximity of gates to the camera to enhance detection accuracy

Remote Controlled (RC) Car | Course Project: TA212 | *Prof. Shantanu Bhattacharya*   *Aug'23-Nov'23*

- Designed an **RC** miniature car using CAD software such as Fusion360 and Inventor
- Manufactured components using a variety of machinery, including lathes, milling machines, drilling equipment, 3D printer

- Implemented RC functionality utilizing **Arduino UNO** and **Bluetooth** modules for driving two motors with a motor controller

VISION FORGE | *Electrical Engineering Association Senior Student Mentored Project* *Dec'23*
- Learnt Image Processing basics and performed basic operations on an image using Python libraries (Matplotlib, Numpy)
- Used Verilog to **design** and **simulate** combinational and sequential circuits
- Implemented edge detection on an image using **OpenCV** libraries

Traveller Transpiler | Takneek 22 - IIT Kanpur | ⍟ *April'23*
- Developed a **transpiler** for converting Super Stack esolang to IITK traveler language by substantiating with a proof of concept
- Validated the transpiler's correctness, demonstrating its practicality as a bridge between Super Stack and IITK traveler language
- Utilized **C++** to parse and translate input code, ensuring the conversion of Super Stack commands into the IITK traveler language

TECHNICAL SKILLS

Programming Languages	Robotics	Utilities
C/C++, Python, Java, HTML5, CSS, Javascript, MATLAB, Verilog HDL	ROS, ROS2, Gazebo, RViZ, Arduino, Raspberry-Pi, MoveIt	Markdown, LaTeX, Git, Bash, Fusion360, Docker, Solidworks

POSITION OF RESPONSIBILITY

Coordinator | Robotics Club, IIT Kanpur *Mar'24-Present*
- Managing inventory of **Rs 10 Lacs+** and leading a team of **30 secretaries** with **Rs 4 Lacs** budget as Club Coordinator
- **Representing IIT Kanpur** in competitions like World Robotics Championship, GujCOST Robofest 4.0, Techkriti and Techfest
- Working on robots like Maze Solver, Line Follower, Self Balancing Robot, Inverted Pendulum and Battlebot to train the secretaries
- **Organised** lectures with professors, workshops and competitions related to robotics for campus community of **9000+ students**
- Conducted **weekly workshops** in **Singhania School, Kanpur** for **school students** cultivating their interest in robotics
- Conducted **software identification** of the pick-and-place mechanism and simulated it to integrate on ROS network of Rover
- Successfully navigated through Pre-liminary round and Hardware Realisation Round to Quals-1 of **ISRO Rover Challenge'24**

Leadership	• Leading a **two-tier** team comprising of **30 secretaries** to spread the domain of Robotics in Campus and beyond
Management	• Planned **4 semester projects** & selected 45+ mentees out of **300+** applications through recruitment test • Managed budget worth **INR 4 Lakh** and Inventory worth **INR 10 Lakh** under Science and Technology Council
Initiative	• Participating in National level - **RoboFest 4.0, ISRO Rover Challenge** and International level - **WRC**, Delhi • **Conducted interactive sessions** for the students of Singhania School, Kanpur **every week for whole year** • **Boosting** publicity via revamped Web Page, active Instagram Page, and other live exhibits like SnT Pavillion

Academic Mentor - PHY113 (Classical Electrodynamics) | Counselling Service, IIT Kanpur *Aug'23-Mar'24*

- Guided **30** freshman students in solving academic hardships faced in the course
- Conducted Doubt Clearing Sessions for **400+** students facing issues related to vector calculus in physics

RELEVANT COURSEWORK **Ongoing courses*

Electronics and Electrical
Introduction to Electronics
Signals, Systems & Networks
Introduction to Electrical Engineering
Analog Electronics
Control System Analysis

Mathematics
Linear Algebra
Ordinary Differential Equations
Complex Analysis
Partial Differential Equations
Probability & Statistics

Computing
Fundamentals of Computing (C language)
Physics
Quantum Physics
Electrodynamics

EXTRACURRICULAR ACTIVITIES

Aquatics	• **Captain,** Institute Aquatics Team IITK (Girls), thereby responsible for team trials, regular training, nutrition, conduction of **Summer camp** and performance at Inter-IIT and other Aquatics competitions in relays and races • Awarded **Sportsman of the Year'24** and **Player of the Summer Camp'23** for exceptional performance • Won **2 silver** medals at **The Sportz Hub Kanpur District** level Swimming competition for individual races • Received multiple Cash prizes for winning **4 medals** in Inter-IIT Aquatics meet 2023 in team and individual races
Technical	• Worked in a two-tiered Formula Student team- **IITK Motorsports** of 50+ members as Junior Team Member. • Actively participated in the **manufacturing** of IITK's **first EV** presented in Formula Bharat (EV category) 2024 • Organized a successful 3-day exhibition introducing past Formula Cars of the team to over 1200 freshman students
Social	• **Academic Mentor**, Guided 30 freshman students in solving hardships faced in Classical Electrodynamics • **Volunteer Tutor, Prayas**,guided four students for their Class 12 Board Exams and CLAT English in 2022 • **Volunteer**, Organized a Madhubani Painting Workshop to support artists in Bihar affected by lockdown
Managerial	• **Secretary**, Electrical Engineering Association took part in organizing farewell for over 250+ department graduates • **Content and Outreach**, Contributed to the media presence of EEA on multiple platforms