

# Manvi Bengani

Third Year, Department of Electrical Engineering  
Indian Institute of Technology Kanpur

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## EDUCATIONAL QUALIFICATIONS

Year	Degree/Certificate	Institute	CPI/%
2022 - Present	B.Tech	Indian Institute of Technology Kanpur	8.5/10
2022	Class XII (HSC)	Pace Junior Science College, Andheri	93%
2020	Class X (ICSE)	Pawar Public School, Chandivali	98.33%

## SCHOLASTIC ACHIEVEMENTS

- **All India Rank 2877** in Joint Entrance Examination - Advanced, among 250,000 shortlisted candidates in India [Sep'22]
- **99.6 Percentile** in Joint Entrance Examination - Main, 2022 among 1.3 million candidates in India [July'22]
- **100 Percentile** in MHT CET - Maharashtra Common Entrance Exam, among 428,000 candidates in India [Sep'22]
- Ranked **2nd** in Pawar Public School, Chandivali, ICSE Board exams and awarded with cash prizes [Mar'20]
- **Youngest team** to participate in **International Level of Robocup Junior - 2016** competition held at Germany [June'16]
- **Runner-up** position in National Level of Robocup Junior competition held at Bangalore [Nov'15]

## OTHER ACHIEVEMENTS

- **Bronze medal** in **RoboQuest** No Prep PS by Rigbetels Lab at the **Inter IIT Tech Meet 13.0** held at IIT Bombay [Dec'24]
- 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]
- **Top 45, J.P.Morgan Chase** Quantitative Finance Research Mentorship Program, 2024 out of top 15 IITs [Jan'24]
- **Silver** and **Bronze** Medals in individual events and relays at the **Inter-IIT Aquatics Meet 2024**, Indore [Oct'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]

## RESEARCH EXPERIENCE

### SURGE

[May'24 - Aug'24]

Faculty Advisor: Prof. Soumya Ranjan Sahoo | 🌐

- 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

## PROJECTS UNDERTAKEN

### SWARNA: RL based Centralized Intelligence for Swarm Navigation

[Dec '24]

Inter IIT Tech Meet 13.0, IIT Bombay | 🌐

- Implemented a PPO-based RL algorithm to autonomously explore unknown environments for scalable swarms. Tested it up to 6 turtles in 2 different sized Gazebo Environments with SLAM G-Mapping and Nav2 packages while avoiding dynamic obstacles
- Integrated Depth Camera plugin on Turtle Bot to run YOLOv3 for Object detection and labeling, storing the co-ordinates in a YAML
- Implemented a delivery task allocation algorithm to coordinate bots in the swarm in least time

### RoboQuest: Rigbetels Lab

[Dec '24]

Inter IIT Tech Meet 13.0, IIT Bombay | 🌐

- Spawned multiple copies of Tortoise bot in Gazebo, used Google Cartographer for mapping while autonomously exploring environment
- Built a Lidar based map using Tortoisebot of given environment with Teleop, then implemented Localization using ORB-feature matching

### F1Tenth

[Jun'23 - Jan'24]

Faculty Advisor: Prof. Manjesh Kumar Singh and Prof T.Tripathy | Team IITKMS | 🌐

- Working on the development of an F1tenth car for fast racing, using a containerized simulation environment
- Employed reactive navigation methods, namely **Automatic Emergency Braking, Follow-the-Gap, Wall-Following**
- Integrated a **PID** control algorithm, fine-tuning  $K_p, K_i, K_d$  **gain** parameters for precise path following
- Implemented an **ICP variant using a point-to-line metric** for localization through scan matching

## RELEVANT COURSEWORK

### Electronics and Electrical

- Introduction to Electronics, Signal System and Networks, Analog Electronics, Digital Electronics, Power System Analysis, Principles of Communication Systems, Electromagnetic Theory\*

### Mathematics and Statistics

- Linear Algebra, Ordinary Differential Equations, Complex Analysis, Partial Differential Equations, Probability and Statistics

### Robotics and Machine Learning

- Introduction to Machine Learning, Robot Manipulators: Dynamics And Control, Control System Analysis

### Pure Sciences and Computing

- Classical Electrodynamics, Quantum Physics, Fundamentals of Computing (C language)

\* Ongoing Courses

## TECHNICAL SKILLS

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- **Programming** C, C++(primarily), Python, Java, HTML, CSS, Javascript, Verilog HDL, MATLAB
- **Tools and Libraries:** Numpy, OpenCV, TensorFlow
- **Robotics and Electronics:** ROS, ROS2, RViz, Gazebo, SLAM toolbox, Arduino
- **Utilities:** Markdown,  $\LaTeX$ , Git, Fusion360, SolidWorks, Cura, Docker, Bash Scripting

## POSITIONS OF RESPONSIBILITY

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### Coordinator

[Mar'24 - Present]

*Robotics Club, IIT Kanpur*

- Recruited and mentored 120 freshers in basics of robotics for 2 months as a part of the program RoboDive
- Organized various Intra-campus competitions and robotics hackathons like Robothon, Simulation Challenge and Takneek for campus
- Took part in **Micromouse** and **Fastest Line Follower** at the Technoxian World Robotics Championship, Delhi
- Participated in **TechFest, IITB** in divisions of **Cozmoclench** and **Meshmerize** and won Zonal level of Meshmerize held at Jaipur
- Managing a budget of **INR 3,00,000+**, and Inventory worth 10 lakhs allocated to the club for various activities

### Junior Technical Member

[Feb'23 - Feb'24]

*Team IITK Motorsports*

- Active junior member of IITK's Student Formula Car Racing Team, participating in Formula Bharat (EV category) 2024
- Organized a successful 3-day exhibition introducing past Formula Cars of the team to over **1200** freshman students
- Contributed to the development of IITK's first student-built electric vehicle's Data Acquisition System

## EXTRACURRICULAR SKILLS & ACHIEVEMENTS

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- **Swimming Team Captain**, Currently leading the Swimming Team at IITK overseeing training and competitive participation
- Awarded **Sports Performer Of The Year** for exceptional achievements in representing IITK's aquatics
- **Swimming**, Participated in various swimming competitions since the age of 8 and was awarded **Player of the Summer Camp** in IITK in June 2023
- **Volunteer Tutor, Prayas**, Mentored and guided four students for their Class 12 Board Exams and CLAT English in 2022
- **Volunteer**, Organized a Madhubani Painting Workshop to support artists in rural areas affected by pandemic-related lockdown
- **Inferno**, Won a Silver and Bronze medal in Basketball and Football, respectively, as part of the inter-hostel sports competition
- Avid reader, painter and Potterhead