Manvi Bengani

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Educational Qualifications

Year	Degree/Certificate	Institute	CPI/%
2022 - Present	B.Tech	Indian Institute of Technology Kanpur	**8.73**/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]
- **All India Rank 3054** in Joint Entrance Examination - Main, 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]

Projects Undertaken

Mobile Robotics Lab [Dec'23 - Present]

Faculty Advisor: Prof. Shakti S. Gupta

- Procurement and integration of an air pressure sensor for a quadruped bot leg
- Integration of sensor, lights and buzzer on the robot using **Arduino NANO RP2040** and establishing a working pipeline to the ROS network of the quadruped
- Executed in-depth studies on brushless DC (**BLDC**) motors to optimize the mass of the actuator model

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

Deep Blue Hackathon Challenge [Dec'23]

Organized by Electronics club and Team AUV-IITK |

- Designed a robust Image Processing pipeline to detect and label gates in underwater images
- Utilized CLAHE for **image enhancement** including contrast stretching and gamma correction followed by 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
- Marked images with bounding box to enclose the gate and locate the centre point

Remote Controlled(RC) Car [Aug'23-Nov'23]

Faculty Advisor: Prof. Shantanu Bhattacharya *Course Project*

- 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 features utilizing **Arduino UNO** and **Bluetooth** module for driving two motors with a motor controller

ISRO Robotics Challenge 2024 (IRoC-U) — Team Shaurya [Jan'24-Present]

Faculty Advisor: Prof. Shakti S. Gupta

- Collaborated within a team to plan and document the mechanical design, controls, vision, path planning modules, **Pick and Place** algorithm and ROS network of a **Mars Rover** Prototype
- Conducted **software identification** of the pick-and-place mechanism and emergency response system
- Successfully submitted and qualified the project design in the design phase-1 of the challenge on January, 2024

MathWorks Challenge: Data Collection and Visualization [Oct'23-Nov'23]

- Conducted telemetric data collection on an all-terrain vehicle, utilizing IMU, GPS and plotted results using MathWorks tool
- Analyzed Tire Pressure Monitoring System (**TPMS**) data using MATLAB, and employing **PCA** techniques for analysis
- Applied **PCA** to analyze pressure v/s temperature, determining the outliers and detecting leaks for enhanced reliability

Traveller Transpiler [Apr'23]

Takneek 22 - IIT Kanpur |

- Developed a **transpiler** for converting Super Stack esolang to IITK traveler language with extensive use of C++
- Utilized **C++** to parse and translate input code, ensuring the accurate conversion of Super Stack commands into the predefined IITK traveler language constructs

Technical Skills

- **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

Relevant Coursework

Electronics and Electrical

- Introduction to Electronics, Signal System and Networks, Introduction to Electrical Engineering*, Analog Electronics*, Control System Analysis*

Mathematics and Statistics

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

Pure Sciences and Computing

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

* Ongoing Courses

Positions of Responsibility

Junior Technical Member [Feb'23 - Jan'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

Academic Mentor - PHY113 (Classical Electrodynamics) [Aug'23 - Present]
Counselling Service, IIT Kanpur

- 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

Extracurricular Skills & Achievements

- **2 Silver** and **2 Bronze** Medals each in individual events and relays at the **Inter-IIT Aquatics Meet 2023**
- **Swimming**, Participated in various swimming competitions since the age of 8 and was awarded **Player of the Summer Camp** in IITK in June 2023
- **Selected** as a mentee (Top 60) for the **JPMorgan Chase Quantitative Finance Mentorship Program, 2024** among **1000+** female students from various IITs after two selection rounds
- **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