

VAISHNAVI KULKARNI

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[Project Portfolio](#) [Linkedin](#)

Profile Summary

Final-year B.Tech student in Electrical and Electronics Engineering at MIT Manipal with a strong foundation in control systems, VLSI design, and AI applications. Experienced in FPGA-based system design, real-time control, and data acquisition systems, with hands-on expertise in tools such as MATLAB, Siemens MAGNET, Xilinx Vivado, and LabVIEW. Proven track record in interdisciplinary research and competition-winning projects spanning automation, embedded systems, and reinforcement learning. Adept at bridging hardware-software integration, with a keen interest in applying advanced computational and electronic design skills to large-scale scientific research environments.

Education

Bombay Scottish School, Mahim, Mumbai <i>High School , 98.5%</i>	2008 – 2020
PACE Junior Science College, Dadar, Mumbai <i>Intermediate / +2, 83.5%</i>	2020 – 2022
Manipal Institute of Technology, Manipal <i>BTech. Electrical and Electronics Engineering, 8.85 CGPA (as of 7th semester)</i>	2022 – 2026

Achievements

- **Intelligent Ground Vehicle Competition (IGVC) 2024** : 1st place Design Challenge, 4th Overall - Project MANAS
- **Student Unmanned Aerial Systems (SUAS) 2024** :Placed 4th Mission Demonstration - Project MANAS
- **IET Student Prize** (2024)
- **Rank 1 in Branch** (as of 7th semester) (2025)

Skills

- **PCB Design & Hardware Development:** KiCad
- **Motor & Electromagnetic Simulation:** Siemens MAGNET, ANSYS
- **Control Systems & Embedded Development:** NI LabVIEW, Xilinx Vivado, Vitis HLS, Code Composer Studio, Keil micro-Vision, MATLAB/Simulink
- **FPGA & Digital System Design:** Verilog, VHDL, Partial Reconfiguration (Artix-7, Zynq-7000)
- **AI & Machine Learning for Automation:** TensorFlow, PyTorch, Gymnasium, ROS
- **Quantum Computing:** Qiskit
- **Programming Languages:** Java, Python, C, C++, FORTRAN, Assembly, Verilog, VBS, ~~L~~**A**T~~E~~**X**
- **3D Modeling & Fabrication:** Fusion 360, Custom 3D Printing

Internships

Bhabha Atomic Research Centre (BARC) <i>Research Intern - Controls and Instrumentation Division</i>	May 2025– July 2025 <i>Mumbai</i>
<ul style="list-style-type: none">• Worked on Vibration Monitoring and Analysis System (VMAS).• Developed a fully automated LabVIEW system for VMAS: signal generator control, Ethernet-based configuration, waveform display, and signal processing (RMS, DC, SNR) along with multi-iteration curve fitting and regression for ADC calibration.• Explored FPGA partial reconfiguration on Zynq-7000 to enable dynamic sampling rate adjustment.	

- Implemented control of a SPIM using TI F28379D and SEMIKRON inverter stack.
- Enabled real-time parameter tuning via Code Composer Studio.
- Conducted FEA simulations in Siemens MAGNET and ANSYS to analyze electromagnetic, thermal, and mechanical performance and optimized motor parameters to improve efficiency and torque output.

Experience

Project MANAS — AI and Robotics Student Project

2023– 2025

AI Member

Manipal Institute of Technology

- Engineered a drop point detector from drone-captured images boosting YOLO accuracy from 76% to 94%.
- Developed a person detection and identification system with Siamese networks for face recognition using dashcam footage.
- Implemented and evaluated goal generation and real-time path planning algorithms for an autonomous ground vehicle, optimizing navigation efficiency and obstacle avoidance.

Projects

Honors in FPGA based digital system design

2025– Present

FPGA based inference of AI models

Manipal Institute of Technology

- Designed and implemented a simulated, user-configurable cache architecture on an Artix-7 FPGA, supporting both direct-mapped and set-associative modes.
- Currently investigating partial reconfiguration and reconfigurable cache architectures for accelerating image processing workloads on FPGA platforms.

Minor Specialization in Control Systems

2025– Present

Reinforcement Learning based Non-Linear Model Predictive Control

Manipal Institute of Technology

- Implementing a hybrid control system for a batch reactor, combining Model Predictive Control with Reinforcement Learning to enhance process efficiency and control performance.

Quadruped Robot Development (Ongoing)

June 2025– Present

Personal Project

- Designing and building a quadruped robotic platform primarily using a Raspberry Pi 4B and custom 3D-printed components.
- Developed the base mechanical structure and integrating an AI-based navigation system for autonomous operation.
- Currently designing a custom PCB for centralized power distribution and signal routing to optimize system reliability and wiring efficiency.

Extracurriculars

- **Project MANAS** - Senior AI Member [2023-2025]
- **IECSE Manipal** - Working Committee Member [2022-23]
- **Research Society Manipal** - Working Committee Member (Mathematics and Physics Division) [2024-present]

Relevant Courses

Signal Processing | Digital System Design | Control Theory |
Electromagnetic Field Theory | Advanced Computer Architectures |
Analog System Design | Microcontrollers | Measurement and Instrumentation |
Cryogenic Electronics for quantum computing | Research Methodology