

Statement of Purpose

Tanishq Kanare, B.Tech. Applicant

Subject: Application for Research Internship – Development of Embedded Systems and Sensors for Environment and Air Pollutant Monitoring

I am a final year student pursuing Bachelor of Technology in Electronics and Communication Engineering from College of Technology and Engineering, MPUAT, Udaipur, Rajasthan. (graduating in 2025). My **inclination towards Core Electronics and Embedded systems** has blossomed into a strong resolve for a career in embedded systems and internet of things (IOT). Till now, during my undergraduate journey **I produced a total of 5 noteworthy projects** under the mentorship of eminent advisors and professors. My projects are complemented by my **academic performance** – recognized with **top 15%** of meritorious students of my batch. My undergraduate experience culminated broad interest in Embedded Systems, Cyber Security, Ethical Hacking, Internet of Things, PCB design, Firmware development, Embedded c/c++ and Robotics Design using Solid-works and ANSYS. With the technical skills I have amassed, I feel confident and excited to undertake the prestigious research internship at Indian Institute of Technology, Bombay.

Air pollution poses one of the gravest threats to both public health and the environment. Finding innovative, technology-driven solutions to monitor and mitigate this issue is not just a scientific challenge—it's a moral imperative. I am committed to being part of this solution. This project, which integrates embedded systems and cutting-edge sensor technology, offers an incredible opportunity to contribute to a field that has the potential to transform how we approach environmental health and sustainability. **The ability to develop systems that can precisely measure and monitor pollutants in real time is what draws me most to this project.**

- Below are my background, skills and experience relevant to the project:

- I. Internship in Cyber Security and Ethical Hacking from CDAC-Kolkata:** During this rigorous internship at CDAC, I performed a project of penetration testing for a virtual machine¹. I gained strong knowledge about vulnerabilities and network protocols. I can implement the same the same in Embedded systems and can make the whole system secure to vulnerabilities.
- II. Internship at Pantech Pro-Labs:** I have interned with this company and a **developed a two major projects** in the field of embedded systems, iot and pcb design. I had the opportunity to work with a wide range of microcontrollers, including the ESP32 and 8051, and developed skills in sensor integration, PCB design, and real-time data acquisition—all of which are critical to the successful execution of this project. **I developed a project on monitoring the predictive maintenance of a duct fan using vibration sensor, matlab, thingspeak and esp32[#].** Additionally, my exposure to IoT analytics platforms like ThingSpeak has provided me with a solid understanding of how to process and interpret data from interconnected devices, making me well-prepared to handle the challenges of monitoring and managing air pollutants. I **also designed the layout of 8051 microcontroller using Allegro.**
- III. Internship at ROBO-AI:** Here, I **designed and analysed two real life robots** using Solid-works and ANSYS. First robot was a quad legged robot and the second

1: <https://github.com/Tanishq-Kanare/CDAC-projects>

#: <https://github.com/Tanishq-Kanare/Predictive-maintenance-of-duct-fan>

robot was an **Earthquake rescuer robot**⁺.

IV. I also produced and developed a project associated with my college, which was a **High Impedance Differential probe**^{*}. The **hot and cold testing** was done; and a valid **pcb was printed** for this project which turned out to be completely successful and I learnt a lot of things of Analog electronics and EDC during the development of this project.

- Looking toward the future, **my career goal** is to specialize in the development of IoT-based embedded systems for applications in environmental monitoring and sustainable development. **This internship represents a pivotal step in my journey.** By working on this project at IIT Bombay, **I will have the opportunity to collaborate with renowned experts in the field, refine my technical abilities, and further deepen my understanding of how cutting-edge technology can be leveraged to address critical environmental issues.** This experience will provide the foundation upon which I intend to build a career centred on developing scalable, impactful solutions for environmental preservation. **The chance to contribute to this research at IIT Bombay is not only aligned with my long-term professional aspirations but is also an opportunity to be part of a project that has the potential to make a tangible difference.**
- Furthermore, my work as an Embedded Systems Design Intern at Pantech, provided valuable experience in system optimization and performance enhancement, enabling me to deliver solutions that are not only innovative but also highly efficient. I am particularly excited by the technical challenges this project presents and am eager to contribute my knowledge of microcontroller programming, sensor calibration, and data transmission protocols to ensure its success.

Attached is my resume for consideration: [Tanishq Kanare Resume](#)

Thanking You

Sincerely

Tanishq Kanare

Final Year Student (ECE) at CTAE, MPUAT, Udaipur, Rajasthan

Phone: +91-6350239843

Mail: kanaretanishq312@gmail.com

⁺: <https://github.com/Tanishq-Kanare/3-D-helper-robot-model> ; <https://github.com/Tanishq-Kanare/Rescue-Robot>

^{*}: <https://github.com/Tanishq-Kanare/High-Impedance-Differential-Probe>