

ATHARVA PRASHANT KALE

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EDUCATION

Northeastern University, Boston, MA

Dec 2026

Candidate for Master of Science in Internet of Things

Courses: Wireless Sensor Networking, Machine Learning, Hardware Security, Spectrum Policy

MES Pillai College of Engineering, Mumbai, India

May 2023

Bachelor of Engineering in Electronics and Telecommunications Engineering

Courses: Electronics Device and Circuits, Digital Systems Design, Electronic Instrumentation & Control System, Microcontrollers, Linear Integrated Circuits, Signals and Systems, Random Signal Analysis, Digital VLSI

TECHNICAL SKILLS

- **Programming Languages & Scripting:** C, C++, Embedded C, Python, Verilog, VHDL, Assembly
- **IoT & Communication Protocols:** MQTT, CoAP, HTTP, TCP/IP, I2C, SPI, UART, GPIO
- **Microcontrollers & Platforms:** ESP32, Raspberry Pi, LPC2148, MSP430, Arduino, Xilinx FPGAs, Tang Nano, ARM
- **Hardware & PCB Design:** PCB Design (Altium, EagleCAD, KiCad), Circuit Simulation (LTSpice, Proteus), Schematic & Layout, Oscilloscope Debugging
- **EDA & Simulation Tools:** Xilinx Vivado, GOWIN IDE, MATLAB, SolidWorks PCB, CCS IDE, AutoCAD

RELEVANT EXPERIENCE

Broad Net India Pvt. Ltd. – Mumbai, India

Jan - Jun 2023

Hardware and Network Engineering Intern

- Configured and deployed routers, modems, and switches for residential and commercial clients, ensuring <1% packet loss and consistent connectivity.
- Engineered static IP setups, DNS routing, and firewall rules to enhance network uptime and reduce unauthorized access incidents by 20%.
- Calibrated and tested fiber-optic connections to validate link integrity and optimize throughput.
- Diagnosed and executed firmware updates and remote troubleshooting on customer-premises equipment (CPE), reducing downtime by ~30%.
- Authored and standardized signal testing protocols in collaboration with senior engineers, improving QA efficiency and documentation clarity.

ACADEMIC PROJECTS

FPGA-Based Ring Oscillator PUF for Secure Key Generation

Jan - Apr 2025

Tools: Verilog, Tang Nano 20K (GW2A-LV18QN88C8I7), GOWIN IDE, MATLAB, Oscilloscope

Goal: Implemented a hardware security primitive on FPGA to generate device-unique cryptographic keys using manufacturing variations - eliminating the need for secure key storage.

- Engineered a Ring Oscillator-based PUF architecture in Verilog using 128 oscillator pairs for unique key generation through silicon-level entropy.
- Automated collection of 30+ PUF responses using Python and LED-based visual decoding; achieved 85% entropy and 95%+ repeatability across power cycles.
- Validated oscillator stability via oscilloscope testing and resolved timing violations using GOWIN IDE to ensure reliable post-silicon performance.
- Analyzed and visualized security metrics in MATLAB, including randomness, Hamming Distance, and bit-level stability to confirm cryptographic viability.

Formula Bharat - Hyperion Racing Team (SAE)

May 2022 - Feb 2023

Tools: Proteus, EagleCAD, SolidWorks PCB, DAQ, Oscilloscope

Goal: Design and validate a safety-critical BSPD (Brake System Plausibility Device) for electric racecar.

- Designed and simulated a logic-IC-based BSPD circuit for real-time braking fault detection using analog-digital control.
- Constructed the wiring harness and system schematic in SolidWorks; validated electrical design through DAQ and oscilloscope testing.
- Executed full-board validation for FSAE compliance and safety certification.
- Optimized safety logic through performance analysis and response-time tuning.
- Troubleshoot real-time hardware failures during track testing and coordinated cross-functional debugging efforts.

Landmine Detection Robot

Jul - Dec 2021

Tools: Embedded C, RF Module, GPS, GSM, UART

Goal: Build a GPS-enabled robotic system for detecting buried metallic landmines and reporting their coordinates.

- Built and programmed a terrain-capable robot using LPC2148 microcontroller for autonomous landmine detection.
- Programmed control and detection logic in Embedded C; validated sensor accuracy across multi-terrain conditions.
- Enabled remote operation via RF modules; integrated GPS-GSM modules to relay live location of threats.

CERTIFICATIONS

- C Programming for Embedded Applications - LinkedIn Learning **May 2025**
- IoT Foundations: Fundamentals - LinkedIn Learning **May 2025**
- IoT Wireless & Cloud Computing Emerging Technologies - Yonsei University (Coursera) **Aug 2022**
- Digital Circuit Design using Virtual Labs - IEEE-PCE **Aug 2022**
- Introduction to Internet of Things and Embedded Systems - UC Irvine (Coursera) **Jul 2020**

LEADERSHIP ACTIVITIES

- 1) **Electronics Head of Hyperion Racing Team, Formula SAE Team** **Jun 2022 - Apr 2023**
- 2) **Vice Chairperson of IEEE PCE Student Chapter** **Jun 2022 - Apr 2023**
- 3) **Graphics Head at Journal Team, IEEE PCE, and Hyperion Racing Team** **Jun 2020 - Apr 2023**