ATHARVA PRASHANT KALE

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SUMMARY

IoT & Automation Engineer specializing in industrial control systems and infrastructure modernization. Proven track record at MassDOT engineering migration strategies for legacy mixed-vendor environments (ControlNet to EtherNet/IP) and diagnosing complex SCADA faults. Experienced in designing safety-critical automotive electronics and hardware security primitives.

EDUCATION

Northeastern University, Boston, MA   **Dec 2026**
Candidate for Master of Science in Internet of Things

MES Pillai College of Engineering, Mumbai, India   **May 2023**
Bachelor of Engineering in Electronics and Telecommunications Engineering

TECHNICAL SKILLS

- **Programming Languages & Scripting:** C, C++, Embedded C, Python, Verilog, VHDL, Assembly, PLC Ladder Logic
- **Industrial Automation & SCADA:** Allen-Bradley ControlLogix (Studio 5000, RSLogix 5000), Schneider Modicon Quantum (Concept 2.6, Unity Pro), Emerson PACSystems RX3i (Proficy Machine Edition), Honeywell IPCS/Experion, VFD configuration
- **IoT & Communication Protocols:** MQTT, CoAP, TCP/IP, I2C, SPI, UART, GPIO, SCADA, PROFINET, EtherNet/IP, ControlNet, DLR (Device Level Ring), REP
- **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, SolidWorks Electrical, CCS IDE, AutoCAD, Factory I/O

RELEVANT EXPERIENCE

Massachusetts Department of Transportation (MassDOT) – Boston, MA   **Jan 2026 - Present**
Highway Engineering Co-op – District 6 (M/E/C Building Systems)

- **Infrastructure Modernization:** Engineered migration strategy for legacy ControlNet PLCs to EtherNet/IP architecture across 10+ vent buildings, utilizing Stratix 5800 switches and Device Level Ring (DLR) topology.
- **Hardware Engineering:** Specified replacement architecture for obsolete ControlNet fiber adapters using 1756-EN2TR modules and SFP transceivers to maintain dual-path redundancy in critical life-safety systems.
- **Diagnostics:** Troubleshoot mixed-vendor environments (Allen-Bradley ControlLogix, Schneider Quantum, Emerson RX3i) using Honeywell IPCS SCADA to resolve communication faults and logic failures in tunnel ventilation sequences.

Broad Net India Pvt. Ltd. – Mumbai, India   **Jan - Jun 2023**
Hardware and Network Engineering Intern

- Configured routers, switches, and firewalls for residential/commercial clients, optimizing DNS routing to reduce packet loss to <1% and improve uptime.
- Conducted fiber-optic signal calibration and authored technical SOPs for signal testing procedures, improving team training efficiency.

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

- **Implemented** a hardware security primitive on **Tang Nano 20K FPGA** to generate device-unique cryptographic keys, eliminating the need for secure non-volatile memory storage.
- **Synthesized** 128 Ring Oscillator pairs in Verilog to exploit manufacturing variations, achieving **85% entropy** and **95% reliability** across voltage/temperature cycles.
- **Analyzed** bit stability using MATLAB and verified frequency behavior with oscilloscope measurements, resolving synthesis timing violations in GOWIN IDE.

Formula Bharat - Hyperion Racing Team (SAE)   **May 2022 - Feb 2023**
Tools: Proteus, EagleCAD, SolidWorks PCB, SolidWorks Electrical, DAQ, Oscilloscope

- **Designed** a safety-critical **Brake System Plausibility Device (BSPD)** using discrete logic **to cut ignition and close throttle** during faults, ensuring compliance with FSAE rules.
- **Developed** the complete low-voltage wiring harness and dashboard schematics in **SolidWorks Electrical**, validating signal integrity under engine noise conditions.
- **Debugged** in-track electrical issues during endurance testing, coordinating sensor calibration fixes with the powertrain team.

LEADERSHIP ACTIVITIES

Electronics Head of Hyperion Racing Team, Formula SAE Team   **Jun 2022 - Apr 2023**
- Led electronics subsystem design for combustion vehicle and managed team logistics.

Vice Chairperson, IEEE PCE Student Chapter   **Jun 2022 - Apr 2023**
- Coordinated technical workshops and managed event logistics for 100+ students.