SKANDHAN KARTHIKEYAN

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SKILLS

Programming & Software - C, C++, Python, MATLAB, Simulink, PyTorch, ROS2, Linux, Git, SQL
Hardware - FreeRTOS, PCB design (EasyEDA), I²C, SPI, UART, CP2102 USB
Tools & Simulators - CARLA, IsaacSim, MuJoCo, Unity, SolidWorks, Fusion 360, AutoCAD, P-Scope
Concepts - TinyML, Signal Processing, Design of Mechatronic Systems, Process Optimization Probability Theory, Instrumentation & Control, Data Structures & Algorithms

EXPERIENCE

Course Assistant - TinyML, ESE3600, Penn, USA *Aug 2025 - Nov 2025*

- Transitioned workflows from Arduino IDE to PlatformIO (ESP-IDF), adapting codebases for Seeed Studio XIAO ESP32S3 Sense microcontrollers and reimplementing lab assignments to reduce inference latency.

Embedded Systems Intern - Blooming Mill, JSW Steel, India *Jun 2023 - Jul 2023*

- Devised a microcontroller-based diagnostic unit capturing deformation signals from the blooming mill, improving anomaly detection response time by 30%.

Controls Engineer - Electronics Club, IITM, India *Apr 2022 - Apr 2024*

- Designed a custom ESP32-C3 PCB for "VersaGrip," an assistive device with actuation accuracy and developed real-time closed-loop control with safety interlocks, enabling over 50 human-subject trials at R2D2, IITM.

RESEARCH & PROJECTS

StackX : Autonomous Pick-and-Place Challenge *Aug 2025 - Nov 2025*

- Engineered a pick-and-place pipeline integrating perception, planning, and control and executed closed-loop feedback using vision and force sensors to correct object shift, reduced placement misalignment by 4 mm.

BattleBots : WiFi-controlled RC Car *Aug 2025 - Nov 2025*

- Implemented encoder-based feedback for position control and optimized PID gains for consistent traversal.

Synthase : Local PDF Summarizer *May 2025 - Jul 2025*

- Created an offline, multi-level PDF summarizer pipeline combining transformer-based embedding extraction, relational semantic graph construction (D3.js), and local keyword extraction for contextual understanding.

LiDAR- and Camera-based Navigation for Lane-Keeping on Semi-structured Roads *Nov 2024 - May 2025*

- Built a lightweight ML-based decision system for semi-structured roads, maintaining < 0.25 m lateral error bounds under different weather and terrain conditions.

Delay Compensation in Networked Robotic Systems *Sep 2024 - Feb 2025*

- Designed an observer-based mechanism for a mobile robot system during transition, using Delayed Self Reinforcement (DSR), leading to a reduction in cohesion loss by 33%.

Interparticle Force Analysis (Research Internship - North Carolina State University) *Jun 2024 - Aug 2024*

- Established a non-invasive technique for interparticle friction evaluation. Improved the computation and temporal efficiency of PeGS by 50% and 35%, respectively. NSF ID: 2104986, titled Mechanics of Granular Materials.

Digital Twin Development, IITM-Accenture Collaboration *Jan 2024 - May 2024*

- Modeled a Unity-based thermal digital twin for a custom 3D printer achieving ~12% thermal-prediction error.

EDUCATION

University of Pennsylvania (Penn), Philadelphia, USA *(Expected) May 2027*
Master of Science in Mechanical Engineering & Applied Mechanics (Mechatronics and Robotics Systems)

Indian Institute of Technology Madras (IITM), Chennai, India *Jul 2025*
Bachelor of Technology in Mechanical Engineering (GPA : 3.89/4.00)

ACHIEVEMENTS

- Best Presentation, *Young Investigator Workshop*, International Soft Matter Conference (2024)

- Ranked among the top 0.24% in JEE Main 2021 and top 1.69% in JEE Advanced 2021 nationwide.