

# PIYUSH TANDON

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## EDUCATION

University of Washington | Seattle, WA

Aug 2024

Master of Science in Mechanical- Mechatronics

GPA: 3.72/4.0

Thapar Institute of Engineering and Technology | Punjab, India

Jul 2021

Bachelor of Engineering in Mechanical Engineering(CS Minor)

GPA: 8.13/10.0

## SKILLS

**Hardware and Firmware:** PCIe, I2C, SPI, UART, CAN, BMC, BIOS, TCP/I, HTTPS, NVMe validation, CUDA Toolkit, ROCM, TensorFlow, PyTorch,

**Validation and Testing Tools:** Selenium, Robot Framework, Jenkins, Pytest, GDB, JTAG, Oscilloscopes, RTOS, Gtest, Logic Analyzers,

**Programming and Scripting:** C, C++, Python, SQL, Python Scripting, Bash Scripting, Shell Scripting, **OS and Virtualization:** Windows, Linux

(RedHat, Ubuntu), PXE Boot, Kickstart, KVM, Docker, Kubernetes, **Data Analysis and Monitoring:** JMeter, LoadRunner, NVIDIA Nsight Systems,

MATLAB, Power BI, Tableau, **Processors and Controllers:** Raspberry Pi, Jetson Nano, ARM Cortex-M, STM, RISC-V, Intel Xeon-D, Qualcomm

Snapdragon, **Teamwork and Process Management:** JIRA, Redmine, Trello, Miro.

## RELEVANT WORK EXPERIENCE

Embedded systems and ML Researcher | NASA JPL (Capstone)

Jan 2023 – Jun 2023

- Designed and implemented a discriminator for NASA's CADRE project, enabling rovers to identify the lunar subsurface for exploration.
- Designed multi-layer PCB layouts integrating GPR sensors, power-efficient ARM Cortex-M microcontrollers, and communication modules, achieving minimal electromagnetic interference for accurate signal acquisition.
- Developed embedded software in C/C++ using Keil uVision, and implemented real-time functionalities with FreeRTOS.
- Deployed ML model, focusing on optimizing inference time and resource usage for embedded systems, tailored for extraterrestrial GPR imaging applications.

Embedded Software Engineer | Capgemini Technologies, India

Jul 2021 – Sep 2022

- Worked with client's engineering teams to enhance the performance of Snapdragon processors, focusing on power management and thermal efficiency across IoT and mobile platforms.
- Integrated ARM-based architectures for edge computing solutions, delivering scalable designs with optimized energy consumption.
- Led initiatives to automate validation pipelines using Python and Jenkins, improving test efficiency and reducing manual intervention.
- Contributed to projects involving AI accelerators and GPU performance tuning, working closely with teams in networking, storage, and 5G technologies to align hardware and software capabilities.

Automation and Series Planning Intern | Mercedes-Benz US International, USA

Feb 2020 – Sep 2020

- Developed and implemented an automated testing framework for validating automotive control systems, reducing testing time by 30%.
- Streamlined production and assembly line processes by integrating automated tools for real-time data collection and analysis, improving operational efficiency.
- Designed automation scripts to analyze vehicle diagnostic data, enabling faster fault detection and resolution in prototypes.

## PROJECTS

Data Driven Slope Estimator for Lower limb robotics | Data driven Robotics

Mar 2024 – Jun 2024

- Processed data from 54 sensor streams, including accelerometers, gyroscopes, and force sensors, using normalization, scaling, and categorical encoding. Focused on sensor fusion techniques to improve the reliability of slope estimation for lower limb wearable robots.
- Developed and trained neural networks and support vector machines (SVM) to classify slope categories (5°, 7.5°, 15°) with significantly higher accuracy (78% on unseen data) compared to traditional linear regression.
- Identified limitations in user-specific model performance and proposed the use of dynamic slope datasets for real-world adaptability. Incorporated techniques like k-fold cross-validation and hyperparameter tuning for robust model evaluation.

Panic Detection Smartwatch | Tiny ML embedded systems

Apr 2023 – Aug 2023

- Developed an innovative communication system using the Huzzah ESP8266 board, enabling seamless Wi-Fi-based interaction between patients and healthcare staff.
- Established a Firebase Realtime Database to store and manage patient data, ensuring efficient connectivity between device and app.
- Enhanced patient care by upgrading the communicator to include real-time health monitoring using STM32 microcontrollers and BLE.
- Integrated a TinyML model for anomaly detection in vital signs, achieving 92% accuracy while utilizing less than 30% of available memory.
- Developed a cloud-based backend using AWS IoT Core, enabling seamless data synchronization and alert notifications to caregivers.
- Conducted rigorous validation tests under simulated hospital conditions, ensuring 98% reliability for both hardware and software components.

Automated Grain Dispenser | Automation

Aug 2020 – Jun 2021

- Implemented real-time grain classification and quality control using OpenCV, ensuring precision in automated dispensing standards.
- Designed and integrated sensors, actuators, and microcontrollers to regulate grain flow with high reliability and safety compliance.
- Fabricated key parts in-house using processes such as laser cutting, TIG welding, and rotary bending.

Autonomous Buggy Communication and Path Tracking | Embedded systems

Jun 2018 – Dec 2018

- Designed and implemented an autonomous buggy system equipped with Zigbee communication to enable real-time coordination between multiple buggies, facilitating positional data exchange and task synchronization.
- Developed the circuit layout in EAGLE to integrate IR sensors, motor drivers, and Zigbee modules efficiently and employed a PID control algorithm to ensure accurate and smooth navigation. Included a Bluetooth module for debugging and monitoring.
- Validated the system under diverse scenarios, achieving 96% path-tracking accuracy and reliable communication across all buggies.