



Prabath Wijethilaka

Electronic and Telecommunication Engineering
Undergraduate
University of Moratuwa
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🌐 Portfolio - prabath.auradigitallabs.com

⌚ Github - github.com/PrabathBK

LinkedIn - Prabath Wijethilaka

SUMMARY

I am Prabath Wijethilaka, a Final Year undergraduate student in Electronic and Telecommunication Engineering at the University of Moratuwa, skilled in digital electronics and communications.

Interest Areas

I have a strong interest in FPGA Hardware Accelerated Systems, Computer Architecture, Embedded Systems, AI & ML, Full Stack Developing, Entrepreneurship, Sports and Outdoor Activities.

EDUCATION

- **BSc (Hons) Electronic and Telecommunication Engineering** 2022 - Present
University of Moratuwa CGPA/Percentage: 3.69/4.0
- **GCE Advanced Level Examinations** 2012-2020
Dharmaraja College - Kandy Physical Science Stream
 - Z score - 2.5258
 - District Rank - 13, Island Rank - 134

EXPERIENCE

- **Hardware Accelerated Systems Engineer - Internship** On-site
London Stock Exchange Group Dec 2024 – June 2025

I contributed to the verification of high-performance FPGA-based networking systems. I developed a UVM-driven Ethernet packet capture and replay tool capable of injecting .pcap files to reliably reproduce real production failures. I also migrated the full testbench architecture from nanosecond to femtosecond precision, resolving critical timing alignment issues in the TCP Offload Engine pipeline. Additionally, I explored Linux kernel driver operation for configuring the Xilinx Alveo U50 data-center FPGA and integrated Model Checking principles into the verification methodology to strengthen functional correctness and coverage.

RECOMMENDATIONS

"Prabath demonstrated outstanding self-learning skills, quickly adapting to our existing codebase with minimal intervention and significantly improved the test bench's running time. I highly recommend Prabath to any organization. He would be an invaluable asset to any forward-thinking organization"

— **Nuwantha Silva, Assoc. Tech Lead (FPGA), London Stock Exchange Group** View full recommendation on LinkedIn
(LinkedIn Recommendation)

CONFERENCES & WORKSHOPS

- **DVCon India 2025 – Design and Verification Conference** Radisson Blu, Marathahalli, Bangalore
Runners-up – Design Contest September 10–11, 2025
 - * Awarded **1st Runners-up** at the DVCon India 2025 Design Contest organized by CDAC Trivandrum - [Link](#).
 - * Designed a custom accelerator for the **VEGA AT1051 SoC** and built a framework capable of running the **full Qwen3 inference pipeline on bare metal**, demonstrating strong hardware-software co-design skills while competing against top university and industry teams in a rigorous verification challenge.
- **LEAD CS 8.0 – Leadership Development Program** Hotel Ramrich, Ja-Ela
AIESEC Society – University of Moratuwa March 2022

PROJECTS

- **SLMs on Edge - 1st Runners-Up | DVCon India 2025 – Design and Verification Conference** Repository
FPGA Accelerator for Qwen3 SLM Inference Jan 2025 – Sep 2025
 - * Designed a complete hardware software co-design framework enabling **Qwen3 SLM inference on the VEGA AT1051 RISC-V SoC**, reducing latency from minutes to seconds through FPGA-accelerated GEMM offloading.
 - * Built a full bare-metal runtime capable of executing the entire Qwen3 pipeline, including custom memory allocation, tiling schedule generation, AXI-based data movement, and CPU-FPGA synchronization for deterministic sequential inference.
 - * Developed a lightweight systolic array accelerator featuring **INT8 GEMM**, 16×16 tiled architecture, double buffering, AXI4/AXI-Lite integration, and optimized DMA dataflow - delivering high-throughput GEMM execution on edge hardware.

- Hardware accelerator for a Vision Transformer-based malware detection system	<i>Accelerating ViT-based malware detection on edge devices with VEGA AS1061 Processor, based on RISC-V ISA.</i>	<i>Report</i>
* This project aims to deploy a ViT-based malware detection system on an edge device equipped with the VEGA AS1061 Processor		Jan 2024
* Stage 1 focuses on proposing a novel acceleration IP to enhance the ViT model's inference performance on the VEGA Processor, ensuring effective malware detection in real-world scenarios.		
- CNN Accelerator RTL Implementation	<i>High-Performance INT8 CNN Accelerator for Zynq-7020 FPGA</i>	<i>Ongoing</i>
		Aug 2025 – Present
* Designed and implemented a high-performance CNN accelerator IP core for the Xilinx Zynq-7020 , featuring a 14×14 INT8 processing-element array delivering 31.36 GOP/s at 80 MHz .		
* Developed a custom 32-bit ISA , hierarchical memory system (PE register files + global buffers), and AXI4 DMA integration for seamless ARM-FPGA communication.		
- RV32I Processor Design and Implementation on FPGA	<i>RV32I Single Cycle and Pipeline Core</i>	<i>Jul 2024 – Jan 2025</i>
* Single-Cycle Core: Developed a fully verified 32-bit RV32I single-cycle CPU in SystemVerilog with full instruction support and FPGA-ready architecture. - Check Repository		
* Pipelined Core: Implemented a 5-stage pipelined RV32I CPU with hazard detection, forwarding, stall control, and branch prediction, achieving full RV32I functional verification. - Check Repository		
* SystemVerilog, Vivado design flow, RISC-V architecture, pipeline control logic, and hardware verification.		
- Serial Bus Design	<i>Custom RTL Bus Interconnect with Arbitration and Split Transactions</i>	<i>Repository</i>
		Aug 2025 – Nov 2025
* Designed and implemented a multi-master serial bus on Intel Cyclone IV FPGA with priority arbitration, split transactions, and UART-based inter-FPGA bridging.		
* Achieved low resource utilization using a 1-bit serial protocol supporting two masters and three slaves, with FIFO-based clock-domain crossing and full RTL and hardware verification.		
* SystemVerilog, FPGA RTL Design, Bus Protocols, UART, Quartus Prime		
- EcoWatt – Smart Inverter Monitoring & Control System	<i>ESP32-Based IoT Platform for Solar Inverter Telemetry</i>	<i>Repository</i>
		Aug 2025 – Nov 2025
* Designed and developed a production-ready IoT platform for real-time solar inverter monitoring, featuring secure telemetry with multi-layer protection, adaptive data compression, Modbus support, power-optimized operation, and a bidirectional command queue for remote control.		
* Implemented a robust FOTA and reliability framework with signed updates and rollback protection, backed by extensive automated testing, fault-injection validation, and a professional real-time React dashboard for analytics and device diagnostics.		
* ESP32, PlatformIO, Python Flask, React, MQTT		
- TransX – Transformer Maintenance Full-Stack Web Platform	<i>End-to-end inspection workflow with CV-based anomaly detection and annotation system</i>	<i>Repository</i>
		Jul 2025 – Nov 2025
* Built a complete transformer inspection workflow with thermal image management, CV-based anomaly detection, and human in the loop annotation capabilities.		
* Developed modular backend services and a responsive frontend supporting role-based access, multi-user comments, and maintenance record generation.		
* Spring Boot, React, TypeScript, Java, MySQL, Flask, YOLOv8p2, Vite		
- Factory Assembly Line Management Full-Stack Development with Modular OOP Design		<i>Jan 2024 - May 2024</i>
<i>Developed a web application as a submodule within a main project.</i>		Repository
* Integrating backend functionalities with frontend components to assembly line operations.		
* Spring boot, Java, MongoDB, React, Postman, Rest API		
- Project Hydrolink - Champions SIIoT Challenge 2023	<i>A Complete IoT Device Revolutionizing Smart Water Tank Management</i>	<i>2023 - 2024</i>
		hydrolink.auradigitallabs.com
* A complete IoT device revolutionizing water tank management.		
* Arduino IDE, ESP Microcontroller, Google Firebase, Flutter, SolidWorks, Altium		
- High-Performance Trading System in C++	<i>Flower Exchange Order Matching Engine</i>	<i>Repository</i>
		Aug 2024 – Nov 2024
* Developed a high-performance C++ order matching engine implementing price-time priority, in-memory order books, and full order validation across multiple instruments.		
* Designed the C++ backend architecture including matching logic, execution state handling, and CSV-based batch processing with test coverage.		

- **Steer-Safe - Championship | IEEE Circuit Challenge 2024 and 1st Runners-Up | Brainstorm 2024** [Repository](#)
Drowsiness Detection system Jun 2024 – Oct 2024
- * Developed a lightweight, eyewear-integrated driver safety device using **embedded systems**, **Communication Protocols**, and low-power firmware for real-time drowsiness and attention monitoring.
- **Gazebo Robot Simulation** [May 2024 Repository](#)
Robot Simulation Project using ROS2 Humble and Gazebo
- * Map a room and navigate the robot from one location to another, avoiding obstacles along the way. Additionally, perform object tracking.
 - * Gazebo, Ros2, Ubuntu, OpenCV
- **Point-to-Point Communication Design project** [Aug 2023 - Dec 2023 Repository](#)
A secure and reliable point-to-point digital wireless communication system using SDR.
- * Successful transmission and reception of diverse data types, such as images, text, and real-time audio.
 - * Python, GNU radio, MATLAB
- **Industrial Portable Water Quality Measurement Device** [Jan 2024 - May 2024 Repository](#)
Developed an industrial portable water quality measuring device using sensor technologies and a Mobile app.
- * Capable of accurately measuring four key parameters: pH, Turbidity, Conductivity, and Temperature.
 - * Arduino-IDE, ESP-Microcontroller, Google Firebase, Flutter, SolidWorks, Altium
- **UART Communication System Implementation on FPGA using Verilog** [May 2024 Repository](#)
Implemented and tested a UART communication system on an FPGA using Verilog.
- * Utilized Quartus Lite for FPGA development and integrated Raspberry Pi for data input.
 - * Verilog-HDL, Quartus Lite, FPGA, Raspberry-pi, Python
- **Analog Portable Audio Amplifier** [Aug 2023 - Dec 2023 Repository](#)
We have designed a Portable Audio Amplifier using only analog components.
- * Our device is capable of amplifying audio input from any audio-generating device through three main sub-circuits: preamplifier, tone controller, and power amplifier. We've implemented the Baxandall passive tone controller.
 - * Simulink, Proteus, LT-Spice, Altium, Solidworks
- **Machine Learning Projects** [Repository](#)
- * DiabetesAI-Webproject
 - * SMS spam detector
 - * Stock prediction
 - * Breast Cancer Wisconsin Diagnostic Predictor
 - * Cardiovascular Disease Predictor
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- ## AWARDS
- **1st Runners-Up | DVCon India 2025 – International Design Contest** [2025](#)
- * SLMs on Edge – A lightweight FPGA-based systolic array accelerator and bare-metal inference engine designed to run the full Qwen3 pipeline on the VEGA AT1051 RISC-V SoC.
- **Championship | SLIoT Challenge 2023 - All island IoT competition** [2023](#)
- * Hydrolink - A Complete IoT Device Revolutionizing Water Tank Management
- **Championship | IEEE Sri Lanka Circuit Challenge 2024** [2024](#)
- * Steer Safe by PulseX - A wearable device that utilizes machine learning and Electrooculography (EOG) signals to track a driver's state of awareness in real-time.
- **1st Runners-Up | Brainstorm 2024 - Healthcare innovation competition** [2024](#)
- * Steer Safe - A wearable device that utilizes machine learning and Electrooculography (EOG) signals to track a driver's state of awareness in real-time
- **Stage 2 (Top 20) | DVCon India 2024 - International Design Contest** [2024](#)
- * GateMasters - Design and implement a hardware accelerator for a Vision Transformer-based malware detection system on a VEGA Processor.
- **Finalist | HackX 2024 - Inter University Startup Challenge** [2024](#)
- * Hydrolink - A Complete IoT Device Revolutionizing Water Tank Management.
- **Dean's List**

SPECIALIZATIONS AND CERTIFICATIONS

- **Function Acceleration on FPGA with Vitis**
Udemy
- **Linux Device Drivers**
LinkedIn Learning
- **High-Performance and Mission-Critical Software Development Using C++**
London Stock Exchange Group
- **Introduction to FPGA Design for Embedded Systems**
University of Colorado Boulder - Coursera
- **FPGA Softcore Processors and IP Acquisition**
University of Colorado Boulder - Coursera
- **Hardware Description Languages for FPGA Design**
University of Colorado Boulder - Coursera
- **Machine Learning Specialization**
DeepLearning.AI - Coursera
- **AAT Level 3 Completed**
Association of Accounting Technicians of Sri Lanka
- **Diploma in English**
Esoft Metro Campus - Sri Lanka
- **Diploma in IT**
Esoft Metro Campus - Sri Lanka

EXTRA-CURRICULAR AND VOLUNTEERING

- **Volunteer Developer – FloodSupport Sri Lanka - stats.floodsupport.org** 2025
Community Disaster Relief Initiative – Sri Lanka
- **Judge Board – HackElite 2.0** 2025
IEEE Sri Lanka Women in Engineering – University of Moratuwa
- **Conduct Knowledge Session: Advanced Biomedical Electronics & Computational Technologies** 2025
IEEE EMBS Student Branch Chapter – University of Moratuwa
- **Conduct Knowledge Session: Raspberry Pi Web Services** 2025
Pi Mora, SPARK Branch - University of Moratuwa
- **Head of Marketing** Aug 2025 - Present
Electronic Club - University of Moratuwa
- **Marketing Coordinator** Sep 2024 - Aug 2025
Electronic Club - University of Moratuwa
- **Social Media Sub-Coordinator** Aug 2023 - Sep 2024
Electronic Club - University of Moratuwa
- **Social Media Sub-Coordinator** Aug 2023 - Sep 2024
Electronic Club - University of Moratuwa
- **Department Batch Representative** Jan 2024 - May 2025
Department of Electronic and Telecommunication Engineering - University of Moratuwa
- **Finance Committee member** Mar 2023 - Aug 2023
IEEE Society University of Moratuwa - project "Mora Foresight 1.0"
- **Event Sub-Committee member** July 2023 - Aug 2023
EXMO - University of Moratuwa
- **Finance Committee member** Aug 2022 - Dec 2022
AIESEC Society University of Moratuwa - project "Rooted 1.0"
- **Junior Prefect** Jan 2015 - Dec 2015
Dharmaraja Collage - Kandy
- **President of Collage Hosteler's Society** Jan 2017 - Dec 2017
Dharmaraja Collage - Kandy
- **Volunteering in Sasnaka Sansada** 2021 - 2022
Teaching experience with Volunteering in "Ganitha Saviya" Project

SPORTS AND ACTIVITIES

- **Sri Lanka University Games Championship 2023**
University Baseball Team - University of Moratuwa
- **Participated STRIDIAN'23**
Mora Hiking Club - University of Moratuwa
- **Captain of the college under 17 volleyball team**
Dharmaraja College - Kandy
- **Obtained a 'Merit' for Hockey on Annual "Colors Nite".**
Dharmaraja College - Kandy
- **Member of the college Baseball, and Hockey team**
Dharmaraja College - Kandy

TECHNICAL SKILLS

- **Languages:** Java, C, C++, VHDL, Verilog, SystemVerilog, Python, SQL, React, JavaScript, Dart, HTML, CSS
- **Developer Tools:** Vivado, Vitis, Quartus, IntelliJ, MATLAB, Git, Altium Designer, SolidWorks, Android Studio, Gazebo, Docker, VS Code, Postman
- **Frameworks:** UVM, Spring Boot, Flutter, Arduino, Scikit-learn, ROS2
- **Cloud/Databases:** Firebase, Mongo DB, Microsoft Azure, MySQL
- **Operating Systems:** Ubuntu, Windows, RedHat , Raspbian
- **Soft Skills:** Problem-Solving, Team Leadership, Project Management, Teamwork, Public Speaking, Finance and Account management, Strategic Decision-Making, Digital Marketing, Teaching, Photography, Videography

REFERENCES

- **Ajith A. Pasqual,**
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