



Prabath Wijethilaka

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

🐙 Github - github.com/PrabathBK

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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

CGPA/Percentage: 3.69/4.0

University of Moratuwa

2012-2020

Physical Science Stream

• GCE Advanced Level Examinations

Dharmaraja College - Kandy

- 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

(LinkedIn Recommendation)

[View full recommendation on LinkedIn](#)

CONFERENCES & WORKSHOPS

– DVCon India 2025 – Design and Verification Conference

Radisson Blu, Marathahalli, Bangalore

September 10–11, 2025

Runners-up – Design Contest

* 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/LLM 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>Ongoing</i>
<i>High-Performance INT8 CNN Accelerator for Zynq-7020 FPGA</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>		Jul 2024 – Jan 2025
* 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.		
- EcoWatt – Smart Inverter Monitoring & Control System		<i>Ongoing</i>
<i>ESP32-Based IoT Platform for Solar Inverter Telemetry</i>		Aug 2025 – Present
* Developed an ESP32-powered IoT system for real-time solar inverter monitoring using Modbus RTU polling and an adaptive compression pipeline achieving 96% data size reduction .		
* Implemented encrypted telemetry uploads to a Flask backend with reliable remote command execution and a secure FOTA pipeline using RSA-2048 signature verification and AES-encrypted firmware delivery .		
- TransX – Transformer Maintenance Full-Stack Web Platform		<i>Ongoing</i>
<i>AI-Powered Thermal Inspection & Maintenance System</i>		Jul 2025 – Present
* Developed a full-stack transformer maintenance platform integrating YOLOv8 thermal anomaly detection , canvas-based annotation tools, and a complete inspection workflow for end-to-end transformer health assessment.		
* Built using a microservice architecture with React, Spring Boot, Flask, and MySQL , enabling automated reporting, real-time collaboration, and scalable transformer data management.		
- Serial Bus Design		<i>Ongoing</i>
<i>Custom RTL Bus Interconnect with Arbitration & Split Transactions</i>		Aug 2025 – Present
* Developing a custom RTL serial bus featuring a fixed-priority arbiter (Master0 > Master1), range-based address decoder , and parameterized master/slave interface modules.		
* Implemented split-transaction handling with full verification using module-level and top-level testbenches (Verilator + Vivado), and FPGA-ready synthesis flows for both Vivado and Quartus .		
- Full-Stack Solution 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 SLIoT Challenge 2023		<i>2023 - Present</i>
<i>A Complete IoT Device Revolutionizing Water Tank Management</i>		www.hydrolink.lk
* A complete IoT device revolutionizing water tank management.		
* Arduino IDE, ESP Microcontroller, Google Firebase, Flutter, SolidWorks, Altium		
- High-Performance Trading System in C++		<i>Repository</i>
<i>Flower Exchange Order Matching Engine</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		<i>Repository</i>
<i>Drowsiness Detection system</i>		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	<i>Robot Simulation Project using ROS2 Humble and Gazebo</i>	<i>May 2024</i>
		<i>Repository</i>
* 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		<i>Aug 2023 - Dec 2023</i>
<i>We implemented a secure and reliable point-to-point digital wireless communication system using SDR.</i>		<i>Repository</i>
* Our achievements include the 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		<i>Jan 2024 - May 2024</i>
<i>Developed an industrial portable water quality measuring device using sensor technologies and a Mobile app.</i>		<i>Repository</i>
* 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		<i>May 2024</i>
<i>Implemented and tested a UART communication system on an FPGA using Verilog.</i>		<i>Repository</i>
* 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		<i>Aug 2023 - Dec 2023</i>
<i>We have designed a Portable Audio Amplifier using only analog components.</i>		<i>Repository</i>
* 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		
<i>Repository</i>		
* DiabetesAI-Webproject		
* SMS spam detector		
* Stock prediction		
* Breast Cancer Wisconsin Diagnostic Predictor		
* Cardiovascular Disease Predictor		
AWARDS		
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- 1st Runners-Up DVCon India 2025 – International Design Contest		<i>2025</i>
* 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		<i>2023</i>
* Hydrolink - A Complete IoT Device Revolutionizing Water Tank Management		
- Championship IEEE Sri Lanka Circuit Challenge 2024		<i>2024</i>
* 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		<i>2024</i>
* 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		<i>2024</i>
* 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		<i>2024</i>
* Hydrolink - A Complete IoT Device Revolutionizing Water Tank Management.		
- Dean's List		
* Semester 2, 6		

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

- **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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