

ALI AQDAS

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EDUCATION

National University of Sciences and Technology, Islamabad *Sept 2019 - Jun 2023*
B.E. in Electrical Engineering *CGPA: 3.93/4*
Thesis: SoC Implementation of RISC-V Vector Processor
Advisor: Dr. Muhammad Imran
Co-advisor: Dr. Rehan Ahmed

EXPERIENCE

Integrated Circuits Design Lab *Jan 2023 - Jun 2023*
Junior Research Assistant *Islamabad, Pakistan*

Project Title: "SoC Implementation of RISC-V Vector Processor"

- Developed a chaining mechanism for parallel operation of functional units.
- Implemented parameteric microarchitectural components enabling scalability.
- Worked on physical mapping of microarchitecture on TSMC 65 nm.

System-on-Chip(SoC) Design Lab *Jun 2022 - Dec 2022*
Hardware Design Intern *Islamabad, Pakistan*

Project Title: "SoC Implementation of RISC-V Vector Processor"

- Developed and integrated a vector extension with a scalar core.
- Developed a neural network and benchmark kernels using intrinsic instructions.

AI Lounge *Jul 2021 - Present*
Teaching Assistant *Islamabad, Pakistan*

Project Title: "TinyML and its Applications"

- Implemented a Fall Detection System to reduce fatality risk in elderly people through appropriate alerting system.
- Developed content for Workshop/MOOC in collaboration with Dr. Syed Ali Raza Zaidi (University of Leeds) and Dr. Hassan Aqeel (Aston University).

Signal Processing and Machine Learning Lab (SIGMA) *Jul 2020 - Oct 2020*
Summer Intern *Islamabad, Pakistan*

Project Title: "Keratin Pearl Localization in Whole Slide Images"

- Designed a tool to localize anomalies in whole slide images to reduce doctors' effort in diagnosing tumors.
- Performed tiling of ultra high resolution images using OpenSlide
- Binary Mask generation for image segmentation using GeoJSON and SciKit Image

TECHNICAL STRENGTHS

Hardware Descriptive Languages	Verilog HDL
Programming Languages	C, C++, Python, MATLAB, Embedded-C, RISC-V Assembly
Deep Learning Frameworks	Tensorflow 2, Tensorflow for Microcontrollers, PyTorch, FAST.AI
Tools	Quartus Prime, Proteus, PSPICE

MANUSCRIPTS UNDER REVIEW

1. **A. Aqdas**, M. Ibrahim, F. Gul, R. Ahmed, and M. Imran. V-Flow: A RISC-V Vector Processor for Machine Learning.

PROJECTS

FPGA Implementation of Bresenham Circle Drawing Algorithm

Bresenham Circle Drawing algorithm is a lightweight algorithm to draw circles on computer that only computes points for an octant of circle, and uses eight way symmetry to draw a full circle.

- Implemented Bresenham's Circle Drawing Algorithm in Verilog to draw circles with variable radii.
- Utilized University of Toronto's VGA Adapter to display the output on LCD using DE1-SoC. https://www.eecg.utoronto.ca/~jayar/ece241_7F/vga/

Intelligent Traffic Control System

Intelligent Traffic Control System (ITCS) is a traffic light switching system based on Infrared Sensors to reduce traffic congestion at peak hours.

- It uses to infrared sensors count the number of vehicles entering and exiting a road.
- An Arduino is utilized to implement a light switching algorithm for optimized switching.
- Traffic Jam Detection to detect possible emergencies and generate an alarm for concerned authorities.

Buck Converter Control Design and Simulation

Buck Converter is a Voltage Regulating Device which can downscale DC Voltage. It however requires a control system to keep a stable voltage irrespective of load device. In our project we have designed a buck converter using control techniques such as Root Locus and Bode Plots and used SIMULINK to simulate our design. Our specifications are

- 28V Input with a 4V Ripple
- 1-10A Load Current
- 2% Output Voltage Ripple at 5V

Further Projects available on LinkedIn