



USMAN AYUB

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SUMMARY

In my undergraduate studies in Electrical Engineering, I have developed a strong foundation in various domains such as electronics, computer architecture, embedded systems, artificial intelligence, and the Internet of Things (IoT). My academic pursuits have been particularly focused on microcontrollers, the RISC-V architecture, and the design and prototyping of deep learning accelerators on Field Programmable Gate Arrays (FPGAs). Additionally, I have explored the integration of machine learning within embedded systems, edge computing, and the application of IoT technologies in the biomedical field. .

EDUCATION

National University of Science and Technology

Islamabad, Pakistan

Bachelor of Electrical Engineering

Sep. 2021 – July 2025 (expected)

3.62/4.0 (90.5%) 3rd Highest in Section

Relevant Coursework: *Digital System Designs , Digital Signal Processing, Microprocessor Systems, Electronic Circuit Design, Digital Logic Design, Linear Algebra & ODE, Probability & Statistics*

Iqra Academy

Abbottabad, Pakistan

A levels, Pre-Engineering

Aug. 2018 – Aug. 2020

Straight A's , Merit Scholarship Awardee*

PIPS College for Boys

Abbottabad, Pakistan

O levels

April 2016 – July 2018

3 A's 3A's 2B's , Merit Scholarship Awardee*

PROJECTS

RISC-V Base 32 Integer Core on FPGA | *Verilog/VHDL, Xilinx Vivado, FPGA*

- Designed a single-cycle RISC-V RV32I core with a 5-stage pipeline architecture.
- Successfully synthesized the designed core on an FPGA platform and executed Fibonacci sequence.

Arrhythmia Classification Using Discrete Wavelet Transform | *MATLAB, Machine Learning*

- Preprocessed time series ECG signal of patients.
- Applied Discrete Wavelet transform using SYMLET 4 to identify R peaks.
- Then trained an AI model with half of patients data and tested with the rest half.

Speed Control of Induction Motor Using VFD | *MATLAB, Proteus*

- AC voltage converted to DC using full rectifier circuit
- PWM used to create waves of desired frequency, square waves were generated using mosfets

Smog Detection | *Arduino, Python, Google Colab*

- Developed a prototype for timely smog prediction in major cities to take necessary actions.
- MQ2, MQ4 and MQ135 were used to detect smog related gases and based on threshold values conclusions were drawn.
- AI model was trained to take real time sensors values and predict the forecast of smog for next 10 days

TinyML Temperature Sensor | *ATmega16, Microchip Studio, Python, C++*

- Implemented TinyML on AVR microcontroller for measuring precise temperature value.
- Deployed machine learning model for sensor calibration, enhancing measurement accuracy.
- Enabled real-time temperature monitoring via UART communication for local and remote access.

4-Bit Number Crunching Machine | *Proteus, Logic Gates*

- Designed a 4-bit microprocessor encompassing an ALU, data registers and control logic unit.

- Executed its gate-level implementation through logic ICs and demonstrated its functionality by generating the Fibonacci sequence.

Automatic Irrigation Control System | *Proteus, Logic Gates*

- Engineered an intelligent irrigation control system featuring precise timed and quantified water supply.
- The system was aimed at conserving water and optimizing crop yield.

Smart Solar Panel System | *Multisim, Arduino*

- Built an automated solar panel system with sun-tracking mechanism for optimal solar harvesting.

ADDITIONAL COURSES

CS-371 Minor in Artificial Intelligence

NUST, Islamabad

CS-253 Minor in Data Structures and Algorithms

NUST, Islamabad

SKILLS

Programming Languages: Python, C/C++, Verilog/VHDL, Assembly Language, RISC-V ASM

Design and Simulation Tools: Quartus, Vivado, ModelSim, Proteus, LTspice, MATLAB/Simulink, LabView

Embedded Systems: FPGA, Raspberry Pi, Advanced Virtual RISC microcontroller

Soft Skills: Team-work, Problem-solving, Time-management, Leadership

CONFERENCE ATTENDED

Materials for Sustainable Energy & Climate Change (MatSEC)

Aug. 2023

- Attended the International Conference on MatSEC 2023 at NUST, Pakistan, supported by the British Council.
- The conference featured keynote addresses and panel sessions by researchers from Cranfield University, UK.
- Participation aimed at exploring how my research field can contribute to the development of sustainable energy and climate change solutions.

HONORS & ACHIEVEMENTS

Currently maintaining the third highest CGPA among 45 students of NUST Electrical Engg. program in BEE-13A

3rd Position Winner of Elevator pitch competition of American Society of Mechanical Engineers, 2024

Merit Scholarship Awardee in A levels and O levels.

Bebras Mathematic Competition Winner, 2018.

EXTRA-CURRICULAR ACTIVITIES

Office Bearer of Nust IEEE Club (2023-2014).

Participated in the Intra-Department Cricket Championship, 2022

Interested in Swimming and gym.