

# Waseem Irfan

Gujranwala, Pakistan

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## EDUCATION

NUST College of Electrical & Mechanical Engineering

Bachelor of Mechatronics Engineering

November 2021 – June 2025

Rawalpindi, Pakistan

## EXPERIENCE

Cowlar Design Studio (backed by Y-Combinator)

July 2024 – October 2024

Embedded Design Engineer – Paid Internship

Islamabad, Pakistan

- Developed an ESP32-S3 based kitchen dashboard to automate restaurant operations, deployed in Qatar, optimizing order management, reducing processing time by 30%, enhancing workflow, and cutting operational costs by 45%.
- Wrapped up low-level driver APIs in C++ for STM32 peripherals, leveraging object-oriented programming principles to enhance modularity, simplify code, and accelerate development time.
- Validated SPI, UART, and CAN communication protocols with a logic analyzer and developed cross-platform portable sensor libraries, enhancing system compatibility and ensuring reliable performance.

July 2023 – September 2023

Electronic Design Engineer – Paid Internship

Islamabad, Pakistan

- Acquired proficiency in reading schematics and datasheets, PCB design, SMD soldering, and hardware debugging.
- Designed an automotive diagnostic tool (Ignition coil tester) using the PADAUK PMC232 microcontroller to evaluate vehicle ignition coils, distinguishing functional and faulty coils with precision.
- Applied best practices of electronic design to successfully build and develop innovative projects.

## PROJECTS

Modular Self-Reconfigurable Robots (Link) | Final Year Design Project

June 2025

- Developing ESP32-based Modular Robots, BU04-Kit for indoor positioning, MPU6050 for orientation sensing, Li-Po cells with BMS for power management, N20 encoder motors with PID control, and magnetic docking for self-reconfiguration.

Intelligent Mechanical Arm (Source Code) | ROS2, Gazebo

December 2024

- Created a URDF model using Xacro and ROS2 launch files to simulate a mechanical hand in Gazebo, interfacing with real hardware via PCA9685 for precise servo control and real-time performance validation.

Kitchen Display System (Link) | FreeRTOS, MQTT, UART, LVGL, ESP-IDF

August 2024

- Developed an ESP32-S3 VGA based kitchen dashboard with real-time order display, hardware navigation, and status updates, integrating a thermal printer and buzzer alert system to optimize workflow.

Warehouse Management Robot (Link) | Arduino, SolidWorks, 3D Printing

May 2024

- Engineered an autonomous pick-and-place robot for the NERC 2024, featuring a 5-DoF robotic mechanism that scans a grid map to pick and place multiple objects in parallel, achieving 6x faster performance and significantly boosting productivity and operational efficiency.

H-Bridge Motor Driver (Link) | Altium Designer, Proteus

November 2023

- Crafted an H-Bridge for robot's drive train, enabling reliable 24V operation with a 10A stall current capacity, improving motor control efficiency and system performance.

## TECHNICAL SKILLS

PCB Design: Altium Designer | Proteus | PDN Analyzer

Industrial Automation: CNC (G-code, M-code) | PLC (Ladder Logic)

Programming: C/C++ | Assembly | Python | Verilog | FreeRTOS | DSA & OOP

Embedded Boards: BU04-Kit | STM32 | ESP32-S3 | AT89C51 | Raspberry Pi | Radxa ZERO 3W

Communication Protocols: I2C | SPI | WIFI | UWB | BLE | MQTT | HTTP | SNMP | ESP-NOW

Frameworks & Tools: ESP-IDF | STM32CubeIDE | LabVIEW | MATLAB | CMake | Git | ROS2 | Linux(Ubuntu)

## AWARDS & CERTIFICATIONS

- Participated in COMPPEC 2025, NUST CEME (Link)
- Best Product Design Award - Hackathon 2023, NUST CEME (Link)
- Participated in NUST Robotics & Automation Club (Link)
- Microcontroller Embedded C Programming: Absolute Beginners - Udemy (Link) Completed
- Mastering Microcontroller and Embedded Driver Development - Udemy (Link) Completed
- Advanced Embedded Linux Development Specialization - Coursera (Link) In Progress

**Soft Skills:** Strategic Leadership, Project Execution and Planning, Effective Communication, Analytical Problem Solving