

# 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

**October 2024 – Present**

- 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

• 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

• ROS2 for Beginners Level 2 - TF | URDF | RViz | Gazebo - 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