

Syed Muhammad Daniyal Gillani

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EXPERIENCE

Embedded Design Engineer | Cowlar Design Studio (YC-W17)

Islamabad, Pakistan | 07/2024 – 10/2024

- Designed and developed a cost-effective Kitchen Display System using the LVGL library, interfacing it with ESP32 S3 via a VGA connection. Integrated Wi-Fi, MQTT, and UART to receive API data and print receipts with a thermal printer, reducing hardware costs by 80% compared to traditional kiosk machines.
- Programmed microcontroller firmware for IoT projects, focusing on sensor integration, peripheral interfacing, and seamless system operation.
- Fabricated and manually assembled custom ESP32 S3 VGA PCBs, including soldering surface-mount components.
- Leveraged Git and GitLab for efficient version control and collaboration across the development team.

EDUCATION

National University of Sciences & Technology | BE-Mechatronics Engineering

Islamabad, Pakistan | 11/2021 – 05/2025

- Cumulative GPA: 3.42/4.00
- Thesis title: *Humanoid Assistive Robotics Platform*
- Relevant Coursework: *Electronic Circuit Design, Microcontrollers and Embedded Systems, Introduction to Robotics, Digital Image Processing, Engineering Project Management, Instrumentation and Measurements, Mechatronics System Design, Modelling and Simulation, Linear Control Systems.*

SKILLS

Programming Languages	C/C++, Embedded C and IoT, Assembly, Python, Verilog, MATLAB, CNC Programming, HTML
Microcontrollers and FPGAs	ESP32, 89C51, Arduino, Raspberry Pi Pico, NI myRIO, NI Elvis, Spartan 6
Robots and Machines	UR-5, Rhino XR-4, LabVolt Robot, 2-Axis CNC lathe machine, 3-axis CNC milling machine
Tools, libraries & Frameworks	Version Control – Git, CMake, freeRTOS, ESP-IDF, ROS2, Raspberry Pi Pico C++ SDK, Image Processing and Machine Vision libraries
Software Tools	MATLAB and Simulink, VS Code, Keil µVision, Visual Studio, Microchip Studio, Arduino IDE, Proteus, Altium, LTSpice, NI LabVIEW, SolidWorks, AutoCAD
Hardware & Manufacturing	PCB Designing, Soldering, Circuit fabrication, Machine Design and Workshop Manufacturing
Research and Analytical	Information Retrieval and Research Skills, Googling, Prompt generation
Soft Skills	Adaptability, Resilience, Hard work, Communication, Problem solving

ACADEMIC PROJECTS

FYDP - Humanoid Robot | C/C++, ROS2, Machine Design, Embedded Systems, Machine Vision, Python

09/2024 – 05/2025

- Led the development of a socially interactive humanoid robot with autonomous navigation, face tracking, and context-aware dialogue using behavior recognition and LLM-based response generation.
- Integrated speech recognition and voice-controlled teleoperation alongside MQTT-based remote control and passive SLAM for flexible human-robot interaction.
- Designed and built a custom mecanum wheel robot base enabling omnidirectional mobility and stable navigation in dynamic environments.
- Unified all modules—vision, facial animation, motion control—into a single ROS2 platform, removing hardware fragmentation and Wi-Fi dependency.
- Managed a 4-member team with efficient Git-based collaboration for seamless hardware-software integration and version control.

Electronics, Signals and Control Systems | DLD, DIP, Proteus, MATLAB, LTSpice

09/2022 – 05/2025

- Utilized control system techniques such as PID tuners, lead, lag compensators to fine-tune the output response of various systems in MATLAB.
- Designed and simulated various signal filter topologies and electrical circuits in MATLAB, Proteus and LTSpice.
- Applied image processing techniques in MATLAB to extract meaningful data from image datasets.

Wooden Robotic Hand Simulation and Control | C++, ROS2, Gazebo, Embedded and IOT

12/2024

- Simulated a digital twin of a wooden robotic hand in ROS Gazebo and implemented a control system for the robotic hand using ESP32 and ESP-IDF, with servo motor actuation managed via a PCA9685 controller.
- Set up a ROS2 environment to control the hand via Gazebo simulations and other wireless devices using MQTT.

Prototype Tree Plantation Robot | C++, Machine Design, Circuit designing, Altium, Proteus

09/2023 – 05/2024

- Applied circuit design skills and techniques for the design and development of motor driver H-bridge circuit PCBs.
- Engineered the mechanical design and resolved troubleshooting issues of robot's base, mechanism, and electronics.

PATENTS & PUBLICATIONS

- Khalid, A. et al. (2025). *Humanoid Assistive Robotics Platform*. Application No. 23849-D. Filed 12/11/25. Grant pending.
- Ali, S., Gillani, S. M., Zain, S. M., & Khan, S. A. (2024). Controlled fluid flow without controlling pump through Arduino. *Archives of Advanced Engineering Science*. <https://doi.org/10.47852/bonviewaaes42022901>

AWARDS & CERTIFICATIONS

Awards:

- Merit Certificate for Distinguished Students | National University of Sciences and Technology 05/2024
- Merit Certificate for Distinguished Students | National University of Sciences and Technology 12/2023

Certifications:

- An Introduction to Programming the Internet of Things (IOT) | Coursera specialization
- Scikit-learn, Linear regression and other Machine learning | Coursera guided projects.
- Introduction to the Internet of Things and Embedded Systems | Coursera course.
- MATLAB Onramp and Introduction to Image processing | MathWorks
- Robotics: Aerial Robotics | Coursera course

Competitions:

- Runner up HSRC Logic Design Category | HeadStart School 03/2023
- Runner up Mini NERC Logic Design Category | NUST CEME 01/2022

LEADERSHIP & MANAGEMENT

Wing Manager | Blood Donations Wing – NUST Volunteer Club

09/2024 – 05/2025

- Wing Manager for NUST Volunteer Club's Blood Donation Wing, responsible for ensuring blood donors are arranged immediately for patients.

Supervisor | Marketing Team – Robotics and Automation Club

09/2024 – 05/2025

- Oversaw the development and execution of marketing campaigns and managing promotional activities, ensuring effective communication across various platforms to boost the club's visibility and engagement.

General Secretary of Promotions | International Conference on Robotics and Automation in Industries

11/2024 – 12/2024

- Spearheaded the promotional campaign for an International Conference on Robotics and Automation in Industries across multiple social media platforms and email, reaching over 1000 students.
- Successfully led a team of 6 members to organize and execute promotional strategies, enhancing event visibility and engagement.
- Crafted engaging captions and content for posters, banners, and other promotional materials.

Technical Assistant | Competing Team – Robotics and Automation Club

09/2023 – 09/2024

- Trained more than 20 students in robot design, PID control, and hardware interfacing and helped them prepare for line follower robot competitions.

VOLUNTEER EXPERIENCE

Arena Management | National Engineering and Robotics Contest

01/2022 – 03/2022

- Worked in designing and constructing the arena for Fruit Picking Robot contest in NERC 2022.