

Omar Siddique

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EDUCATION

Northeastern University, Boston, MA Expected Dec 2028
M.S. in Robotics, College of Engineering
National University of Sciences & Technology (NUST), Islamabad, Pakistan June 2025
B.S. in Electrical Engineering | CGPA: 3.51/4.00 | GRE: 322/340 (167Q, 155V)
Relevant Coursework: Linear Control Systems, Computer Vision, Embedded System Design, Numerical Methods

SKILLS

Languages/HDL: C, C++, Python, Verilog
Embedded & Hardware: Arduino, ESP32, STM32, Raspberry Pi, Xilinx Zynq-7000/UltraScale+ SoCs, PCB Design, FreeRTOS
Robotics & Controls: PID Control, Sensor Fusion (IMU, Complementary/Low-Pass Filtering), Zero-Moment Point (ZMP) Analysis, RL for Locomotion
AI/ML: Transformer Architectures, LLM Fine-Tuning, Diffusion Models, Synthetic Data Generation
CAD & Tools: Fusion 360, Altium Designer, WSL2/Linux

EXPERIENCE

Embedded Design Engineer, Signatics Pvt Ltd, Islamabad, Pakistan Nov 2025 – July 2026

- Designed and implemented low-level hardware blocks in Verilog on Xilinx Zynq-7000 and UltraScale+ SoCs, with bare-metal C/C++ drivers for custom peripherals and accelerators.
- Led the teardown and design recovery of an automatic antenna tracker; with only the compiled binary, reverse-engineered and rewrote the STM32 firmware for closed-loop pan/tilt motor control (digital compass, optical encoders, motor drivers).

Research Assistant, LLM Bias Study, NUST (Remote) May 2026 – July 2026

- Implemented and executed the experimental pipeline for a study evaluating bias in LLMs, designed by a PhD student; manuscript currently under review.

GenAI Intern, SkyLabs-AI, Islamabad, Pakistan (Hybrid) Oct 2024 – Apr 2025

- Worked on developing explainability dataset for solving the Abstraction & Reasoning Corpus (ARC), a reasoning benchmark for AI models, and generated synthetic data to improve generalization to unseen patterns.

ROBOTICS PROJECTS

ZMP Analysis & Motion Generation for Humanoids (Final Year Project, Extended)

- Reproduced CLoSD (Tevet et al.), a pipeline that pairs a diffusion-based motion planner with a physics-simulated tracking controller, generating humanoid motions from text prompts (e.g., "walk forward").
- Developed zero-moment point (ZMP) analysis to evaluate the dynamic stability of diffusion-generated motions, computing and visualizing ZMP trajectories against the support polygon.

Self-Balancing Robot

- Built a two-wheeled self-balancing robot from scratch (on two different hardware platforms, Arduino and ESP32) with a custom MPU6050 library, low-pass/complementary filtering, and PID control tuning.

Rotary Inverted Pendulum (Ongoing Personal Project)

- Prototyped closed-loop electronics (STM32, AS5600 encoder, stepper motor, PD control) to validate Rapid Motor Adaptation (RMA); now implementing RMA's base-policy-plus-adaptation-module approach in simulation to close the sim-to-real gap.