Mohammad Nazmur Rahman Emon

Embedded Systems & IoT Engineer | Firmware, PCB Design, Robotics, Power Electronics

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PROFILE

EEE graduate and embedded-systems builder with hands-on experience across firmware, custom PCB design, circuit simulation, sensor integration, IoT/cellular communication, robotics, and power-electronics prototypes. Comfortable moving from schematic and datasheet analysis to C/C++ firmware, hardware bring-up, debugging, validation, technical documentation, and demo-ready product prototypes.

EMBEDDED SKILL SNAPSHOT

C, C++, Embedded C	**ESP32-WROOM-32, Arduino**	**GPIO, PWM, ADC, Timers**	**UART, SPI, I2C, RS-485**
MQTT, TCP/IP, HTTP, Wi-Fi	**GPRS, 4G LTE, SMS, AT Commands**	**Infrared Remote Protocols**	**KiCad, EasyEDA, Proteus**
2-Layer and Custom PCB Design	**Schematic Review, PCB Validation**	**Soldering, Bring-Up, Debugging**	**Sensors, Relays, Load Control**
Power Electronics, Inverter, APFC	**Robotics and Rover Electronics**	**PlatformIO, Arduino IDE**	**MATLAB, Fusion 360, LightBurn**

EXPERIENCE

Embedded System Intern
Dec 2025 - May 2026

Cybernetics Hi Tech Solutions (Pvt) Ltd, Dhaka

- Developed and tested C/C++ firmware for microcontroller-based prototypes, including sensor and communication-peripheral integration.
- Integrated UART, I2C, RS-485, and MQTT-based telemetry paths; supported hardware/software debugging during bring-up.
- Assisted schematic review and KiCad PCB validation; performed soldering, board checks, and structured technical documentation.

Lead - Circuit Simulation & PCB Design
Sep 2023 - Aug 2024

AUST Mars Rover Team, Ahsanullah University of Science and Technology

- Led circuit simulation and 2-layer PCB development for rover subsystems, coordinating electronics work with mechanical and software teams.
- Designed and reviewed rover electronics using Proteus and EasyEDA; supported prototype testing, troubleshooting, and integration.
- Prepared documentation and presentations for design decisions, validation notes, and competition-facing technical communication.

Customer Support Provider
Nov 2023 - Jan 2025

ElevateMart

- Handled chat/email support and cross-team coordination, strengthening client communication, issue tracking, and response discipline.

SELECTED EMBEDDED PROJECTS

Full project gallery: www.nazmur.engineer/#projects

Universal IR Gree AC Remote | ESP32-WROOM-32, Wi-Fi, HTTP, Infrared, GPIO, Custom PCB

- Built a browser-controlled replacement remote for a Gree AC using an ESP32 web server, IR transmitter/receiver hardware, physical buttons, status LEDs, and a local web UI.
- Mapped UI actions to Gree AC IR frames and designed the compact PCB from schematic to prototype with regulator, USB input, IR output stage, receiver connection, buttons, and LEDs.

A7670C 4G Module Smart Phone Prototype | A7670C, 4G LTE, Touch TFT, UART, AT Commands, SMS

- Created a touchscreen embedded phone concept with dialer, SMS, inbox, settings, and on-screen keyboard flows.
- Managed modem communication through UART AT commands and considered cellular-module power spikes during prototyping.

SIM800 GPRS MQTT Test Bench | SIM800, GPRS, MQTT, HTTP, UART, AT Commands, TFT Logs

- Implemented a cellular IoT test bench that initializes a SIM800 modem, checks network registration, attaches to GPRS, runs HTTP GET tests, and experiments with MQTT over GPRS.
- Displayed modem startup, retry, network, HTTP, and MQTT states on a TFT screen to make debugging visible during long connection cycles.

ESP32 TFT Game Display | ESP32, TFT Display, SPI, GPIO, Embedded Graphics, Game Loop

- Built a playable 2D embedded game on an ESP32-driven TFT display, rendering lanes, obstacles, score, menu, collision, and game-over states directly on the microcontroller.

Linear Encoder 2D Game Controller | Linear Encoder, Input Sensing, GPIO, Serial / USB HID Concept

- Developed a physical linear-encoder controller that converts measured movement into game-control events for low-latency human-interface experimentation.

Smart Energy Meter and Load Controller | Arduino/ESP32-class MCU, LCD, Keypad, Relay, Voltage/Current Sensing

- Built a power-monitoring prototype that displays live voltage, current, power, and energy while switching connected loads through relay/load-control hardware.
- Designed firmware flow for measurement display, keypad input, and load-control decisions for prepaid-metering, appliance supervision, or lab-load monitoring use cases.

IoT-Based Home Security System | Microcontroller, MQTT, Sensor Alerting, Real-Time Monitoring

- Designed a smart alert prototype with sensor-triggered monitoring and MQTT communication for real-time home-security notification flows.
- Focused on practical alarm logic, event transmission, and readable monitoring output for quick debugging during testing.

Power Electronics Builds | Pure Sinewave Inverter, Automatic Power Factor Corrector, Load Monitoring

- Built and documented power-electronics prototypes focused on stable AC output, intelligent load monitoring, and automatic power-factor correction.
- Worked with switching, measurement, correction logic, and safe prototype testing practices for power-oriented embedded systems.

Assistive and Competition Robotics | Patient Assist Robot, Robotic Hand, Line Follower, Fire Fighting Robot, Waterborne Bot, RC Quadcopter

- Delivered multiple robotics prototypes covering assistive mobility, robotic manipulation, autonomous line following, fire response, waterborne movement, and quadcopter control.
- Applied sensor integration, motor/control logic, mechanical-electrical coordination, and competition-style rapid prototyping.

Emergency Calling Device | Embedded Alerting, User Input, Communication Workflow

- Created an emergency-response prototype focused on simple user interaction and fast alert-triggering for assistive or safety-oriented scenarios.
- Designed the workflow around quick activation, clear feedback, and reliability under simple field-use conditions.

EDUCATION

B.Sc. in Electrical and Electronic Engineering — 2020 - 2025
Ahsanullah University of Science and Technology — CGPA: 3.007 / 4.000

Undergraduate Thesis — Power Systems, Renewable Energy
Design of Hybrid Power System to Provide Reliable Supply to Rural Areas of Bangladesh

HSC - Adamjee Cantonment College | GPA: 5.00 / 5.00 — 2017 - 2019

SSC - Adamjee Cantonment Public School | GPA: 5.00 / 5.00 — 2015 - 2017

CERTIFICATES, AWARDS & LEADERSHIP

Certificates & achievements: Sakura Science Exchange Program, Japan (2016); Top 5 - IC4IR Industrial Exhibition (2021); 1st Position - Line Follower Competition (2019); 1st Prize - 6th DCSC National Science Exposition (2018); 2nd Position - DRMC 11th National Science Carnival (2018); 1st Position - IT Olympiad, SAGC Science Festival (2017); Divisional Winner - Creative Talent Hunt (2014).

Leadership: Sub Executive - AUST Robotics Club (2023); House Captain - ACC Explore Club (2018-2019); Participant - Sakura Science Exchange Program, Japan (2016).

ENGINEERING PRACTICES

- Firmware workflow: C/C++ development in Arduino IDE and PlatformIO, serial/TFT debug output, retry logic, and state-based control for communication-heavy prototypes.
- Hardware workflow: schematic review, 2-layer PCB layout, regulator and connector planning, soldering, continuity checks, power checks, and board-level validation.
- Integration workflow: sensor, display, keypad, relay, IR, cellular modem, and robotic subsystem integration with practical troubleshooting and documentation.
- Communication workflow: UART, SPI, I2C, RS-485, MQTT, HTTP, Wi-Fi, GPRS, 4G LTE, SMS, and AT-command based device testing.

PROJECT FOCUS MAP

IoT & Cellular	ESP32 Wi-Fi IR remote, A7670C 4G phone, SIM800 GPRS/MQTT test bench, IoT home security
Power & Measurement	Smart energy meter/load controller, pure sinewave inverter, automatic power factor corrector, rural hybrid power thesis
Robotics	AUST Mars Rover electronics, patient assist robot, robotic hand, line follower, fire fighting robot, waterborne bot, RC quadcopter
Interfaces & Displays	Touch TFT phone UI, TFT game rendering, LCD/keypad load control, linear encoder game input, browser-based AC remote UI

References: Mr. M. M. Atiqur Rahman, Assistant Professor, Dept. of EEE, AUST (mmarahman.eee@aust.edu) | Mr. Hasib Md. Abid Bin Farid, Assistant Professor, Dept. of EEE, AUST (hasib.eee@aust.edu)