

Mohamed Mahmud Ali

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SUMMARY

Embedded System Security

Espoo, Finland

Embedded Systems and Information Security — Electrical Technology

Embedded Systems Security Engineer with a strong foundation in secure embedded software, electronics, and system-level testing. Specialized in securing communication protocols, RTOS-based systems, and hardware–software integration across IoT and industrial platforms. Experienced in vulnerability analysis, secure network architectures, and validation of safety-critical embedded systems. Passionate about building resilient, reliable, and secure embedded infrastructures.

EDUCATION

Tampere University

Tampere, Finland

Master's Programme in Computing Sciences and Electrical Engineering/ Information Security

2025 – Present

Vaasa University of Applied Sciences

Vaasa, Finland

Bachelor of Engineering, Information Technology (Embedded Systems/GPA 3.56)

2020 – 2024

Vamia Aikuiskoulutus

Vaasa, Finland

Diploma, Electrical and Automation Technology

2017 – 2019

University of Baghdad

Baghdad, Iraq

Bachelor of Science, Mathematics

2008 – 2013

EXPERIENCE

Matkahuolto Oy

Espoo, Finland

Package Tracking & Support Analyst

Nov 2024 – Present

- Tracked the package lifecycle from order to delivery, ensuring error resolution and system integrity.
- Resolved customer complaints and ensured timely and correct deliveries.
- Diagnosed and corrected errors in master and slave systems.
- Adjusted package parameters and validated delivery success.

Arcteq Oy

Vaasa, Finland

Test Automation Developer

May 2023 – Oct 2023

- Built a Python-based automated testing system using Jenkins and LabJack for embedded protection relays.
- Designed scalable test cases simulating real-world scenarios, enabling early bug detection.
- Integrated Docker to create containerized, reproducible test environments.
- Utilized Robot Framework for continuous validation and comprehensive test coverage.
- Collaborated cross-functionally to align test infrastructure with software release cycles.

Wärtsilä Oy

Vaasa, Finland

Cybersecurity & Automation System Engineer

Jan 2023 – May 2023

- Designed secure communication layers and VLAN-based network segmentation using FortiGate firewalls.
- Developed Python scripts to automate VM deployment and configure security rules.
- Gained experience with backend communication protocols such as MODBUS TCP and industrial automation interfaces.
- Contributed to cloud-oriented virtual infrastructure using VMware ESXi, aligning with scalable system requirements.

Bravida Oy

Vaasa, Finland

Electrician

Sep 2019 – Dec 2021

- Worked across multiple project sites including Wärtsilä Voas, Tritonia Library, and Omena Hotel.
- Handled installation of electrical cabins, cable preparations, and conducted various electrical measurements.
- Performed insulation resistance, continuity resistance, leakage current, and winding resistance tests using specialized analyzers.
- Demonstrated strong adaptability, work ethic, problem-solving skills, and effective task organization in team-based environments.

Earthlink Telecom

Baghdad, Iraq

Network Designer

Jun 2008 – Apr 2013

- Designed and implemented secure internet infrastructure for cities and universities.
- Built network stations to expand coverage and increase network area.
- Monitored and optimized performance across large-scale networks.
- Provided technical support to clients, resolving security and connectivity issues.

TECHNICAL SKILLS

Programming: Java, Python, C, C++, GraphQL, SQL, Robot Framework
Protocols: USART, I2C, SPI, MODBUS RTU, WiFi, NFC, BLE, TCP/IP, UDP, SSL/TLS, SSH, DHCP, MQTT (familiar)
Hardware: STM32, Raspberry Pi, AVR, ATSAME70, FPGA (basic)
Testing & Validation: Oscilloscope, Spectrum Analyzer, Signal Generator, Fuzzers
Tools & Platforms: Git, Linux, WSL, Wireshark, Redis, Altium, Pads Pro, LTspice, KiCad, Altium Designer, CATMATIC 18
Backend & Microservices: Docker, Kubernetes, REST APIs
Cloud & DevOps: AWS (basics), Jenkins, VMware ESXi, Docker Compose
Databases & Streaming: PostgreSQL, MongoDB, SQL, Kafka (familiar)
Network & Security: CCNA, FortiGate, Cisco, Firewalls, policies, Switch Configuration
Operating Systems: Linux, WSL, uC/OS, FreeRTOS, Zephyr RTOS

PROJECTS

- Battery Management System (BMS)** – STM32L152RE, Modbus RTU, Grafana, Docker2023
 - Designed a high-power PCB and developed firmware in C for STM32L152RE to monitor, protect, and control LiFePO4 battery packs.
 - Implemented State of Charge (SOC), State of Health (SOH), and Depth of Discharge (DOD) with EEPROM storage.
 - Integrated Modbus RTU protocol over USB for communication between controller and nodes.
 - Applied protection algorithms for overcurrent, overcharge, and overdischarge using shunt resistors, MOSFETs, and amplifiers.
 - Developed a Python script to transfer real-time data from STM32 to SQL database via Modbus RTU.
 - Set up Docker Compose with MariaDB and Grafana for visualization and monitoring.
 - For more information, please visit www.alidulaimi.com.
- Bluetooth Low Energy Mesh Network for IoT Solutions** – Nordic nRF52-DK, BLE Mesh, C/C++2024
 - Designed and optimized a BLE Mesh network using Nordic nRF52-DK boards for real-time environmental monitoring.
 - Developed firmware in C/C++ for efficient and reliable multi-node communication.
 - Evaluated Packet Loss Ratio (PLR) in single-link, chain, mesh, and hybrid topologies.
 - Improved reliability via multipath delivery and redundant communication.
 - Conducted real-world tests to validate BLE Mesh performance in various scenarios.
 - Enhanced scalability and accuracy for IoT monitoring in smart buildings and industrial automation.
 - For more information, please visit www.alidulaimi.com.
- Light Intensity Processing for IoT Solutions** – NSL 19M51, STM32, Modbus RTU, GraphQL, SQL2024
 - Designed and built hardware interface for NSL 19M51 light sensor; amplified and filtered analog signals for ADC processing.
 - Connected sensor output to STM32 Nucleo microcontroller and implemented signal acquisition logic.
 - Developed Modbus RTU transmission using MAX3485 transceiver over USART protocol.
 - Sent real-time sensor data to SQL database via GraphQL API for backend integration.
 - Created frontend visualizations with live graphs to display light intensity trends over time.
 - Optimized sensor data flow from analog acquisition to digital transmission and frontend display.
 - For more information, please visit www.alidulaimi.com.

LANGUAGES

English: Fluent	Finnish: Intermediate	Swedish: Intermediate	Arabic: Native
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REFERENCES

Kim Sund Branch Manager, Bravida OY +358 50 466 3974 kim.sund@bravida.fi	Juha Ramsila Supervisor, Bravida OY +358 207 663 623 juha.ramsila@vamk.fi	Ross Bailey Cyber Operations, Wärtsilä OY +358 50 563 9150 ross.bailey@wartsila.com
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