Abdullah M. Almahfouz

EMBEDDED SYSTEMS AND IOT DEVELOPER

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Introductory Profile

Highly motivated and results-oriented Embedded Systems and IoT Developer with practical experience in building complete hardware-software integrated solutions. Currently expanding expertise in ROS2 and PCB design. I specialize in end-to-end embedded solutions using C++ and Python, with particular focus on single board computers and microcontrollers. My technical expertise spans robotics development, IoT system automation, and real-time data integration with cloud databases. With a passion for automotive, industrial automation, and military applications, I focus on creating robust embedded solutions that bridge hardware design, embedded programming, and system integration.

Education

IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY, SAUDI ARABIA   **2019 – 2024**

Bachelor's Degree in Computer Science

Professional Experience

Tuwaiq Academy | Embedded Systems Engineer   **Jan 2023 – Current**

- Embedded Systems Engineer.

- Design and deliver comprehensive mechatronics training programs covering Arduino, Raspberry Pi, ESP32, and electronics fundamentals for all skill levels.

- Supervise laboratory operations and mentor students on competition projects, ensuring safe and effective hands-on learning environments.

- Lead development of research and industry-focused prototypes, guiding 20 students per quarter through complete project cycles with over 60 unique graduation projects completed.

- Official representative of the Digital Manufacturing department for external communications and stakeholder engagement.

Prince Sultan Defense Studies and Research Center (PSDSARC) | COOP Trainee
Mar 2024 – May 2024

- Confidential

Quality Support Solutions (QSS)| Robotics Engineer Trainee   **Nov 2023 – Jan 2024**

- Gained hands-on experience with ROS framework for robotics application development.
- Designed and modeled 3D robotics components for prototype development.
- Participated in smart city modeling project incorporating automated systems and sensors.

Projects

Competition & Award-Winning Projects

NASAM - Environmental Air Quality Monitoring System *Lead Developer | Sedra Hackathon 2025*

- Engineered cost-effective air quality monitoring solution achieving 73% cost reduction (270,000 SAR vs 1,000,000 SAR) while detecting CO_2, NO_2, and PM2.5 particles in underserved urban areas.
- Designed scalable IoT architecture using ESP32 and solar power systems enabling rapid deployment with minimal maintenance requirements.

Intelligent Maritime Shield Defense System *Lead Developer | Personal Project – GCC Science & Cultural Week*
2024

Won First Place in Robotics Track representing Arabian Gulf Countries Universities

- Developed AI-powered military defense prototype integrating computer vision and robotics control for asymmetric maritime threat detection

- Demonstrated advanced embedded systems engineering and military AI applications on international competition level.

AutoNav WRO Competition Vehicle *Embedded Engineer | Tuwaiq Academy* *2024*

Won 1st Place in Arabian Countries and achieved 9th Place Worldwide at World Robot Olympiad

- Developed autonomous competition vehicle using Raspberry Pi 5 with complete electronic design.
- Engineered advanced obstacle detection and sensor fusion combining camera vision, ultrasonic sensors, and IMU data for precise autonomous navigation on international competition level.

Aquaintelsys: Intelligent Aquaponic System *Embedded Engineer | Tuwaiq Academy* **– ITEX2024**

Won Best Project Award at ITEX 2024

- Developed AI-powered camera diagnostic system for real-time plant and fish health assessment with automated alert notifications.
- Implemented comprehensive automation with pH, temperature, and nutrient monitoring plus web-based dashboard for remote control.

Industrial & Commercial Applications

SmartStock Inventory Management System *Lead Developer | Tuwaiq Academy 2025*

- Architected AI-powered laboratory inventory system reducing manual inventory checks by 80% and eliminating equipment shortages through automated component categorization.
- Developed NFC-enabled tracking system with real-time custody monitoring and comprehensive database logging for operational readiness.

Personal Innovation

PetVibe Animal Shelter Management System *Technical Consultant | Personal Lab Project* **2025**

- Engineered wireless vibration-based animal management system for humane shelter operations with centralized control capabilities.
- Implemented extended range wireless communication protocol enabling individual or group animal alerts using harmless vibration motors.

SafeCount Smart Evacuation System *Lead Developer | Personal Lab Project* **2025**

- Developed intelligent building occupancy monitoring system using IR sensors providing real-time headcount during emergency situations with automated fire detection integration.

- Created scalable wireless sensor network solution adaptable to various building sizes with real-time emergency response dashboard.

VoiceMirror Smart Display System *Technical Consultant | Personal Lab Project*   *2025*
- Designed voice-controlled smart mirror system powered by Raspberry Pi enabling hands-free daily task management and scheduling.
- Integrated voice recognition technology with intuitive display interface for calendars, weather updates, and personalized information.

SolarFan Climate Control System Lead Developer | Personal Lab   **2024**
- Built solar energy-powered climate control system with 72-hour backup capability and intelligent temperature sensing algorithms.
- Created sustainable IoT solution with real-time cloud database monitoring and automated energy optimization protocols.

SecureLock Biometric Access System *Lead Developer | Personal Lab*   *2024*
- Developed secure cabinet access system using ESP32 with Firebase integration featuring fingerprint authentication and multi-user management.
- Implemented comprehensive security solution with real-time access logging, web-based monitoring, and tamper detection feature.

Skills

- **Programming Languages:** C, C++, Python
- **Embedded Systems:** Single Board Computers, Microcontrollers, Electronics, System Integration
- **IoT & Cloud:** WiFi, GPS, Sensor Integration, Firebase, Supabase, Real-time Data Transmission
- **Development Tools:** Arduino IDE, VS Code, System Automation, 3D Printing

Licenses & Certifications

An Introduction to Programming the Internet of Things (IoT)   **2024**

UCI at Coursera Platform
- Comprehensive IoT development covering Arduino, Raspberry Pi, and Python programming.

Robotics and AI   **2023**

Ministry of Communications
- Robotics fundamentals and AI applications in embedded systems.

Python for Data Science, AI & Development   **2022**

IBM – Coursera Platform
- Python programming with NumPy, Pandas, APIs, and web scraping.

Languages

- **Arabic:** Native.
- **English:** Full Professional Proficiency.