Hassan Ibrahim Hassan

Software Engineer, Undergraduate ECE Engineer

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Summary

Motivated Software Engineer and Undergraduate Communication and Electronics Engineer with solid experience in C, C++, Python, and backend development using Node.js. Skilled in designing and implementing embedded systems, IoT applications, and digital/analog circuits. Hands-on experience with tools like MATLAB, Altium PCB Designer, and OpenCV. Strong problem-solving mindset with proven ability to adapt across hardware and software domains. Passionate about applying technical knowledge to real-world projects, from system design to application development, while thriving in collaborative team environments.

Experience

STP Academy DevOps Course Aug 2025 - present

- Currently enrolled in DevOps Course, focusing on CI/CD pipelines and automation
- Learning Docker, Kubernetes, Jenkins, and Ansible with hands-on practice
- Exploring cloud deployment and Infrastructure as Code (Terraform)

ROUTE Academy Back-End with NodeJS Diploma May 2025 - present

- Currently enrolled in Node.js Diploma, focusing on scalable backend architecture.
- Gaining expertise in Express.js, microservices, GraphQL, WebSockets, and API security.
- Exploring performance optimization, database scaling (MongoDB/SQL), and cloud deployment.

Mahara-tech Introduction to the Internet of Things - IoT Value Chain Aug 2025

- Gained knowledge of the IoT value chain, smart device features, connectivity technologies, and development challenges.
- Explored Application Enablement Platforms, including Master of Things for device management, data processing, and solution deployment.
- Discovered real-world IoT use cases across industries, highlighting their impact and business value.

IMT Embedded Systems Diploma Jul 2023 - Feb 2024

- Covered C Programming, Embedded Systems Concepts, and Interfacing with extensive hands-on practice.
- Studied Real-Time Operating Systems (RTOS), Testing, and Tooling for embedded applications.
- Explored Automotive Bus Technology and industry-relevant embedded system integration.

Technical Skills

- Programming	C, C++, Python, OpenCV, JavaScript (Node.js)
- Backend	Node.js, Express.js, Socket.IO, REST API Design, Mongoose
- Embedded Systems	AVR (ATmega32), ESP32, IoT Applications, RTOS Basics
- DevOps	Docker, Kubernetes, Linux Administration 1 & 2, Jenkins, Ansible, Terraform
- Tools	MATLAB, Altium Designer, OpenCV, Git
- Concepts	Data Structures, Algorithms, OOP, Digital/Analog Circuits, Communication Systems
- Soft Skills	Leadership, Problem Solving, Teamwork, Project Collaboration

Projects

ESP32-Based AI Color Tracking Robotic Arm Github

Engineered a real-time computer vision system to control a robotic arm via an ESP32 microcontroller. Developed an OpenCV algorithm for object detection and coordinate calculation on a PC, which communicated pan/tilt angles to the ESP32 over serial. Programmed the ESP32 in C++ to parse commands and precisely control servo motors, creating a robust hardware-software pipeline for autonomous tracking. Demonstrated expertise in embedded systems programming, sensor integration, and real-time AI control.

ECG Arrhythmia Detection using Machine Learning Github

Developed an end-to-end ECG analysis system using the MIT-BIH Arrhythmia Database. Implemented preprocessing to remove noise, performed R-peak detection and heart rate variability analysis, and applied machine learning models to classify normal vs. arrhythmic heartbeats, demonstrating expertise in biomedical signal processing and data-driven healthcare diagnostics.

ATmega32-Based IC Tester Github

Developed a microcontroller-based IC Tester using ATmega32 and embedded C to automatically identify and validate digital ICs against their truth tables. Implemented configurable pin initialization, output control, and input verification for multiple logic families including AND, XOR, buffers, latches, decoders, and counters. Designed modular firmware to support scalability and robust error detection, showcasing expertise in digital logic design, embedded systems programming, and hardware-software integration.

ATmega32-Based Smart Home Automation System Github

Designed and implemented a complete smart home automation system centered around an ATmega32 microcontroller. Developed embedded C firmware to integrate a network of hardware components including DC and servo motors for physical actuation, relays for high-power device control, and a UART Bluetooth module (HC-05) to enable wireless monitoring and control via a custom mobile application. Engineered an end-to-end IoT solution for real-time environmental monitoring and automated device management, demonstrating expertise in peripheral interfacing, wireless communication protocols, and real-time embedded systems design.

ESP32-Based Environmental Monitoring & Control System

Developed a comprehensive environmental monitoring and control system using the ESP32 microcontroller. Designed and implemented firmware to interface with multiple sensors (DHT11/DHT22, voltage/current sensors) for real-time measurement of temperature, humidity, and electrical parameters. Created a responsive control system for automated device management and real-time data display. Successfully demonstrated the ESP32's capabilities in handling multi-sensor integration, data processing, and IoT functionality for smart environment applications.

Education

Present Bachelor's Degree in Communication and Electronics Engineering at **Alexandria University** (GPA: 2.96/4.0)

Languages

Arabic Native
English B2