

Moses Sampson

Embedded Software Engineer

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🛂 Employment Visa Holder

Profile

Creative and solution-driven Embedded Systems Engineer with hands-on experience in the event industry delivering high-impact electromechanical systems. Expert in PCB design, C++/Python programming, and integrating hardware like robotic arms and precision servo motors. Proven track record of delivering fully-functional interactive systems for major tech events such as GITEX and LEAP. Adept at controlling industrial hardware using advanced communication protocols (UDP, RS485, Modbus RTU), network debugging tools (Wireshark), and creating real-time user interfaces. I combine technical proficiency with practical implementation skills to create robust, innovative solutions.

Technical Skills

- **Embedded Integration:** Arduino, ESP32, STM32, Controllino PLC, Raspberry Pi.
- **PCB Design:** Schematic capture, board layout, prototyping (EasyEDA, Altium).
- **Programming:** C++, CMake, Vcpkg, Qt, Python, OpenCV, Postgresql, Pyside6, Opengl, Multithreading, Webscrapping, Django.
- **Software:** Madrix 5, Touch designer, Resolume Arena, Novastar, MadMapper, Autocad, Microsoft Office, Overleaf, Pycharm.
- **Communication Protocols:** UDP, TCP/IP, RS485, Modbus RTU, DMX, CAN, SPI, I2C, UART, EthernetCAT, OSC.
- **Network:** Wifi, Mqtt, Espnow, Bluetooth, Wireshark, Sockettest.
- **Motor Control:** JMC iHSS series, Modbus RTU/RS485 protocol implementation, ESP32 wireless control.
- **Real-Time Sensor Fusion:** Mahony filter, PID controller algorithms, real-time rendering.
- **Industrial Robotics:** Elite Robot EC612 programming, system integration.
- **Sensors & Vision:** Hokuyo LiDAR, Kinect Azure depth sensing, projection mapping.

Education

BEng Electrical and Electronic Engineering [Heriot Watt University](#)

Dubai, UAE 2020-2024

Relevant Courses: Embedded Systems, Computer Architecture, Signal Processing, Control Systems, Electrical Power Systems

Professional Experience

Embedded Systems Engineer ([Infinix Innovation](#))

Dubai, UAE 06/2024 - present

- Designed, developed, and deployed interactive electromechanical systems for live event installations showcased at GITEX and LEAP.
- Delivered full-stack embedded solutions involving hardware (PCB + motor control) and software (GUI, networking, protocols).
- Created custom C++ and Python libraries to handle real-time motion control, visualization, and communication for industrial motors and robotic systems.

- Extensive work with RS485/Modbus RTU protocols, ensuring reliable device register access through low-level firmware and libraries.
- Collaborated with UI/UX and Unity developers to integrate hardware systems into interactive public experiences.
- Integrated industrial robots with custom control interfaces using Python and C++.
- Engineered wireless control systems using ESP32 with failover to Bluetooth.

Mechatronics Engineer (*Option One Live*)

Dubai, UAE 2024 - present

- Engineered a custom Python application enabling any flat surface to be transformed into a multi-touch interface using Hokuyo LiDAR sensors, with configurable trigger zones, boundary mapping, remote control, and real-time UDP data streaming.
- Built a companion visualization tool providing live monitoring of LiDAR detections, active zones, and trigger events for setup and live show operation.
- Developed a Python-to-Unity communication bridge controlling 6-seater motion platforms and 6-DOF single-seater simulators, including an automated motion-generation feature that synthesizes platform movement from intended video content.
- Authored custom TouchDesigner control containers orchestrating Hony LED kinetic units, winches, FlipTrix modules, and arbitrary DMX-based fixtures within unified show pipelines.
- Created a Kinect Azure-based mapping application capable of mapping any defined area and dispatching UDP or OSC messages based on user-configured zones, with adjustable on/off signal buffer timing.
- Designed a permanent sliding-screen control application managing motor-driven screens with multi-point trigger logic, integrated with Unity applications via UDP for synchronized show control.

Freelance Embedded System Developer (*Fiverr*)

Dubai, UAE 03/2021 - 06/2024

- Developed custom embedded systems based on client requirements.
- Developed systems ranging from Arduino and ESP32 to complex boards such as the STM32 development board.
- Maintained strict project timelines and resource allocation, consistently meeting or exceeding client deadlines.
- Developed customized programming solutions in C/C++, Python and Database like Postgresql for optimized system functionality and performance.

Projects

Slidex – Kinetic LED Display System, (*Infinix Innovations*)

Dubai, UAE 07/2025 - 08/2025

- Designed and implemented Slidex, a large-scale multi-structure kinetic LED display system for a corporate event at Grand Hyatt Dubai.
- Built complete ESP32-based control electronics with Ethernet and RS485 integration; designed and tested all PCBs using EasyEDA.
- Developed real-time wireless communication using ESP-NOW for synchronized rotation and vertical movement across multiple screens.
- Created a dynamic Python + PySide6 control application for scenario playback, video triggering (Resolume), and operator-friendly live control.
- Performed on-site integration, calibration, and live operation ensuring reliable, ultra-low-latency performance under event conditions.

Tic-Tac-Toe Human vs Robot (WETEX 2025), (*Infinix Innovations*)

Dubai, UAE 09/2025 - 9/2025

- Led the design and deployment of an interactive Tic-Tac-Toe Human vs Robot exhibit using the EC612 Robot for the WETEX 2025 exhibition.
- Developed complete electronic system architecture including LED indicators, electromagnet actuation, and LAN network integration.
- Programmed the robot using JBI, Lua, and Modbus TCP for dynamic response and game logic synchronization.

- Built a PySide6-based desktop application for real-time game state control and robot coordination.
- Executed all wiring, testing, and on-site integration; ensured reliable live operation during exhibition.

Real-Time Robotic Sorting with Computer Vision, ([Fiverr](#))

Dubai, UAE 05/2024 - 07/2024

- Engineered a full-stack robotic sorting system powered by computer vision to detect and classify object anomalies in real time.
- Trained and deployed a custom image classification model integrated into the sorting workflow for precise anomaly detection.
- Designed and fabricated the hardware system, including PCB design, motor control circuitry, and real-time signal interfaces.
- Developed Arduino firmware for motion control and high-speed data exchange with the desktop application.
- Built a Qt + Plotly-based GUI for real-time visualization of sorting data, live calibration, and manual override.
- Implemented UDP over Ethernet for low-latency, bi-directional communication between the microcontroller and GUI.
- Integrated a PostgreSQL database for persistent logging, enabling analytics and performance tracking of the sorting process.

Smart Trash Management Robot, ([Heriot-Watt University](#))

Dubai, UAE 01/2024 - 04/2024

- Designed and developed an autonomous trash-picking robot capable of detecting, collecting, and disposing of waste at designated stations.
- Integrated Blynk IoT platform for real-time monitoring, remote control, and two-way communication between the robot and the operator.
- Implemented smart notifications for transit status, pickup arrival, and return-to-base events to enhance operational feedback.
- Conducted thorough sensor testing, control programming, and system validation to ensure reliable and efficient robot performance.

Online Courses & Certifications

- Crash Course Electronics and PCB Design (Aug. 2022) - UDEMY
- 100 Days of Code: The Complete Python Pro Bootcamp (Jul. 2023) - UDEMY
- Electrical Systems: Reading Drawings and Schematics (Apr. 2024) - LinkedIn
- Autodesk Inventor 2022 Essential Training (Mar. 2023) - LinkedIn

Languages

- English [Native]