Ahmed Hisham Hassabou

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Graduation Project

SEP. 2023 – JUN. 2024
Project Title: SmartBatch – IoT-Based Automation for Concrete Batching Plants. **(Grade A+)**
Role: IoT System Development Lead. (Team Leader)
Responsibilities: Designed Level-3 IoT system, AWS IoT Core integration, implemented AWS Lambda for automation, connected manual station to cloud, applied stochastic time optimal control for weighing station.
AWS Services Used: IoT Core, Lambda, S3, DynamoDB
Impact: Enhanced production efficiency, quality, and smart decision-making.

OCT. 2023 – DEC. 2023
Company: Garraio LLC, Under Supervision of Prof. Sherif Hammad
Project Title: Development of Cordoba Automotive Software Tool
Role: Volunteer.
Responsibilities: aided in the configuration and testing of CAN communication between Multiple Aurix Tricore Boards and between Aurix Tricore and TM4C123GH6PM Board.

Education

2019 – 2024
Dual Degree Engineering Student at Ain Shams University (iCHEP) & University of East London, under Mechatronics and Automation Program, **CGPA:** 3.40 with **Declaration of Honor**, **Rank:** 9.

2016 – 2019
IGCSE Student at Orouba Language School. Graduated with cumulative **GPA** 99.44%, **Rank:** 2.

Experiences

JUN. 2024 – CURRENTLY (COURSE 2)
Advanced Embedded Linux Development Specialization / University of Colorado Boulder

- **Course 1:** Linux System Programming and Introduction to Buildroot (43 hours)
- **Course 2:** Linux Kernel Programming and Introduction to Yocto Project (40 hours)
- **Course 3:** Linux Embedded System Topics and Projects (47 hours)

MAY. 2024 – CURRENTLY (SECOND TERM)
Diploma / Mastering Embedded Systems (Eng. Keroles Shenouda).
Studying and working on this diploma covering the following topics:

- **First Term:** C-Programming, Embedded C, Data Structure, System Design.
- **Second Term:** Microcontroller Architecture, Interfacing, Testing Validation.
- **Third Term:** ARM Inst Set, RTOS and OS, CAN + Ethernet, ROS, C++, Intro to AutoSar.

FEB. 2024 – JUL. 2024
Diploma / Embedded Linux (Eng. Moatasem Elsayed).
a rigorous Embedded Linux Diploma program encompassing 120 hours of comprehensive training. Proficient in Python and C++ programming languages, adept at Linux system administration, Bash scripting, and Raspberry Pi development. Skilled in Yocto for embedded Linux development, including device driver implementation. Additionally, gained familiarity with Rust programming language.

OCT. 2023 – MAY. 2024
Self-Driving Cars Specialization / University of Toronto
Completed specialized series of courses in Autonomous Vehicle Engineering, gaining hands-on experience with real data sets and CARLA simulator. Proficient in state-of-the-art practices like object detection, localization, and behavior planning, ready for roles in the self-driving car industry.

AUG. 2023 – SEP. 2023
Diploma / ITI 6-Weeks Advanced Embedded Systems Track.
a 6-week training program, totaling 160 hours, in the Advanced Embedded Systems Track at ITI. The training covered the following key topics: ARM Cortex M3/M4 Architecture & Core Peripherals. Exceptions, Interrupts & NVIC. SYSTICK & Real-time Concepts. Communication Protocols and DMA. Start-up Files and Bootloader.

JUL. 2023 – AUG. 2023

Trainee / Embedded Systems and Automotive Technologies, Garraio LLC.

Under the guidance of Prof. Sherif Hammad, I immersed myself in various aspects of embedded systems and automotive technologies. This comprehensive training encompassed three key areas:

1. **ARM Microcontroller Development:** I received extensive training in ARM Microcontroller development, specifically focusing on the Tiva C series. This involved practical projects with various peripherals.
2. **Ethernet & CAN Protocols:** I gained expertise in Ethernet network architecture, packet structures, and configuration for efficient data transmission. Additionally, I mastered CAN bus architecture, message formats, and troubleshooting techniques.
3. **Automotive Software Architecture (AutoSAR):** I received hands-on training in AutoSAR, focusing on SWCs, RTE, and AutoSAR configuration tools.

MAY. 2023 – JUL. 2023

Course / ROS (Robotic Operating Systems), Delft University of Technology, edX.

- **Key Skills:** ROS Essentials, URDF, GMapping, ROS MoveIt, Robot Vision.
- **Achievements:** Completed 6 graded assignments, including a final project.
- **Project:** Build a production line application with two industrial robot arms and a mobile robot.

JUL. 2022 – NOV. 2022

Diploma / Standard Embedded Systems.

- Full Embedded Systems Diploma (160 Hours) under supervision of Engineer Mohamed Tarek.
- Projects: Stopwatch, Fan Speed Controller with Temperature, Distance Measuring System, and Door Locker Security System.

MAY. 2022 – JUN. 2022

Trainee / MTI Automotive Co.

- 120 Hours Summer Training in which I got introduced to almost all parts of cars of different types, petrol, and hybrid cars.
- Learnt all operations of the cars from the periodic services to the critical repairs.

JUL. 2021 – AUG. 2021

Trainee / Basic Industrial Automation, Schneider Electric (SE).

- Demonstrated an overview for Automation, PLC hardware introduction, and components. Acquired new skills about using ladder diagram (LD) on Unity Pro, Function blocks, and markers.

Projects

All Projects Details and Progress

- **Hospital Sterilization Semi-Autonomous Robot:** Developed an autonomous UV sterilization robot for hospitals, integrating PID control with RTOS and ROS, and enabling remote monitoring and control via a Wi-Fi GUI.
- **Customizing QEMU x86 Images with Yocto:** Customized QEMU x86 VM images using Yocto to create a tailored, optimized Linux distribution. Configured and built images with custom recipes and layers.
- **Rotary Inverted Pendulum LQR Control:** Designed and implemented an LQR control system for a Furuta Pendulum using MATLAB/Simulink, incorporating hardware-in-the-loop simulation and GUI integration.
- **Cortex M4 Educational Development Kit:** Developed a learning kit for transitioning from TivaC to STM32F401CC (BlackPill), adding features like on-board CAN transceiver and SPI/Ethernet Controller, reducing costs by 70%.
- **Image Search Engine:** Created a GUI for an advanced image search engine leveraging TensorFlow object detection to retrieve related images from a database based on a selected input image.
- **Image Clustering Using K-means:** cluster images using VGG features and visualize results.
- **Image Classification Using Multi-Layer Neural Network:** Developed a multilayer neural network to classify images into their respective categories using the CIFAR-100 dataset.
- **ML Optimization Techniques Comparison:** Compare the performance of five optimization techniques (GD, GD with momentum, Adam, Adagrad, Adadelta) for training a shallow neural network on the MNIST dataset.
- **Power Window Real Time Control:** Implemented an advanced automotive power window control system, utilizing FreeRTOS for real-time operation. Successfully integrated limit switches for safety and obstacle detection, enabling manual and one-touch auto functions, along with window lock and jam protection features.
- **Industrial Automation for Simulated Production System:** Designed and controlled a comprehensive simulated production line using Siemens TIA Portal software, integrating machining, sorting, and assembly processes, and developed a HMI interface for real-time monitoring and fault detection.
- **Industrial Liquid Level System:** Implementation of industrial control systems using SIMATIC S7-1200 PLC, including cascaded PID tuning and HMI design, to optimize liquid-level, while ensuring fault detection capabilities.
- **ROS1-Powered Autonomous Car:** Converted a 1/14 RC car into an autonomous vehicle using ROS1, Raspberry Pi, IMU, and encoders, achieving precise navigation and obstacle avoidance.

- **Autonomous Restaurant Robot:** A robot powered by Raspberry Pi computer vision for face and gesture detection, coupled with precise wheel control using PID algorithms.
- **Multi-Functional ARM Embedded System (Calculator, Timer, Stopwatch):** Designed a multifunctional embedded system with Calculator, Stopwatch, and Timer modes.
- **Mini – Production Line:** Designed, manufactured, and controlled a small production line that feeds, sorts, and store products of different categories (Color, Size). Utilized two microcontrollers with RTOS implementation and Ethernet communication for system integration.
- **Wind Turbine Pitch Control Mechanism:** Designed and manufactured a prototype for a pitch control mechanism to be fitted to a small horizontal axis wind turbine.

Skills

- MATLAB
- Simulink
- SolidWorks
- Inventor
- Fusion-360
- Aurix Studio
- Keil
- Code Composer
- Eclipse
- IAR Workbench
- STMCube
- Ansys
- EKTS
- Factory IO
- TIA Portal
- VREP
- Gazebo
- Rviz
- ROS Framework
- C/C++
- C#
- Python
- Lua
- HTML
- CSS
- Ladder
- SCL
- Pandas
- Numpy
- Matplotlib
- Scikit-learn
- Tensorflow
- PID Tuning
- Technical Writing
- Leadership

Languages

- Arabic (Native)
- English
- French (A2)
- German (A2)