Youssef Omar

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Summary

Engineering student with a strong foundation in software development and real-time systems, with growing expertise in machine learning. Proficient in Python, C/C++, and PyTorch; experienced in developing and deploying ML pipelines, optimizing model performance, and implementing feedback-driven improvements. Seeking ML/DL roles to apply technical skills toward impactful, data-driven solutions.

Technical Skills

Programming Languages: Python, C/C++, JavaScript, SQL

Embedded & Robotics: ATmega32A/8A, ESP32, FreeRTOS, ROS

Full-Stack Development: HTML, CSS, PHP, MySQL, Flask

Machine Learning: PyTorch, NumPy, pandas, TensorBoard, Scikit learn

MLOps: Git, Linux, Docker

Projects

Machine Learning & Deep Learning Projects:

Handwritten Digit Recognition Web App — PyTorch, Flask, HTML, CSS, JavaScript

- Developed an interactive web app for real-time classification of user-drawn digits (0–9) using a custom CNN based on the TinyVGG architecture. Trained the model on MNIST and additional custom data from Kaggle.
- Integrated a feedback loop allowing users to correct misclassifications, triggering on-the-fly retraining. Built with a Flask backend and a responsive JavaScript frontend.
- Achieved 99% accuracy on MNIST and custom data; the feedback system enabled adaptation to new handwriting styles, improving generalization and performance.

FoodVision Mini – Experiment Tracking — PyTorch, TensorBoard

- Integrated TensorBoard experiment tracking into PyTorch pipelines for FoodVision Mini (using a mini Food101 dataset), logging training/validation loss, accuracy, and model graphs via `SummaryWriter`.
- Built helper functions to automate experiments (varying model architectures, dataset sizes, and hyperparameters) and adapted `EfficientNet_B0_Weights` via feature extraction—modifying the classifier head—to suit the mini Food101 dataset, identifying the best model for final inference.

Embedded & Robotics Projects:

Car w/ MPU Module — ATmega32A, MPU6050, Bluetooth, C, Custom Drivers

Collaborated on a team to develop an MPU-based car control system, authoring custom ATmega32A drivers to enable real-time motion and speed regulation.

APP & DB Development Projects:

Hospital Blood Bank App — Python, CustomTkinter, SQLite

GUI-based patient and inventory management system for El-Qabbary General Hospital Blood Bank department.

Real Estate CRM — Python, PyQt6, MySQL

Customer data management with role-based access control.

General Software Projects:

ATmega32A Drivers — Embedded C

Full-suite peripheral drivers (ADC, USART, SPI, I²C, Timers, Interrupts).

Systems Programming & Data Structures — C/C++, python

- Built reusable data structure libraries (linked lists, stacks, queues) with modular interfaces and examples in C/C++.
- Solved threading and synchronization problems, including multi-threaded matrix multiplication and mutex-protected shared memory. Contributed to PintOS projects on timer management, thread scheduling, and process control.

Courses

MIT Introduction to Deep Learning (6.S191)
MIT IAP Course – Labs & Projects

- Built a strong theoretical and mathematical foundation in deep learning, covering forward/backward propagation, optimization, regularization, and NN architectures (CNNs, RNNs, Transformers).
- Reinforced understanding through hands-on PyTorch labs, applying concepts to real-world tasks in computer vision, sequence modeling, generative modeling (Db-VAE), and transfer learning.
- Applied data augmentation, batch normalization, and dropout to enhance model generalization and performance.

PyTorch for Deep Learning
Online Course – Project Repository

- Trained and deployed modular PyTorch models for classification and computer vision using custom and benchmark datasets.
- Applied transfer learning and feature extraction to tune pre-trained models for custom tasks with better accuracy and fit.
- Integrated TensorBoard and Comet for experiment tracking; currently working on model deployment with a Gradio demo and replicating deep learning research papers.

Data Analysis & Visualization
New Horizons

- Mastered data analysis and preprocessing with Pandas, NumPy, SQL (MySQL), and Jupyter Notebook; utilized Matplotlib for data visualization.

Full stack course
The Odin Project - Repo Link

- Completed foundational and intermediate web courses in HTML, CSS, and JavaScript; currently advancing backend skills in JavaScript, React, and Node.js.

Experience

Software Subteam Member, RoboTech Technical Team October 2024 – July 2025
Faculty of Engineering

- Collaborated on a robotics project involving embedded systems and real-time telemetry, contributing to IMU integration within the ROS framework.
- Assisted the team in developing a responsive GUI for rover monitoring and control using HTML, CSS, JavaScript, and Bootstrap.

Embedded Systems Diploma June 2024 – November 2024
AMIT

- Specialized in Embedded C, data structures, RTOS, and AUTOSAR, focusing on ATmega32A driver development.
- Gained practical knowledge in automotive communication protocols and software validation.

Education

Faculty of Engineering, Alexandria University
Electronics and communication department, GPA: 3.76 *Oct 2021 – Present*

Peace Tower Language School
Graduated top in class. *2009 – 2021*

Additional Projects and activities

- Solved many problems on HackerRank and Leetcode in C, C++, and Python
- Developed a wireless motion detection system using ESP32 that delivers instant push notifications via a Telegram bot.
- Built a password-protected ATmega8A smart lock with analog/digital sensors for environment monitoring and retry-limit security.
- Control system for 25 drones with real-time TCP/IP communications using Python threading and subprocess-driven GUI.