

Mahmoud Badawi

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EDUCATION

Rice University

Class of 2022

B.S. in Electrical and Computer Engineering with Data Science specialization.

GPA: 3.90/4.00

Related coursework: Computer Systems. Parallel Programming. Computer Vision. Program Design. Machine Learning. Digital and Analog Signal Processing and Systems. Digital Circuit Design. Algorithmic Thinking. Electronic Materials and Devices. Calculus I-IV. General Chemistry.

SKILLS

Languages, software & frameworks: Python, Java, C, C++, Hack, React, SQL, Spark, LabVIEW, LTspice, Networkx.

Spoken languages: Arabic (Native), English (Full Professional Proficiency), German (Limited Working Proficiency).

Experience

Software Engineer | Meta, Inc.

Sep 2022 – Nov 2022

- Worked on Back-end and Front-end tasks for multiple teams in the company during 6 weeks of Engineering Bootcamp (Messenger, Meta Spark Studio, and Performance tools) utilizing C++, Java, Hack, and React.

Vehicle Software Intern | Tesla, Inc.

May 2021 – Aug 2021

- Built a full data science pipeline to collect, analyze, and use signal data using Apache Spark and Pandas in python.
- Developed & trained ML models to enhance phone key-car interaction and boost user experience.
- Deployed the developed ML models in C to be used in the vehicles.

Data Science Researcher | Prof. Santiago Segarra | Rice ECE Department

Feb 2020 – Oct 2020

- Analyzed and studied state-of-the-art graph embedding methods and algorithms including struc2vec and REGAL.
- Examined the ability of different graph centralities on capturing the structural identity of (1000+ nodes) graphs & found that other graph centralities can capture structural roles that degree centrality cannot.
- Modified struc2vec to account for additional graph features as inputs.
- Performed experiments to measure the modified method's accuracy and robustness against noise on real-life data.

Projects

Computer Vision Projects: *(Feature Detection – Image Processing – Transforms)*

- Programmed a real-time feed object and face detection with gaze tracking.
- Implemented the dynamic programming intra-scanline search for depth estimation based on stereo disparity.
- Optimized a 25-classes image classifier using Speeded Up Robust Features and Scale-Invariant Feature Transform.

Java FEAT Implementation: *(Object-oriented Programming)*

- Implemented a "Feedback & Evaluation via Automated Tests" program in Java (**1500+** lines of code).
- Designed the program for cross-compatibility to create a concise set of test cases for Python programs.

POS Tagging: *(NLP – HMMs – Dynamic Programming – Cross validation – Viterbi Algorithm)*

- Trained Hidden Markov models on a labeled text corpus using cross-validation.
- Applied the model to tag parts of speech using the dynamic programming Viterbi algorithm.
- Achieved **95% & 93% accuracies** for the 2nd & 3rd order models while using only **25%** of the data for training.

Transceiver system: *(Digital Signal Processing – Amplitude Modulation (AM) – LabVIEW)*

- Developed the **back-end** ADC/DAC and DSP LabVIEW program, including modulation, demodulation, and filtering.
- Developed the **front-end** signal representation and user processing tools using LabVIEW.
- Constructed the analog circuits for acquiring and transmitting signals using loop antennas.
- Tested the communications system on the ISM band (160-190 kHz).

PCB/Class D Audio Amplifier: *(Pulse-width Modulation (PMW) – EMI Reduction – Eagle – LTspice)*

- Built and tested a class D audio amplifier circuit (with oscillators, comparators, and PMW generators) using LTspice.
- Designed a PCB circuit of the class D amplifier using EAGLE to efficiently place SMDs.