Ahmed Fouad

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Education:

Johns Hopkins University – Baltimore, MD — ***December 2025***
- Master of Science in Electrical Engineering — **GPA: 3.6**

Lehigh University – Bethlehem, PA — ***May 2023***
- Bachelor of Science in Electrical Engineering — **GPA: 3.25**

Work Experience

Electrical Engineer, Raytheon Missiles & Defense – Tucson, AZ — ***Oct 2023 – Present***

Simulation Work
- Added mechanical steering support to the radar simulator used by the signal processing team in C++.
- Added support for different materials and configurations of radomes to the simulator.

Datalink Update
- Collaborated with a Subject Matter Expert to support the transition from legacy analog data link to an updated digital data link.
- Simulated the digital data link algorithm in MATLAB and C++ and helped the FPGA team understand and implement the algorithm and validate their configurable logic.
- Revised the legacy testing scripts and requirements and supplied the manufacturing team with the updated testing scripts and methodology.
- Managed and mitigated $10M in program risk through simulation, testing, and cross-team collaboration, ensuring successful system validation and delivery.

Robotics Researcher, Lehigh University – Bethlehem, PA – github.com/AhmedM-Fouad/F1Tenth-Lane-Follower — ***Sep 2022 – May 2023***
- Configured an autonomous car to use ORB-SLAM3, a visual mapping package, based on an RGB-D Kinect sensor.
- Tested the performance of the visual mapping package in low light conditions.
- Developed an algorithm for manual visual detection of lanes and obstacles.

Robotics Research Intern, STEM-SI – Bethlehem, PA – github.com/AhmedM-Fouad/Yolov2-Adverserial-Attacks-with-F1Tenth-Car — ***Jun – Aug 2022***
- Configured a Darknet ROS object detection model on an autonomous car to detect traffic signs and a variety of objects.
- Designed an algorithm for the car to follow the visually detected object and react correctly to traffic signs.
- Researched the vulnerability of autonomous cars to adversarial attacks.
- Performed successful appearance attacks on YOLOv2 object detection model with varying levels of perturbations and recorded the car's reaction to misclassification.
- Participated in Research Day at Lehigh University among 100 projects and achieved 2nd place in the Robotics category.

Product Development Intern, Ford Motor Company – Dearborn, MI — ***Jun – Aug 2021***
- Designed pressure sensor array of 16 Force Sensitive Resistors (FSR) for seats in automobiles and wrote Arduino code for it.
- Processed and filtered signals from FSR matrices using MATLAB and operational amplifiers.
- Tested Loomia, which is a conductive fabric, for analog and digital signal transmission.

Projects

Autonomous Racing Platform (Full-Stack Robotics System) – fouadrobotics.com — ***Dec 2024 – Present***
- Architected and built a fully autonomous RC racing platform using Raspberry Pi, Arduino, and stereo vision as a low-cost counterpart to the F1TENTH platform (~$4,000), achieving comparable functionality at ~$400 system cost.
- Wrote efficient sensor drivers and achieved publishing intervals: IMU — mean interval: 2.40 ms, std: 0.62 ms; Camera 1 — mean interval: 33.34 ms, std: 3.14 ms; Camera 2 — mean interval: 33.34 ms, std: 3.14 ms.
- Calibrated the IMU intrinsics using Allan Variance and stereo pair intrinsics/extrinsics relative to each other and relative to the IMU using Kalibr.
- Designed and implemented a ROS-based modular architecture for real-time perception, planning, and control, integrating visual SLAM and depth estimation.
- Integrated and evaluated multiple SLAM/visual-inertial frameworks (ORB-SLAM3, VINS-Fusion, RTAB-Map) across diverse scenarios and sensor configurations to benchmark mapping and localization robustness and performance.
- Implemented multi-sensor fusion node (IMU, wheel odometry, servo command) to get odometry to fuse with visual SLAM odometry.
- Designed and trained neural networks for imitation learning using TensorFlow with data from stereo pair, throttle, and steering.
- Optimized system performance under hardware constraints, addressing latency, compute bottlenecks, and synchronization between non-hardware triggered sensors.
- Conducted real-world testing in constrained indoor environments and iterated on system reliability.

Analog Signals Controller (Capstone) – github.com/AhmedM-Fouad/Analog-Signals-Controller — ***Aug 2022-May 2023***
- Modified The Analog Thing, an analog calculator, to operate without manual wiring.
- Designed a PCB consisting of 3 analog switching ICs, 2 shift register ICs, 24 resistors, and 20 pin headers.
- Demoed a prototype that performs the basic arithmetic operations.

Digital System Design (course project) – github.com/AhmedM-Fouad/Digital-System-Design — ***Aug – Dec 2022***
- Designed the layouts of an inverter, 4-input NOR gate, and 6x6 array SRAM memory using Cadence Virtuoso.
- Designed the circuit schematics of a 4-input NAND gate, 8-bit adder, 4-bit multiplier, and an 8-bit divider.

Robotic Racing (coursework) – github.com/AhmedM-Fouad/F1Tenth — ***Jan – May 2022***
- Studied ROS and built an autonomous car using the F1Tenth platform hardware.
- Performed in virtual races on the F1Tenth ROS Simulator and 3 actual races using the car for the class.
- Ranked 14th in the qualification stage and reached the second round in the elimination stage of the F1Tenth Grand Prix at ICRA 2022.