Ali Jafar

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Education

University of Illinois at Chicago (UIC) Chicago,IL
Masters of Science in Electrical and Computer Engineering *Jan. 2023 – Dec. 2024*

University of Illinois at Chicago (UIC) Chicago, IL
Bachelors of Science in Computer Engineering *Aug. 2018 – May 2021*

Tracks

Computer and Networked Systems: Design and Optimization of Computer Systems
Digital Systems and VLSI: Design, Analysis and Fabrication of Electronic Components and Systems
Relevant Courses: OS, Embedded Systems, Neural Networks, Robotics Control, HPC & Cloud, Signals & Digital Communication

Technical Skills

Lab Equipment: Oscilloscope, Multimeter, Function Generator, Power Supply, Soldering Station, Breadboard
Architectures: CPU, GPU , Neural Networks, Data Center & Cloud
Software: C, C++, Python, MATLAB, Assembly, HDL/Verilog

Experience

Undergraduate Teaching Assistant Jan. 2019 – May 2021
University of Illinois at Chicago (UIC) *Chicago, IL*

- Facilitated weekly labs and help sessions, guiding 30+ students through core programming concepts in C and problem-solving techniques.
- Developed instructional materials and visual aids to simplify complex topics, improving student comprehension and engagement.
- Provided one-on-one and group tutoring, boosting student performance and confidence in coding assignments.
- Assisted faculty in evaluating progress and maintaining a collaborative learning environment.

Projects

Line Following Robot | *C, Altium, FRDM Micro controller*

- Designed and fabricated a custom PCB in Altium to integrate camera sensors, motor drivers, and power regulation circuitry.
- Programmed the FRDM microcontroller in C to process camera sensor input, control steering logic, manage motor speed and implement a PID control algorithm for precise steering and stable path tracking.
- Debugged and validated circuits using oscilloscope, multimeter, and function generator; optimized motor control signals and power delivery for reliable operation.
- Conducted iterative hardware/software testing and tuning of PID parameters, achieving robust performance and securing 1st place in a competitive random-track race.

Lidar Object Detector | *Linux, Python, Xbox Kinect, NVIDA Jetson Nano*

- Developed a custom K -means clustering computer vision and object detection algorithm to classify and localize obstacles using Lidar point cloud data.
- Configured and deployed a Linux-based environment on the Nvidia Jetson Nano for real-time sensor communication and data acquisition.
- Utilized oscilloscope and multimeter to debug signal integrity and power delivery issues during hardware testing.
- Collaborated with a multidisciplinary team to validate algorithm accuracy and meet project performance benchmarks.

LFSR-Based Multi-Fault Analysis | *Python, Digital Circuits Simulation*

- Designed and implemented a Python-based fault simulator to evaluate the effectiveness of LFSRs as pseudo-random pattern generators for detecting multi-faults in digital circuits.
- Generated and tested thousands of two-fault combinations using 8-bit LFSR-generated test vectors, analyzing coverage through automated multi-fault simulation and result tracking.