

Sam Khalaf

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PROFESSIONAL SUMMARY

Motivated Electrical and Computer Engineering graduate from the University of Michigan - Dearborn, with comprehensive experience in programming, hardware design, and control systems. Proficient in C++23, Python, MATLAB, JavaScript, VHDL, and cloud platforms. Skilled in SiL and HiL testing, real-time simulation, and VCU development for ADAS and autonomous driving systems. Seeking an entry-level electrical engineering role to leverage technical expertise and practical experience for innovative solutions.

EDUCATION

- **University of Michigan - Dearborn** Dearborn, MI
Dual BSE in Electrical Engineering and Computer Engineering *September 2019 – April 2024*
 - **Senior Design Project: Smart Shoe System for Distance and Balance Measurement:** Integrated and calibrated force sensors and a TF Luna LiDAR to accurately capture pressure data and calculate distances to the nearest object. Processed and transmitted data wirelessly using WiFi with ESP32 for real-time monitoring and analysis.

Relevant Courses: Microprocessor and Embedded Systems, Digital Systems and Computer Architecture, Control Systems, Circuits and Electronic Circuits, Embedded System Design, Automatic Control Systems, Analog and Digital Communication Systems, Digital Signal Processing, Computer Networks/Data Communication, Robotics and Vision Systems.

SKILLS SUMMARY

- **Software & Development Tools:** Microsoft Office, Visual Studio Code, Git/GitHub, MATLAB, Simulink, LabVIEW
- **Programming Languages:** C++23, C, Java, JavaScript, Python, HTML/CSS
- **Control Systems & Automation:** PLC Programming, PID Controllers, Servo Motors
- **Testing & Simulation:** Software-in-the-Loop (SiL) and Hardware-in-the-Loop (HiL), OPAL-RT, dSPACE ControlDesk, Vector-CANoe, Protocol Analyzers, JTAG/Boundary Scan Tools
- **Communication Protocols:** I2C, SPI, UART, CAN Bus, Ethernet, LAN, and WAN
- **Hardware & Embedded Systems Design:** VHDL, Verilog, FPGA Design, PCB Design, Arduino, STM32, ESP32
- **Standards & Quality Assurance:** ISO 26262, UL/CE, FMEA, DFMEA/PFMEA
- **Design & CAD Tools:** AutoCAD, Cadence, TinkerCAD
- **Electrical Engineering Tools:** Multimeters, Oscilloscopes, Soldering Equipment
- **Soft Skills:** Problem-Solving, Teamwork, Attention to Detail, Time Management

CERTIFICATIONS

- **Microsoft:** Career Essentials in Software Development by Microsoft and Career Essentials in Data Analysis by Microsoft and LinkedIn
- **IBM:** Python for Data Science, Generative AI, Introduction to AI, What is Data Science
- **Google:** Data-Driven Decisions, Foundations: Data, Data Everywhere
- **LinkedIn Learning:** AWS Essentials, Career Skills in Software Development, Android Development Tips, Programming for Non-Programmers (Android and Kotlin), Software Architecture Foundations, Learning Assembly Language, IT Automation, PLC Developer
- **Nachi Robot Training Certificate:** Ax PLC and I/O, FD Operation/Programming

EXPERIENCE

- **Junior Electrical Engineering Internship** Plymouth, MI
Robert Bosch, XC-Multimedia Department *March 2021 – September 2021*
 - **Vehicle Control Units (VCUs):** Programmed and analyzed VCUs using tools such as Vector CANoe and ETAS INCA, ensuring optimal functionality and performance.
 - **Software Updates and Diagnostics:** Performed software updates and diagnostics with CAN tools like CANalyzer and CANape, enhancing system reliability.
 - **VCU Configuration and Calibration:** Configured and calibrated VCU settings using MATLAB/Simulink for model-based design and parameter tuning to meet specific operational specifications.
 - **Design Verification Plans and Reports (DVPR):** Created DVPRs for VCU components, ensuring compliance with industry standards.
 - **Bug Tracking and Resolution:** Tracked, prioritized, and resolved bugs using IBM Jazz, Jira, and Confluence, ensuring project milestones were met.
 - **ADAS and Autonomous Driving Testing:** Developed and tested ADAS and autonomous driving functionalities using bench testing and simulated environments.
 - **SiL and HiL Testing:** Conducted SiL testing with Qualcomm towers and HiL testing using dSPACE ControlDesk and National Instruments tools to validate VCU performance.
 - **Real-Time Simulation:** Utilized OPAL-RT's RT-LAB for real-time simulation, ensuring precise VCU functionality under dynamic conditions.

PROJECTS

- **Alcohol Detection System (FPGA, VHDL, Sensors):** Developed VHDL code for an FPGA Nexys A7 board to implement a drink-driving detection system. Integrated sensors such as PMOD AQS and PMOD MAXSONAR for alcohol concentration measurement, acceleration, and object detection. Utilized Xilinx Vivado for simulation and synthesis to evaluate crash probabilities.
- **Autonomous Navigation (Robotics, Control Systems, ROS):** Designed and implemented advanced control algorithms for the autonomous navigation of a TurtleBot 3. Utilized MATLAB and ROS2 to enable navigation in varied environments.
- **Image Transmission Network (Networking, Python):** Engineered a network architecture to transmit a test image between Windows and macOS using TCP and UDP protocols. Demonstrated advanced networking skills through Python and Socket Programming.
- **Taillight Controller (Digital Electronics, Verilog):** Created a sequential logic-based taillight controller, inspired by the 1966 Ford Thunderbird, demonstrating digital electronics and circuit design skills. Designed using Verilog and simulated with ModelSim.
- **Sinusoidal Circuit Analysis (Circuit Design, MATLAB):** Analyzed and designed sinusoidal circuits, applying Thevenin's theorem and Laplace transforms, with practical testing on pulse response circuits. Utilized MATLAB for analysis and simulation.
- **Voltage Regulator Circuit (Circuit Design, Simulation):** Engineered and tested a stable 9V voltage regulator circuit, incorporating a current limiter to ensure consistent performance across varying electrical conditions. Used SPICE for circuit simulation.