KUSH RANA

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SKILLS

Programming Languages: C, C++, Python, Linux, Verilog, VHDL, RTL, MATLAB, JAVA, R
Electrical: PCB & Analog/Digital Circuit design, Oscilloscope, Field Programmable Gate Array, Logic Analyzers, Arduino
Software: OrCAD, PSpice, LTSpice, Altium, Microsoft Office Suite, AutoCAD, SolidWorks, Autodesk Inventor

EDUCATION

B.Eng in Electrical Engineering (3rd Year) - McMaster University   Expected April 2026
Relevant Courses: Digital Logic Design, Circuits & Systems, Data Structures & Algorithms, Control Systems

WORK EXPERIENCE

Power and Performance Engineering Intern – AMD   May 2024 – April 2025
- Optimized a digital current controller for stability and performance metrics on Radeon GPUs that limits 92% of current spikes through clock throttling using **Python** and **machine learning** libraries
- Worked on post-silicon board bring up & **verification**, focusing on power metrics to ensure system stability & reliability
- Prototyping new **power management** features for AMD's MI **datacenter** systems, leveraging chip-level engineering on **Linux** and analyzing critical voltage, current, power, and memory metrics
- Developed data-solving techniques using **linear regression models** and optimized **C firmware** code for **embedded systems**
- Effectively **communicated** all procedures & knowledge through team presentations & professional documentation practices

Electrical Engineering Intern – Aversan Inc.   May 2023 – August 2023
- Designed Automated Test Equipment (ATE) **system design**, **test scripts and framework** with a $100,000 budget to test signals from flight controllers, saving 50% of the manual testing time
- Implemented **real-time data logging** and analysis features in the ATE system, enabling efficient tracking of test results and faster issue identification for **improved decision-making** and reporting
- Developed software for a safety-critical aviation controller using **C/C++** ensuring compliance with industry safety standards
- Designed **low voltage** circuits through schematic capture tools on **OrCAD**, and executed comprehensive analysis, simulation, and hardware verification
- Conducted extensive board-level **testing** of flight controllers while utilizing power supplies, oscilloscopes, and multimeters

EXTRACURRICULAR EXPERIENCE

Lead Hardware Specialist – McMaster EcoCAR EV Team   August 2023 – April 2024
- Integrated advanced **electro-mechanical** systems, and **designed** & **tested** autonomous features for a redesigned Cadillac EV
- Utilized **Altium** to develop **low-voltage designs**, power converters, & battery chargers while considering **power optimization**
- Contributed to rear powertrain system, battery pack, & inverters and performed **root cause analysis** for hardware debugging

Control Systems & Electrical Engineer -McMaster RoboMaster Robotics Team   Sept 2022 – April 2023
- Developed a buck converter circuit to step down voltage to the motors in the gimbal, increasing the power efficiency by 20%
- Utilized **C/C++**, **microcontrollers**, and FreeRTOS to **test & optimize** gimbal systems, gyroscopes, and motor controls
- Collaborated with Mechanical team to build a 360° rolling wheel system to increase the robot's speed and mobility by 30%

PROJECTS

Autonomous Miniature Electric Vehicle (AEV)   January 2024
- Integrated **electric propulsion systems** & advanced control algorithms to enhance AEV performance & efficiency
- Designed robotics kinematics, motion planning, and **control systems** with **C++, Python, and ROS** integration
- Leveraged **Linux** and optimization techniques for efficient autonomous navigation and precise trajectory planning

Embedded 360° Spatial Capture System   March 2023
- Built an ARM-based **microcontroller** LIDAR system with **Embedded C**, **Python**, & time-of-flight sensor with a stepper motor
- Developed schematics and wrote code to enable data transmission (I2C/UART) between the microcontroller, sensor, & PC
- Implemented **software algorithms** & scripts for **data acquisition** along with port configuration and interrupt setup