

Karan Humpal

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SUMMARY

M.S. in Electrical and Computer Engineering student at UC San Diego, specializing in Intelligent Systems, Robotics, and Control. Computer Engineering graduate from UC Santa Cruz with 6+ years of experience in CNC programming and hands-on projects in robotics, embedded systems, and FPGA design. Strong background in C/C++, Verilog, and Python with heavy emphasis on Artificial Intelligence and Machine Learning.

EDUCATION

University of California, San Diego (UCSD) <i>M.S. in Electrical and Computer Engineering - Intelligent Systems, Robotics, and Control (EC80)</i> • Relevant Courses: Low Power VLSI for Machine Learning, VLSI IC Design, Statistical Learning, Sensing in Robotics, Computer Vision, Stochastic Processes, Digital Image Processing	San Diego, CA <i>Expected June 2026</i>
University of California, Santa Cruz (UCSC) <i>B.S. in Computer Engineering (Robotics and Control), Minor in Electrical Engineering</i> • Honors Distinction • Relevant Courses: Intro to Mechatronics, Embedded Systems, Feedback Control, Logic Design, Sensing and Sensor Technologies	Santa Cruz, CA <i>Graduated June 2024, Honors</i>

SKILLS

Programming <i>C/C++, Python, Verilog, MATLAB, G-Code, PyTorch, R, Linux</i>
Hardware Skills <i>RTL, PSpice, V-Rep, Signal Generator, Oscilloscope, ESP32, Arduino, PIC32, SolidWorks</i>

EXPERIENCE

Humpal Design Support <i>CNC Programmer</i> • Programmed precision CNC machines to manufacture aerospace components to exacting specifications. • Applied G-Code programming to optimize the paths of 5-axis mills and lathes for increased efficiency. • Collaborated with engineers to translate CAD models and technical drawings into high-precision parts, ensuring compliance with industry standards. • Integrated quality control checks using measurement instruments and 3D models to verify dimensional accuracy and tolerances.	Hayward, CA <i>June 2017 – Present</i>
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PROJECTS

Autonomous Robot - UCSC Mechatronics • Led the design and development of an autonomous robot for UCSC's competitive mechatronics course, integrating mechanical, electrical, and software systems. • Developed and programmed a 3-level hierarchical state machine in C using the Uno32 microcontroller to control navigation, collision detection, and object manipulation using IR sensors, limit switches, and DC motors. • Collaborated with a team to fabricate the robot using CAD designs from SolidWorks, integrating components such as a linear actuator, servo motors, and a ball-collecting mechanism. Placed 3rd out of 22 teams.	2024
Fully 3D Printed Remote Control Car with Wi-Fi and Live Video Streaming • Designed and built a 2-story fully 3D printed remote control car using SolidWorks, incorporating IR sensors for autonomous navigation. • Developed a Wi-Fi-controlled interface using ESP32 for remote driving and live video streaming, with an ArduCAM mounted for real-time video capture. The system supported both manual control and autonomous operation modes. • Programmed the microcontroller for motor control and sensor data acquisition, enabling real-time obstacle detection and avoidance.	2024
FPGA-Based VGA Game Development - "Bug Fest" • Developed "Bug Fest," a VGA-based game on the BASYS3 FPGA board, featuring a dynamic environment where players control a slug character navigating platforms and avoiding bugs. • Programmed the game's mechanics using Verilog, implementing continuous gravity effects, collision detection, and score tracking. Integrated user input via push buttons to control movement, while the game rendered in real-time on a VGA display. • Designed and optimized the graphics engine and collision algorithms for the game, balancing performance and visual appeal, and integrated a score display using the 7-segment LED.	2024
ZoomFlight: Advanced Drone Safety System • Designed an advanced drone safety system using ultrasonic, flex, and temperature sensors, integrated with an Nvidia Jetson for real-time data processing to monitor altitude, battery expansion, and environmental conditions.	2023