Jimmy Esteban Velasco Granda

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Education

University of Toronto
BASc. Electrical & Computer Engineering
4th year

Minors
AI & ML
Robotics and Mechatronics

Certificate
Entrepreneurship and Innovation

Skills

Python	Altium
C/C++	Pytorch
SystemVerilog	Django
STM32	React
Fusion360	Matlab

Courses

Robot Modelling & Control
Intro to AI
Computer Hardware
Data Structures & Algorithms

Experience

Digital Design Verification — **AMD Inc** — May 2023 - Present

- Revamped remote execution interface of design verification regressions remotely, achieving a 70% decrease in setup time and doubled executing regression rate.
- Developed a dynamic scheduler for parallel execution of design verification regressions, enhancing by 80% resource usage efficiency and decreasing by 50% report generation time.
- Effected a custom report generator for design verification regressions, resulting in a 30% reduction in error reproducibility steps and a 40% faster error identification.
- Contributed graphics encoder design verification by setting up a UVM test bench utilizing SystemVerilog and Verti.
- Designed and implemented a disk space management tool that eliminates regression stalling and incomplete tests.
- Devised and deployed a web data visualizer for clock domain analysis through full-stack tools.

Mechatronics Team — **Research for Space Exploration** — 2023 - Present

- Managed and led a team of four to overhaul a rover gripper's motor system, optimizing performance for the University Rover Challenge.
- Developed and implemented a PID and experimental haptic feedback controller in an STM32 chip for a BLDC system.
- Designed and validated a custom PCB to manage power routing and SparkMax - SMT32 connection.
- Engineered and installed supporting structures for integrating the PCB controller within the rover's framework, leveraging Fusion 360 and SolidWorks.

Aero/Electrical Team — **Solar Racing Car** — 2021 - Present

- Debugged and validated the custom STM32 PCB, which controls extended features at the steering wheel, employing C in CubeIDE and Keil and a multimeter.
- Generated canopy meshes for aerodynamic simulation utilizing Pointwise.
- Contributed to the Carbon Fiber canopy surface polishing and refinement process.
- Collaborated to define new requirements and identified electrical optimization opportunities for the new Gen12.

Projects

Machine Learning Developer   TasteBud   2023
Recipe Generator

- Teamed up with a group of four to develop an AI model that generates food recipes based on a list of ingredients.
- Developed and implemented the datasets' processing logic to ensure compatibility between recipes, ingredient lists and cuisine types using Python (Pandas, Numpy).
- Created an ingredient compatibility adjacency matrix and optimized table population algorithm for analyzing 2.23 million recipes.
- Constructed and analyzed the performance of a PyTorch-based RNN (GRU) compared to a GAN architecture for recipe generation.
- Optimized hyperparameters in the GAN model based on loss and accuracy curves across training epochs.

Embedded Systems Designer   Handy   2023
Hand-Controlled Canvas

- Designed a wireless hand-motion-based controller, using 2 SMT32 MCUs to interconnect an IMU with multiple sensors and intercommunicate them through I2C, SPI, UART, and IEEE 802.15 protocols.
- Devised and implemented a C algorithm to control variable-size digital pointer through a 6-DoF IMU, a flex sensor, and Keil uVision.
- Enabled wireless remote control capabilities by interconnecting HC-05 Bluetooth to the main SMT32 MCU.
- Developed and deployed a Python-based drawing canvas to showcase the hand-control capabilities of the device.
- Optimized the frame generation algorithm through the built-in STM32 DMA and improved frame reconstruction by implementing data truncation and Run-Length Encoding (RLE), reaching 64 FPS average in B/W.

Analog Systems Designer   NEODEM-43   2022
Software Defined Radio

- Designed an SSB demodulator using the pashing method with a multi-staged cascaded op-Amp Hilbert transform, achieving $\pm 6°$ phase shift accuracy.
- Developed an analog AM demodulator using the op-Amp and a diode variation for improved accuracy.
- Designed a fixed-size PCB to integrate AM, SSB demodulation and volume amplification with the power source and audio output interface using Altium.
- Optimized the PCB layout with surface-mount components, achieving a 20% reduction in surface area.
- Constructed the demodulator PCB using BOM-optimized surface-mount components and reflow oven.
- Debbuged and validated PCB using electronic test equipment and an SDR full-sanity test.

Digital Systems Designer   ARM Cortex A9 Processor   2022

- Developed and synthesized an 11-instructions processor compliant with ARM Cortex-A9 architecture using Verilog.
- Debugged and validated the functionality using ModelSim test benches and wave visualizer.
- Enhanced the processor to support DE1-SoC interfaces for LED decoding, switch control, and 7-segment display.
- Showcased capabilities through an assembly memory game controlled by DE1-SoC switches, LEDs and display.