Chitvan Patel

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SUMMARY

Passionate computer engineer with software and hardware experience. Completed several design oriented projects ranging from Machine Learning to embedded system design and programming. A team player committed to employing strong engineering practices to identify root causes of problems and proficient in utilizing various electronic laboratory instruments, reading electrical schematics and datasheets

EDUCATION

Santa Clara University **Santa Clara, CA**
Masters in Electrical and Computer Engineering June 2023
Relevant Courses: Natural Language Processing, Deep Learning, Computer vision, Machine Learning, Brain-Computer Interface, Advanced Computer Architecture, Machine Learning and Digital Signal Processing Using FPGAs, Software engineering, VLSI, Embedded Systems, Logic Design Using HDL, Real-Time Operating Systems, System on Chip Verification, Project Management

Pandit Deendayal Energy University **Gujarat, India**
Bachelor of Technology, Electrical Engineering May 2021

SKILLS

Languages: Embedded C, Python, C/C++, C# .NET, Verilog, SQL
Tools: Jupyter Notebook, PyCharm, Vitis HLS, Tableau, Simulink, Git, SPICE, MATLAB, Visual Studio, Synopsys VCS, IAR, STM32CubeMX
Machine Learning: PyTorch, Tensorflow, Keras, Numpy, Pandas, Matplotlib, SciPy, Scikit-Learn, OpenCV, YOLO, Caffe, Hugging Face
Protocols: I2C, USB, SPI, UART, RS485, ASCII, TCP, IP, ADC, DAC
Knowledge: OOD, CPU, RTOS, Embedded operating systems, Software Development Lifecycle, Debugging, Data analysis

EXPERIENCE

Tag-N-Trac (Telecommunications Startup) **Campbell, CA**
Design Validation and Test Intern June 2022 - December 2022

- Developed a Python script for test automation to post-process DVT data of **12,000** temperature loggers by obtaining all data in a PPT-presentation format by integrating the python-PPTX library, resulting in a **7%** increase in revenue after improved data analysis
- Implemented a Python script to convert raw sensor data collected from tested temperature loggers into a standardized Excel format for analysis in Tibco software, resulting in a **65%** reduction in the time spent manually sorting data
- Created interactive dashboards using **Tableau** to identify trends and patterns in the data, as well as facilitate data-driven decision-making
- Collaborated with the manager to perform PCB soldering tasks, ensuring the accurate and efficient assembly of electronic components
- Led the quality assurance team to restore approximately 6000 damaged temperature loggers and linked the cellular labels to AWS network
- Performed tasks like **bring-up** test board design to test, validate and debug assembly, hardware, and firmware of the smart sense tags

PROJECTS

Credit Card Fraud Detection **Machine Learning**

- Built a data processing pipeline with Python and SQL on **8k+** credit card transactions. Improved data completeness by **8%** through data-imputation techniques for features with low cardinality
- Leveraged up-sampling method to handle data imbalance. Trained binary classification models to predict potential credit card fraud based on transaction metadata where the Random Forest model showed the best performance with **83%** precision and **96%** recall

Grill Thermometer **Embedded Systems**

- Utilized ARM-CORTEX Microcontroller **STM32G070RB** to construct a device that measures the internal temperature of meat on a grill, displays it on an LCD screen, and alerts when the meat has reached the set temperature by activating a buzzer
- Developed the C code to linearize the non-linear readings from the temperature sensors and utilized the EEPROM using I2C to store calibrated constants

High-Level Synthesis implementation of CNN **Machine Learning and Digital Signal Processing Using FPGAs**

- Implemented HLS of the convolutional neural network in **Vitis HLS** using GEMM-based approach, achieved **93%** accuracy by using trace data from the Jupyter Notebook to verify the results of HLS design

Color Organ **Embedded Systems**

- Constructed a device that responds to sound and illuminates lights based on the sound energy in different frequency ranges. Utilized various lab components to listen, analyze the input, and produce an output
- Used IARWARM Workbench to execute and lab debug the sampling, peak detection, and 1/0 interface functions in embedded C. Implemented the DMA to sample faster from the ADC channels

GPS Intra-System Communication **Embedded Systems**

- Developed a system using **ARM-CORTEX** Microcontroller with multiple data streams that include RS485, sending data through fiber optic link to a remote display module, with functionalities like turning on LEDs on remote modules with PC commands, reporting back GPS data such as Latitude and Longitude

Payroll System **SDLC**

- Implemented a basic payroll system by carrying out key phases in the software development life cycle via code and documentation deliverables
- Scoped requirements, identified system components, completed design and use case diagrams, and incrementally built the code base from a skeletal outline to a functioning product

PID loop to control a geared motor in C on FreeRTOS and Verilog **Embedded Systems**

- Created a custom peripheral embedded system in Vivado for Nexys A7 FPGA, and write drivers for custom peripheral, PID loop to control the speed of the motor
- Created custom peripheral in Verilog and drivers in C for PMOD HB3 to control and read motor feedback

CERTIFICATIONS

- **Machine Learning**, Stanford University
- **AWS Cloud Technical Essentials**, Amazon Web Services