Akash Balakrishnan
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TECHNICAL SKILLS:

Language Skills : Python, C, C++, SystemVerilog, Java, Javascript, React **FPGA**: AMD Artix-7 **Version Control**: GIT **Tools**: Jira, Wireshark, Vivado, PSViewer **Waveform Viewer**: Vivado **Development Platforms**: Arduino, Raspberry Pi, BASYS3 board **Database**: MySQL Frameworks: Flask, Django **Skills**: REST API

EXPERIENCE:

Oxford Instruments (OI:XT) **Jan 2024 - July 2024**
Software Engineering Intern

- Assisted operators by automating artifact detection on Beryllium disks, optimizing X-ray tube production to meet stringent buyer specifications, which reduced manual intervention and improved accuracy.
- Developed and programmed Gsense4040 X-ray camera operations using Python, integrating local server commands and optimizing system performance via NI-DAQ 6009/6501, which enabled precise power supply and pneumatic control.
- Implemented artifact detection algorithms using Python and NumPy, which improved accuracy and reduced manual review time while introducing automation modes for diverse operational needs.
- Designed a user-friendly GUI with Winforms, which enhanced operator usability and streamlined workflow.
- Collaborated within a 5-member SCRUM team, which ensured efficient project delivery and iterative improvements.

UC Santa Cruz - SSN Word Identification **Jan 2024 - Mar 2024**
Undergraduate Research Assistant - Spiking Neural Network Word Identification

- Developed a speech-to-text system using Spiking Neural Networks (SNN) and librosa for audio feature extraction, optimizing real-time processing.
- Collaborated with Dr. Eshragian on neuromorphic computing advancements, gaining expertise in backpropagation, activation functions, and hidden layers.
- Implemented multithreading to enhance system performance and reduce computation time, improving efficiency.

PROJECTS:

Anime AI **Jun 2023 - Jul 2023**
Developed a Full Stack Web Application for personalized anime recommendation

- Implemented a Flask and Node.js server for seamless backend functionality and developed APIs to integrate with the system.
- Designed and implemented a KNN algorithm to recommend anime titles based on user-selected genre preferences
- Conducted efficient queries using an SQLite database populated through web scraping.
- Collaborated in a team, adhering to Agile and SCRUM practices for effective project management.

HTTP Server with Custom Firewall **May 2023 - Jun 2023**

- Constructed a robust HTTP server with custom firewall functionality within a simulated network.
- Utilized a POX Controller to create a router, exploring network behaviors and custom protocols.
- Implemented multithreading for simultaneous handling of GET and PUT requests, optimizing performance and resource utilization.

Huffman Encoder and Decoder **Mar 2023 - Apr 2023**

- Developed a robust Huffman encoder and decoder in C for file compression.
- Incorporated Shannon entropy techniques to optimize compression by assigning shorter bit representations to frequently occurring symbols.
- Employed static encoding for efficient compression with minimal data loss.

RSA Encryption and Decryption in C **Feb 2023 - Mar 2023**

Implemented an industry-standard RSA encryption and decryption algorithm in C

- Created a robust key generator, encryption, and decryption system using RSA algorithm.
- Implemented secure communication principles through the use of Euclid's algorithm and mpz_t library for large prime numbers.
- Demonstrated expertise in RSA encryption, ensuring secure and reliable data transmission

Osmosys game development **Nov 2023 - Dec 2023**

Integrated VGA-based Osmosys Game using BASYS3 Board.

- Proficient in FPGA development with Vivado, including FSM design, synthesis, timing analysis, testbench creation, simulation, and bitstream generation and validation
- Achieved precise VGA control, including Hsync, Vsync, and RGB signal generation, and successfully integrated a state machine for game flow, meeting all specified requirements.

Small Company Network **Nov 2022 - Dec 2022**

Designed and implemented a structured network for a 4-story building, configuring floor-specific switches and subnets, along with dedicated server subnets in the data center

- Optimized IP traffic routing by implementing source/destination IP and port-based methods to determine the correct destination port.
- Enhanced server security by blocking untrusted IP traffic and restricting ICMP to prevent internal IP exposure.
- Developed POX controller rules for efficient network management, leveraging Mininet and Wireshark for troubleshooting and performance analysis.

Hexapod Walker **May 2019 - Jul 2019**

Designed and constructed a Hexapod Walker using Arduino.

- Assembled and soldered a custom PCB for the project.Developed and integrated control mechanisms using Arduino, ensuring precise functionality and robust construction.
- Demonstrated expertise in hardware engineering and soldering techniques. https://youtu.be/EhPC9sjssrE https://youtu.be/2Ot8LESQMA4 https://youtu.be/Rc19IbLdJ6I

RELEVANT COURSES: Python Programming and Abstractions, Computer Systems and C Programming, Software Engineering, Business Information Systems, Database Management, Statistics and Probability, Object Oriented Programming, Technical Writing, Computer Systems & Assembly Language, Computer Networks, Firmware Development, Logic Design, Computer Architecture, Electronic Circuits, Parallel and Concurrent Programming, Signals and Systems

CERTIFICATIONS: **Sept 2023 - Oct 2023**

- **Advanced Learning Algorithms -** DeepLearning.AI, Stanford University
- **Supervised Machine Learning**: Regression and Classification **-** DeepLearning.AI, Stanford University

EDUCATION:

University of California, Santa Cruz **Sept 2020 - Aug 2024**

BS in Computer Engineering | Honors | Specialized in Systems Programming