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 Artix-7 **Tools**: MySQL

EXPERIENCE:

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

Assisted operators by automating the detection of small artifacts on Beryllium disks, streamlining the production of X-ray tubes to meet stringent buyer specifications. Reduced manual intervention by implementing efficient automation solutions, improving accuracy and overall process efficiency.

- Programmed and automated Gsense4040 X-ray camera operations using Python, integrating local server commands, and optimizing system performance via NI-DAQ 6009 and NI-DAQ 6501 for precise power supply and pneumatic control.
- Developed artifact detection algorithms in Python with NumPy, improving accuracy, reducing manual review time, and implementing automation modes to suit diverse operational needs.
- Designed a user-friendly GUI with WinForms, enhancing usability for operators, and collaborated within a 5-member team using SCRUM practices for efficient project delivery.

PROJECTS:

SSN Word Identification **Jan 2024 - Mar 2024**

- Developed a speech-to-text system using Spiking Neural Network (SNN) and librosa for audio feature extraction.
- Implemented multithreading to enhance performance and reduce computation time.

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
- 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**

Implemented a Huffman encoder and decoder in C.

- 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**

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**

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**

Designed and implemented a comprehensive network for a small company situated in a 4-story building. Each floor features its own switch and subnet, with additional switches and subnets dedicated to servers in the data center.

- Employed creative methods, considering source and destination IP addresses as well as source ports, to determine the correct destination port for IP traffic.
- Enhanced server security by blocking all IP traffic from untrusted hosts to servers and restricting ICMP traffic to prevent the exposure of internal IP addresses.
- Developed and executed rules in the POX controller for effective network management, ensuring the switch "remembers" actions for a defined duration to optimize packet processing.
- Demonstrated proficiency in using mininet commands such as *mn* and fuser for effective network control and troubleshooting using net, dump, pingall, iperf and dpctl dump-flows, Wireshark traces

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:

- Artificial Intelligence Specialization by Andrew Ng **September 2024**

EDUCATION:

University of California - B.S. Computer Engineering **Sept 2020 - Aug 2024**