Venkatakrishnan Sutharsan

979-286-4518 venkatakrishnan.sutharsan@tamu.edu LinkedIn GitLab GitHub PortFolio

Education

Texas A&M University Dec 2024
Master of Science in Computer Engineering — ***Current GPA 3.67/4.00*** *College Station, Texas*
- **Coursework:** Computer Architecture, Microprocessor System Design, Operating System, Quantum Logic Synthesis, Parallel Computing, Distributed Processing Systems, Computer Communications and Networking.

Anna University Apr 2020
Bachelors of Engineering in Electrical and Electronics Engineering — ***CGPA - 8.16/10.00*** *Chennai, India*

Experience

Indian Institute of Technology, Madras Jan 2021 – Dec 2022
Project Associate *Chennai, India*
- Engineered the first boot-up of the I-Class Processor (16-stage OOO Processor) in FPGA for the Shakti Ecosystem.
- Spearheaded a team on developing Secure Boot in hardware using Cryptographic accelerators in Shakti Processor.
- Collaborated on developing Secure Hypervisor (Sec-V) for Shakti Processor which is based on RISC-V Architecture.
- Developed device drivers for Shakti SoCs and conducted workshops and demos for Government of India delegates.
- Implemented RISC-V bit manipulation specifications in the Shakti Microprocessor (Ratified: 06/2021).

Corporeal Health Solutions Ltd. Nov 2020 – Jan 2021
Backend Web Developer *Chennai, India*
- Optimized and created an efficient backend for AI based Healthcare Product (CHOCO) using Flask (Python).
- Overhauled the data security infrastructure in the system including databases. Remodeled the Database System.

Council for Scientific and Industrial Research - CEERI May 2019 – Jun 2020
Intern & Graduation Project *Chennai, India*
- Modeled a Deep Learning pipeline for EEG processing that achieves **90%** accuracy in cognitive stress prediction.

Projects

Implementation of FIFO based cache replacement strategy in Champsim | *C++* — Mar 2024 - May 2024
- Designed a FIFO-based cache replacement strategy in Champsim simulator (inspired from S3FIFO algorithm) using the concept of quick demotion to increase efficiency.
- Benchmark evaluation yielded a maximum improvement of **29.2%**, with an overall average improvement of **2.6%**.

Custom ISA Design for Quantum Computers | *Python, pyQuil* — Mar 2024 - May 2024
- Conducted experimental study enhancing quantum computing with custom instructions, leveraging Quil language.
- Developed instructions similar to existing instructions and more quantum-specific instructions like ADD and QFT.

Hardware Fuzzing using Beagle Bone Black | *C, C++, Makefile, TI CCS, ARM Toolchain, JTAG DP* Nov 2023 - Jul 2024
- Developed fuzzing framework on Beagle Bone Black PLC for AM335X processor using OpenOCD and GDB.
- Designed Python script to dispatch operations to board and gather coverage, which can be used for bug detection.

Implementation of "B" Standard Extension from RISC-V| *BSV, Python, CoCoTB* — Aug 2022 - Dec 2022
- Implemented the RISC-V "B" extension for bit manipulation in Shakti Microprocessor using Bluspec System Verilog.
- The implemented design was also verified using CoCoTB framework in Python and was found to be **15%** more efficient to other implementations.

EEG Signal Processing using ICA to classify Cognitive Stress | *Python, sklearn, PyTorch* — May 2019 - Jun 2020
- Orchestrated an EEG signal analysis strategy using Sklearn and PyTorch to enhance human brain predictability.
- Achieved an accuracy of **90%** in developing a algorithm to determining cognitive stress.

Publications

- Sutharsan, V., et al (2022), *Electroencephalogram Signal Processing with ICA and Cognitive Stress Classification Using CNN*, Proceedings of ICRTC, Lecture Notes in Networks and Systems, vol 341. Springer, Singapore.
- Swaminathan, Alagappan & Sutharsan, Venkatakrishnan & Tamilselvi, S.. (2021). *Wind Power Projection using Weather Forecasts by Novel Deep Neural Networks.*

Technical Skills

- **Languages**: C, C++, Python, Assembly, Bluspec System Verilog (BSV), SQLite3, PostgreSQL, Makefile.
- **Libraries**: CoCoTB, pyQuil, gRPC, PyTorch, TensorFlow, Keras (v1.0), Flask, SciPy Stack.
- **Certifications**: CAD for VLSI, Advanced DSA, Computer System Design, DL Specialization, Mathematics for ML, ML with Python, Certificate Course in Management - Great Lakes, Certified Amateur Radio Operator - Govt. of India.