Phani Jayanth Jonnalagedda

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EDUCATION

✦ **Indian Institute of Technology Madras (IITM)** — Chennai, India

✧ B. Tech (Honours) in Electrical Engineering and Minor in Computing: **CGPA 9.1/10** — (July 2019 - June 2023)

PUBLICATIONS

✦ S. Mittal, S. Srivastava, and J. P. Jayanth, "A Survey of Deep Learning Techniques for Underwater Image Classification," in IEEE Transactions on Neural Networks and Learning Systems, DOI: 10.1109/TNNLS.2022.3143887 [Link]

SKILLS

✦ **Languages:** Bluespec Verilog, Verilog HDL, Python, C/C++

✦ **Tools:** Gem5, Spike, ChampSim, LTSpice, Electric, Eagle EDA

✦ **Frameworks:** PyTorch, ROS, CocoTb, Tensorflow

✦ **Others:** Git, Docker, LaTeX, Arduino, ESP32, RPi

PROJECTS

✦ **Extending Vector Support to SHAKTI C-Class Processor ✦ Prof. Kamakoti V** — (Nov 2022 - Present)

✧ Engineering configurable **Vector Functional Units** to add RISC-V Vector ISA support in SHAKTI C-Class Microprocessor.

✦ **Extending RISC-V ISA with Matrix-Multiply Support ✦ Prof. Sparsh Mittal** — (Sep 2022 - Present)

✧ Augmenting **Matrix-Multiply Extensions** to RISC-V ISA for accelerating AI-related Workloads (similar to Intel's AMX).

✧ Aiming to achieve higher performance than RISC-V ISA's Scalar and Vector-based Matrix-Multiply implementations.

✦ **In-Memory Computing (IMC) Engine ✦ Prof. Janakiraman V** — (Apr 2022 - Jun 2022)

✧ Implemented an SRAM-based IMC Engine that can perform Multiply and Accumulate (**MAC**) with a **MAC** range of 128.

✧ Constructed intricately-sized Charge-based and Current-based SRAM Cells with Decoupled Read and Write on Electric.

✧ Achieved **98%** accuracy with the IMC Engine tuned on MNIST Dataset by employing 8-bit fixed-point inputs & weights.

✦ **Hardware Implementation of Discrete Cosine Transform (DCT) ✦ Prof. Kamakoti V** — (Mar 2022 - May 2022)

✧ Programmed **Butterfly Architecture-based fast DCT** algorithm in Bluespec Verilog for H.264 Module in SHAKTI C-Class.

✧ Pipelined the design for maximum throughput, achieving **97.64%** Average Accuracy with minimal MSE Loss of **2.41**.

✦ **Accelerating Mandelbrot Fractal Image Generation ✦ Prof. Nitin Chandrachoodan** — (Apr 2022 - May 2022)

✧ Attained **3X** Performance Speedup by accelerating the Mandelbrot Fractal Generation on an FPGA using **HLS C**.

✧ Analyzed several **HLS pragmas** and hardware parameters like word lengths, data I/O to optimize the implementation.

✧ Utilized PYNQ framework to interface PYNQ-Z1 FPGA | Implemented AXI4 Stream Protocol to provide I/O to IP Block.

✦ **Pipelined RISCV 32-bit Processor ✦ Personal Project (Group of 2)** — (Sep 2021 - Oct 2021)

✧ Built a 5-Stage Pipelined RISCV 32-bit Processor with **Hazard Detection** and **Data Forwarding** Units, coded in **Verilog**.

PROFESSIONAL EXPERIENCE

✦ **Qualcomm India Private Limited ✦ Hardware Engineering Intern** — Bengaluru, India (May 2022 - Aug 2022)

✧ Developed a robust Python framework to perform exhaustive **retention register list analysis** for power optimization.

✧ Identified 3658 potential redundancies (out of 7890 flops in camera sub-module) using Synopsys PrimeTime (PX).

POSITIONS OF RESPONSIBILITY

✦ **Core Member, Electronics Club, CFI[ɬ], IITM** — (Apr 2020 - Apr 2022)

✧ Spearheaded a team of **50+** electronics enthusiasts working on **10+** projects | Managed club sessions and activities.

✧ Designed a custom development board around **ESP-WROOM-32** SoC with built-in WiFi and Bluetooth functionalities.

✧ **Project Head** for the Mountable Heads-up Display for Helmets project that assists bikers' navigation through traffic.

✧ Taught **40+** participants about Parallel Programming, Multi-Threading (OpenMP), CUDA, and RTOS at Shaastra[♯] 2022.

SCHOLASTIC & CO-CURRICULAR ACHIEVEMENTS

✧ Won **Gold** in DRDO's DRGE Autonomous Vision-based Obstacle Avoidance Drone Challenge in Inter IIT Tech Meet 9.0.

✧ Secured AIR[@] **546** in JEE[*] Mains and AIR **685** in JEE[*] Advanced | Awarded the KVPY[$] Fellowship in SA and SX Streams.

[ɬ]Centre for Innovation (Student-Run Research Lab at IITM) [♯]Annual Tech Fest of IITM [@]All India Rank [*]Joint Entrance Examination [$]Kishore Vaigyanik Protsahan Yojana