

## EXPERIENCE

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### • Vicharak

*Systems Software Developer, Full-time*

#### **Gati Project - Edge ML Accelerator**

Surat, India

*August 2023 – August 2025*

- Architected an FPGA based edge-ML accelerator for, and designed hardware building blocks (e.g., im2col, systolic arrays).
- Developed cycle-accurate simulators for architectural verification, performance profiling, and design tradeoff analysis.
- Designed and implemented a dataflow compiler, integrating graph-level (layer fusion, tiling) and ISA-specific hardware optimizations to achieve real-time (20-30fps) inference of image recognition and object detection workloads on low-power edge device.
- Developed a high-throughput runtime engine for edge deployment, including optimized NEON kernel development for ARM processors.

#### **Binary Neural Networks on FPGA**

- Investigated hyper-quantized (Binary, Ternary) neural networks for their efficacy to be deployed on FPGAs
- Ported existing binary networks to validate performance and understand bottlenecks
- Modelled novel architectures of binarized neural nets in PyTorch

### • Vicharak

*Linux Kernel Developer, Intern*

Surat, India

*January 2023 – August 2023*

- Porting Tianocore EDK2 to ARM Cortex-A series proprietary chip
- Configure and Compile the Linux Kernel for various target architectures like x86 and ARM.
- Understand and Implement UEFI/PI specification to bring-up incompatible boards and allow a greater range of kernels to boot.
- Inspect relevant firmwares with tools like Ghidra to find and debug problems.

## TALKS

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### • No-ISA is the Best ISA - Shreeyash Pandey, Rishik Ram

<https://youtu.be/G4fxdHozm5I?si=WGncpPAAsuKaeJuc>

IICT 2024, Bangalore

## EDUCATION

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### • G.H. Raisoni Institute Of Engineering And Technology

*Bachelor of Engineering in Computer Science Engineering; CGPA: 8.5*

Nagpur, India

*August 2019 – May 2023*

## PROJECTS

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### • Clogwave - debug complex C code in a waveform viewer

*LLVM, C++*

<https://github.com/bojle/clogwave>

*December. 2023 – Present*

- Implemented an LLVM pass that instruments C code with VCD dumping callbacks that when the program is run, generates a VCD dump and can be viewed in tools like gtkwave.
- Waveform view of sequential code allows interdependent variables to be analysed wrt to other variables.

### • Open Source Contributions

*LLVM*

<https://github.com/llvm/llvm-project/issues?q=assignee%3Abojle>

*July. 2025 – Present*

- Fixing missed optimization cases for AVX-512
- Adding support for X86 Vector intrinsics to be used as constexpr
- Fixing issues in RISC-V SelectionDAG
- Adding fixed-point division support to LLVM libc

- **Atari 2600 Emulator**

*C, libSDL, GDB, 6502 Assembly*

*February. 2022 – May 2022*

- Engineered a functional Atari 2600 emulator from scratch in C, faithfully replicating the console's behavior.
- Modeled the system's core components, including the 6507 CPU, Television Interface Adaptor (TIA), and RAM, I/O, and Timer (RIOT) chips.
- Developed a 6502 assembler and disassembler to support custom code and debugging.

## TECHNICAL SKILLS

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- **Programming Languages:** C, C++, Bash (Shell Scripting), Python, UV, x86 Assembly, ARM Assembly, RISC-V, Verilog
- **Frameworks and Libraries:** PyTorch, Onnxruntime, Tensorflow, Tinygrad, CUDA, TensorRT, LLVM, ONNX, Protobufs
- **Documentation:** Writing technical documentation and tools for it such as: Markdown, RST, Sphinx
- **Tools:** Git, Make, CMake, GDB, Valgrind, Compiler Explorer
- **Operating Systems and ISAs:** Linux, Windows, ARM, x86, 6502