

Akash Poptani

Fourth Year Student at Indian Institute of Technology (IIT) Dharwad

CPI: 8.96

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 akashpoptani |

PUBLICATION

SANNA: Secure Acceleration of Neural Network Applications

Accepted at International Conference on VLSI Design (VLSID'23), Hyderabad, India, 2023.

LCM: LLM-focused Hybrid SPM-cache Architecture with Cache Management for Multi-Core AI Accelerators

Submitted at IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2024.

PROJECTS AND INTERNSHIP

Research Internships

Hong Kong University of Science and Technology (HKUST)

Jun 2023 - Present

Developed a prefetcher architecture for multi-AI core systems using Verilog. Optimized performance by integrating a prefetcher and dead-block predictor using SMAUG and gem5-aladdin tools.

Mentor: Prof. Wei Zhang.

Arizona State University

Jun-Aug 2023

Applied Machine Learning to predict static IR drop in Electronic Design Automation.

Mentor: Prof. Vidya A. Chhabria.

Tata Consultancy Services (TCS) Bangalore

May-Jun 2023

Enhanced TensorFlow to TensorFlow Lite compatibility for TinyML applications. Gained expertise in TinyML.

IIT Dharwad

Apr-Jul 2022

Designed and evaluated Task Scheduling Algorithms for Heterogeneous Secure Systems (HSS) with a focus on securing neural network applications against Hardware Trojans through assisted parallelism.

Mentor: Prof. Rajshekar K.

IIT Ropar

Apr-Jul 2022

Explored Replacement Policies and Cache Partitioning techniques. Implemented UCP and Hawkeye Predictor on ChampSim simulator.

Mentor: Prof. Shirshendu Das.

Current Projects

CASH: Criticality-Aware Split Hybrid Cache

Dec 2022

Assisted in implementing a Criticality Aware Tiered Cache Hierarchy, incorporating SRAM and STTRAM Technologies. Specialized in optimizing the placement of write-intensive lines to minimize write energy while enhancing performance. Conducted experiments on Branch predictors to fine-tune efficiency.

Design and Development of Runtime Monitor Processors

July 2022

Implemented Temporal-Logic Based Runtime Observer Pairs for System Health Management. Developed FSM models using Haskell on the CLASH compiler.

Tejas Architectural Simulator Extension (McPat and Hotspot)

Jan 2023

Enhanced Tejas with power and temperature modeling capabilities. Enabled accurate power and temperature tracking during program execution.

Drought Prediction with ML/DL

Dec 2022

Led research using ML/DL for improved drought prediction. Investigated various algorithms and enhanced prototypes with innovative simulations. Addressed economic, environmental, and societal aspects for practical application. Potential impact on water resource management.

Other Projects

Breadboard Calculator Design

Digital design implementation of a calculator on a breadboard using RTL model and CMOS logic gates.

Processor Simulators Study

Comparative study of passive cooling techniques and familiarity with Sniper, HotSpot, and 3D-ICE simulators.

MIPS Implementation in Verilog

Proficiency in digital circuit design, including combinational and sequential circuits using Xilinx tools and assembly code.

Treasure Hunt & Snakes and Ladders

Developed Minesweeper and Snakes and Ladders games in C, utilizing binary files and library functions for interactive gaming.

SKILLS

Programming VHDL, Verilog, Haskell, CLASH
C,C++,Python, Java, MATLAB

Technical Computer Architecture, Formal Verification, Hardware Security, Digital Design, Arduino, Linux Basics, Data Analysis, Version Controlling

Documentation LaTeX

Management Good communication and efficient planning

Tools Tejas, McPat, Hotspot, SMAUG, gem5-aladdin, ChampSim

TEACHING

Teaching Assistant (TA) - CS103

Evaluated student coding proficiency, facilitated group discussions, and conducted code reviews to enhance skills.

Freelance Tutor, Raipur

Developed custom materials, assessed progress, and maintained communication with parents.

Subject Matter Expert at Embibe

Contributed to content development, categorized questions, and ensured alignment with learning objectives.

EXTRACURRICULARS

AI-Based Mental Health Monitoring and Feedback System

Sep 2022

Selected for **VLSID Design Contest** at International Conference on VLSI Design, 2024.

Participated in **Inter IIT Tech Meet 2023 (Student's Academic Conclave)** where I presented my work on Task Scheduling algorithms for secure acceleration of neural networks. **Inter IIT Tech Meet 2022 (Bosch Age and Gender Detection event)** where I worked on the ML models for Face recognition.

Contributed actively to various extracurricular activities during my academic journey. Facilitated outreach between companies and our institute and coordinated HR conclave activities in the Public Relations role. Influenced club decisions and judged engaging competitions as a Council Member in the Eunoia Literary Club. Mentored junior peers and conducted sessions for personal and academic growth in the Department Academic Mentorship Programme (DAMP). Coordinated soft skills development activities in the Rational Eloquence Unit (REU-CDC) and provided one-on-one mentoring in the Student Mentorship Programme (SMP). Organized and anchored talks, webinars, and sessions within the Event Management Team (Career Development Cell) to ensure high-quality events. Actively participated in diverse clubs: Robotics, Hardly Human (AI), Code Geass (Coding), Fierce Gallants (Chess), Udghosh (Dramatics), and Sapphire (Dance).