Akash Poptani

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Summary

Third Year Student at IIT Dharwad with a passion for Computer Architecture, Formal Verification, Digital Systems, Embedded Systems, Compilers and Hardware Security.

Publications

SANNA: Secure Acceleration of Neural Network Applications

Accepted at VLSID conference

Projects and Internship

Current Projects

Design and Development of Runtime monitor processors July 2022 - present

- Understanding the concepts of Runtime Verification and Monitorability.
- Implementing Temporal-Logic Based Runtime Observer Pairs for System Health Management of Real-Time Systems.
- Implementation of FSM models(monitor processor) using Haskell on CLASH compiler

Analysing cloud workloads to improve energy efficiency Aug 2022 - present

- Understanding the features and services provided by IBM cloud.
- Profiling of applications based on benchmark workloads
- Comparative study of different Storage services.

Research Internships

IIT Dharwad April 2022 - July 2022

- Designing and evaluating Task Scheduling Algorithms for Heterogeneous Secure Systems (HSS) which dealt with secure acceleration of neural network applications against Hardware Trojans through assisted parallelism.
- I had come up with Heuristic Layer Scheduling algorithms and implemented them using C++ to optimize the output time.
- I learned scripting using python during the process. I also got introduced to writing formal documents on LaTeX.
- Under the guidance of Prof. Rajshekar K.

IIT Ropar April 2022 - July 2022

- Understanding the advancements in Replacement Policies(LRU, BIP, DIP, RRIP, SRRIP, DRRIP) and cache partitioning(UCP).
- Implementing UCP and Hawkeye Predictor on ChampSim.
- Under the guidance of Prof. Shirshendu Das.

Mini Projects

Breadboard implementation of Calculator Design

Digital Design was created using different gates. (Also, designed these gates using CMOS)

Understanding modern aspects of processors using simulators

Learning Sniper(changing existing system models), HotSpot(monitoring on chip temperature for different parameters) and 3D-ICE(3D-Interlayer Cooling Emulator with inter-tier Microchannel Liquid Cooling) simulators. Under the guidance of Prof. Rajesh Kedia

Implementation of MIPS using Verilog

Understanding digital circuits, implementing combinational and sequential circuits on xilinx, writing assembly code and integrating the whole system.

Course Projects

Tresure Hunt, Snakes and Ladders Computer Programming Lab Course

Usage of Binary file and multiple library functions to program Minesweeper and Snakes and Ladders games using C Language.

Implementation of Digital Modulation Schemes Communications Lab

Modulator, Demodulator, Symbols to Bits functions were created for Modulation Schemes(BPSK, QPSK, 16QAM) using MATLAB. Repetition and Interleaver Techniques were implemented later.

Implementation of Object Detection on Raspberry Pi Hands On Engineering Lab

Installed Raspian OS, then used pretrained model of Tensorflow lite to detect the object and face mask.

Education

2020 - 2024	B.Tech(Electrical Engineering)	**IIT Dharwad**	CPI: 8.97
2018 - 2020	Class 12th (CBSE)	S.R. Public School	92.4
2004 - 2020	Class 10th (ICSE)	St. Xavier's High School	91.3

Additional Courses

Digital Design and Computer Architecture By Prof. Onur Mutlu

Computer Organisation and Architecture By Prof. Smruti R. Sarangi

Introduction to Machine Learning
Deep Learning and Neural Networks Prof. Andrew NG (Stanford University)

Organisation

Rational Eloquence Unit (REU- CDC)

REU Sub Head (Coordinating with speakers and conducting various competitions for development of soft skills) , Event Management Team Member (Organising and hosting talks, webinars and sessions)

Public Relations (PR - CDC)

PR Team Member(outreach and management) -Served as coordinator for HR conclave and prepared questions for the speakers.)

Student Mentorship Programme(SMP)

Guided my mentees by exposing them to all academic paths open to them.)

Eunoia- Literary Club of IITDh

Council Member- Prepared question base and hosted activities on multiple social media platforms based on reviews, books, shows/movies and organised many observation/case study based competitions.

Club member

Robotics Club , Hardly Human(AI Club), Code Geass(Coding Club), Fierce Gallants(Chess Club), Udghosh(Dramatics Club) and Sapphire(Dance Club). Hosted/Managed many events/contests/sessions for the clubs
Participated in Inter IIT AI event.

Relevant Institute Courses

Computer Architecture

Language of bits, Processor design, Pipelining and Hazards, Memory Systems

Microprocessors and Microcontrollers

8085 microprocessor architecture and programming, 8051 Microcontroller programming

Digital System

Designing gates from Transistor, Boolean Functions, Multiplexer, Demultiplexer, Registers, Counters, Shift Register, RAM, ROM

Computer Programming

Introduction to C programming, Variables, Data-type, Function

Skills

Programming	VHDL, Verilog, Haskell, CLASH
	C,C++,Python, Java, MATLAB
Technical	Digital Design, Arduino, Linux Basics, Data Analysis, Version Controlling
Documentation	LaTeX
Management	Good communication and efficient planning

Interests

Computer Architecture, Formal Verification, Embedded systems, Digital Systems, Operating Systems, Compilers, Hardware Security, VLSI, Robotics, AI/ML, CNN
Literature, Dance, Chess, Badminton