REBIN SILVA VALAN ARASU

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SUMMARY

Software researcher focused on large-scale graph algorithms and parallel systems, with experience in CUDA-based performance optimization and systems-level research across academia and industry.

EDUCATION

PhD in Computer Science — **Riverside, CA**
University of California Riverside — *September 2023 - June 2028*
CGPA : 4.0/4.0

B.Tech. + M.Tech. in Computer Science and Engineering — **Chennai, India**
Indian Institute of Technology (IIT) Madras — *July 2017 - May 2022*
CGPA : 8.86/10

PROFESSIONAL EXPERIENCE

KLA Corporation — **Chennai, India**
HPC Engineer — *June 2022 - September 2023*
- Implemented and optimized the **GPU-accelerated inference engine** for the semiconductor wafer-defect classification product.
- Developed GPU algorithms for feature computation and image alignment with better cost-normalized performance than CPUs.
- Collaborated with globally distributed teams to integrate the algorithms into production-grade systems.
- Co-designed a **CUDA-based DL framework** that achieved over 200% speedup over TensorFlow + XLA without loss in sensitivity.

Adobe Systems India Private Limited — **Bengaluru, India**
Research Intern — *May 2021 - July 2021*
- Designed an automated data-storytelling engine using **Monte-Carlo Tree Search** (MCTS) to generate cohesive visual narratives.
- Evaluated story quality through a structured user study measuring story integrity, data coverage and visual diversity.

Maximl Labs Private Limited — **Chennai, India**
Software Development Intern — *May 2019 - July 2019*
- Built a secure **code-protection** mechanism for SyncOps, a project management platform.
- Modified the Python interpreter to interpret the protected Python code with only around 1% performance overhead.
- Integrated the modified Python Interpreter into the CI/CD pipeline of SyncOps.

RESEARCH EXPERIENCE

University of California, Riverside — **Riverside, CA**
Student Researcher under guidance of Prof. Rajiv Gupta — *September 2023 - Present*
- Formulated a unified framework for fast and approximate **path planning** problems in robotics using graph-analytic primitives.
- Developed an **anytime approximate and exact general framework** for NP subgraph problems with clever pruning strategies.

University of California Riverside — **Riverside, CA**
Teaching Assistant — *September 2024 - December 2024*
- Supported instruction for the course CS201 (Compiler Construction) under Prof. Rajiv Gupta over the span of 3 months.
- Formulated 3 programming assignments and reference solutions on **LLVM Optimization Passes** for Constant Propagation.
- Assisted students through discussions, debugging sessions, and performance evaluations.

Indian Institute of Technology Madras — **Chennai, India**
Research Assistant under guidance of Prof. Rupesh Nasre — *January 2021 - May 2022*
- Developed a **GPU-accelerated Batch Dynamic K-core maintenance** algorithm with the same guarantees as CPU algorithms.
- Demonstrated an application of dynamic K-core analytics for large-scale graph mining with over 1.5x speedup over prior works.

ACADEMIC PROJECTS

Image Dithering, using a GPU-CPU hybrid algorithm — **IIT Madras, India**
GPU Programming — *January 2020 - May 2020*
- Implemented a high-throughput **hybrid CPU-GPU parallelization** strategy for the Floyd-Steinberg image dithering algorithm.
- Deployed a novel work-distribution strategy and error diffusion scheduling to make the best use of both CPU and GPU.

MiniJava compiler — **IIT Madras, India**
Individual Course Project - Compiler Design — *August 2019 - November 2019*
- Constructed a parser, type checker and IR generator for MiniJava, a small subset of Java.
- Employed flex, bison and JTB to compile MiniJava to MIPS assembly via a multi-level compilation stack.

SKILLS AND INTERESTS

CUDA, Thrust, CUB, OpenMP, C, C++, Python, Linux, Git, Bash, Docker, LLVM, Makefile, GPU Programming, Dynamic Graph Algorithms, Approximate Algorithms, Machine Learning and Deep Learning, Secure Systems Engineering