KARAEN SENTHILKUMAR

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EDUCATION

The University of Chicago Chicago, IL
Master of Science in Computer Science (specializing in High Performance Computing) December 2025 (Expected)
Coursework: Advanced Computer Architecture, GPU Programming, Parallel Programming, Generative AI, Compilers

National Institute of Technology, Tiruchirappalli Tiruchirappalli, India
Bachelor of Technology in Electrical and Electronics Engineering (Minor in Computer Science) May 2021
Coursework: Artificial Neural Networks, Fuzzy and Genetic Algorithms, Microprocessors and Microcontrollers

PROFESSIONAL EXPERIENCE

STAGE Center Chicago, IL
Game Developer January 2025 - Present

- Programmed using GameMaker to develop Quantum Labyrinth, a 2D educational game to introduce core quantum physics concepts in an interactive format through level mechanics and narratives; Showcased for 300 school children in fairs and presented at the American Physical Society Conference, receiving widespread acclaim.
- Developing a 3D multiplayer game in Unity and C# with realistic terrain behaviour and mini-games to educate players on genetic coding, molecular biology, and ASO treatment, scheduled for release on the App Store in the upcoming winter.

Oracle Bengaluru, India
Senior Member of Technical Staff, Autonomous Database (Shared) Cloud July 2021 - August 2024

- Implemented four production-grade metrics using Java, SQL, and Shell scripting, based on database health parameters such as storage, connectivity, and backup, in collaboration with the Database and Oracle REST Data Services teams. Delivered critical insights for observability and monitoring to customers across 40 global regions.
- Collaborated on the Zero Data Loss project to fetch stats for Autonomous Data Guard from live streaming pods for seamless failover planning, ensuring an RTO of less than 2 mins with near-zero data loss and Gold MAA certification.
- Developed dedicated broker workers to aggregate and parallel process database health-check stats directly from Central Container Database to reduce runtime SQL usage, improving metric computation by up to 2.5x.
- Created a unified connection metrics worker that consolidated CMAN logs parsing, removing redundant processing overhead by 70% and cutting total CMAN metrics compute time from 15s to under 4.5s per interval.

Samsung R&D Institute Bengaluru, India
Summer SDE Intern, Voice Intelligence Research May 2020 - July 2020

- Built capsules for Samsung's voice assistant, Bixby, using the Bixby SDK, Django, and MySQL to guide users through IoT device features via contextual NLP. Implemented keyword extraction using Bixby ASR and NLU, and developed dynamic action workflows based on user activity to generate adaptive responses. Received praise from architects and managers for delivering a robust module that anticipated diverse user intents.

PROJECT / RESEARCH EXPERIENCE

Rasterized Digit Classification with cuBLAS and CUDA February 2025 - May 2025

- Implemented a fully-connected neural network to classify handwritten digits from the MNIST database on GPUs.
- Benchmarked performance across NVIDIA GPUs with optimizations like batching, CUDA streams, thread coarsening, and memory coalescing. Achieved 521K grind rate, 97.55% accuracy, and 80% occupancy on V100.

Real-Time Traffic Hazard Detection in CUDA May 2025

- Built a multi-stream GPU pipeline using CUDA streams and pinned memory to process real-time vehicle sensor batches.
- Optimized hazard scoring with coalesced memory access and concurrent host-device transfers for high throughput.

GoLD - End-to-end compiler in Go January 2025 - March 2025

- Built a compiler for Go with AST parsing, LLVM IR generation from control flow graphs, and ARM code generation.
- Used linear scan register allocation and dead code elimination with 2SAT-based optimization for unreachable control paths.

Monte-Carlo Raytracing for HPC systems February 2025

- Developed ray-tracing to generate 7 billion rays to render a sphere, achieved 1200x speedup on V100 versus serial version.
- Explored shared memory version with OpenMP and distributed memory multi-GPU version with MPI for double precision.

SKILLS

Technical Languages: Java, Python, C, C++, JavaScript, SQL, Golang, CUDA, C#, ARM Assembly, MATLAB
Frameworks/Libraries: ReactJS, Django, MongoDB, WebGL, JUnit, cuBLAS
Technologies: Linux, Git, Oracle Cloud Infrastructure, Ethereum, NVIDIA CUDA Toolkit