

VIR NARULA

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Education

University of Illinois at Urbana-Champaign

May 2023

Bachelor of Science in Computer Science (James Scholar)

GPA: 3.83

Relevant Coursework: Data Structures & Algorithms • Systems Programming • Algorithms & Models of Computation • Artificial Intelligence • Programming Languages/Compilers • Computer Architecture • Compiler Construction • Applied Machine Learning

Work Experience

Apple – Compilers for CPU & Accelerators – Software Engineering Intern

May 2022 – August 2022

- Leveraged ARM's vector instruction set & memory to optimize dot product operations on Apple's M1 architecture
- Reduced execution time by up to ~75% on microbenchmarks for vectors with large dimensions
- Created a static loop analysis tool to automate extraction and analysis of loops at scale with a focus on vectorization
- Integrated analysis with profiling functionality to find missed optimizations in performance-critical loops

NVIDIA – SPIRV & CGC Compiler Team - Software Engineering Intern

January 2022 - May 2022

- Added peak memory usage tracking to the GLSL (OpenGL Shading Language) compiler, furthering profiling ability
- Benchmarked the GLSL compiler peak memory usage across various compiler stages to inform and advise future work
- Implemented matrix multiplication reordering optimization in the SPIR-V compiler to reduce computational complexity
- Achieved ~3.5% frame rate boost in key frames of production titles that contained optimizable patterns

LLVM Research Group @ UIUC - Undergraduate Researcher

May 2020 – Present

- Working under Professor Vikram Adve developing HPVM, a heterogeneous and parallel compiler infrastructure
- Leveraged LLVM to create compiler for Hetero-C, which compiles to HPVM-C, allowing for easy HPVM programming
- Reduced average program length by ~50% and significantly improved simplicity for new programmers
- Ported OpenVINs (Intel's computer vision library) to Hetero-C++ with CPU acceleration as proof-of-concept

Minimize Tremors LLC – Software Engineering Intern

April 2020 – September 2020

- Programmed microcontrollers to dampen tremors for Parkinson's patients, a disease afflicting ~1 million in the US
- Used concurrency and real-time principles to perform transforms on tremor data and adjust device in real time

Projects

Deep Learning Games

May 2020 – Present

- Created deep learning models using Keras & TensorFlow to play games including Blackjack, Flappy Bird, and Snake
- Achieved near-perfect scores in most games after generational training. Used PyGame for game mechanisms
- Built a Chess AI using minimax, alpha-beta, and stochastic search to play optimal moves, looking n moves ahead

Speechful – Lead Developer

August 2020 – Present

- Created speech-based document editing solution for those unable to use keyboards using React and Google Speech
- Led development team of 3, guiding application design, program implementation, and release

Extracurricular Activities

Founders (Illinois Entrepreneurs) – Microgrants Analyst

August 2020 – December 2021

- Worked on team to analyze and assist the prospective student startups and award micro-grants.

Awards and Honors

Runner-up Best Pitch at HackThis, HackIllinois, - Awarded prize for second-best overall product pitch

August 2020

James Scholar, University of Illinois, Urbana-Champaign – Awarded to students with high academic standing

August 2020

SKILLS & INTERESTS

Programming Languages: *Proficient:* C/C++, Java, Python, JavaScript. *Intermediate:* Haskell, Rust,

Professional Interests: Compilers, Programming languages, Deep-Learning, Embedded systems, Distributed Systems, Dev Tools

Languages: English (Native), Hindi (Fluent), French (Conversational)