Shashank Rajora

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Shashank Rajora | sha-x2-nk

STATEMENT

I am a final-year undergraduate student with **keen interest on accelerating algorithms on specialized hardware**. I am currently working on **Operating Systems, learning while making a simple one**. I have also **previously worked on optimising matrix multiplication and convolutions on GPUs and CPUs**. My interests lie in performance engineering, parallel computing, image processing and computer vision.

SKILLS & INTERESTS

- **Languages:** C/C++, Python, CUDA
- **Interests:** GPU Programming, Hardware Acceleration, Computer Architecture, Deep Learning
- **Tools/Libraries:** OpenCV, CMake, Nsight Compute, PyTorch, ONNXRuntime

EDUCATION

Indian Institute of Information Technology, Dharwad
Dec. 2021 – present

B.Tech. in Computer Science
India

- **CGPA:** 8.17

EXPERIENCE

Indian Knowledge Systems
July 2023 – Dec. 2023

Research Intern, advised by Dr. Chinmayananda A

- Conducted a literature survey on various methodologies for identifying relationships between word sounds and meanings, focusing on phonology.
- Applied inferential techniques to explore connections between Hindi words and their pronunciation patterns.
- Analyzed the correlation between word sounds and the emotions they convey, identifying phonetic features commonly associated with emotions such as anger, joy, and sadness.

PROJECTS

Convolution algorithms for GPUs and CPUs
May 2024 – Jun. 2024

CUDA, C, C++
Sha-x2-nk/convolution

- **Implemented Winograd convolution algorithms** in CUDA C++ for GPU and C for CPU.
- **Outperformed cuDNN's kernel runtime** for Winograd unfused algorithm on convolution layers of VGG-16 using RTX 3070Ti laptop GPU.
- Achieved optimized kernel runtime using profile-guided optimizations and Nsight Compute for tuning kernels.

MNIST NUMC
Mar. 2024 – Apr. 2024

CUDA, C++
Sha-x2-nk/MNIST_NUMC

- **NumC is a C++ library** with basic functionalities and similar function calls to **NumPy**.
- **Authored the GPU module** of numC.
- Designed and trained a 2-layer neural network for MNIST with forward and backward passes of affine layers, ReLU, dropout, and softmax loss, model achieved **97%** test accuracy.

Fast Face-recognition
May 2023 – Jun. 2023

C++
Sha-x2-nk/FinalEntryExit

- **Developed a face-recognition module** for entry-exit management to track student movement at university gates.
- **Evaluated face detection models:** YOLOv8, Ultra Light Face Detector; and **embedding generation** with Facenet.
- **Ported code to ONNX Runtime (C++)** for performance, enabling inference with different execution providers like Intel OpenVINO and NVidia TensorRT.
- Currently awaiting administrative approvals for deployment.

RELEVANT COURSEWORK[1]

- **Systems:** Microprocessors & Microcontrollers, Computer Architecture, GPU Architectures And Programming[2], Performance Engineering Of Software Systems[3], Database Management Systems, Operating Systems, Security Engineering, Computer Networks
- **Computer Science:** Problem Solving through Programming, Object Oriented Programming, Data Structures, Design & Analysis of Algorithms, Advanced Algorithm Design, Software Engineering, Theory of Computing
- **ML/AI:** Artificial Intelligence, Machine Learning, Image Processing and Computer Vision, Machine Learning for Speech and Computer Vision, Applied Linear Algebra for Machine Learning
- **Mathematics:** Linear Algebra, Probability, Statistics, Calculus, Discrete Mathematics, Number Theory

ACHIEVEMENTS

- Achieved first place in a college-level Data Structures and Algorithms competition.
- Recognized for novelty in a course project, showcasing innovative approaches and original solutions.

[1] All the courses are graded and taken at IIIT Dharward unless explicitly marked. NPTEL offers online courses from top Indian universities that have graded assignments and on-site proctored final exams.

[2] NPTEL and not proctored/graded

[3] MIT OCW and not proctored/graded