RYA SANOVAR

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EDUCATION

Birla Institute of Technology and Science, Pilani *Nov 2020 - Aug 2024*
Bachelor of Engineering in Electronics and Communication GPA: 8.91/10.0
Minor in Computing and Intelligence

Srigayatri Junior College *Jun 2018 - Mar 2020*
Telangana State Board of Intermediate Education Percentage: 97.5%

RESEARCH EXPERIENCE

Microsoft Research Bangalore, India
Research Fellow (Previously Research Intern) *Jan 2024 - Present*

- Developed ***LeanAttention***: A hardware-aware scalable exact-attention execution mechanism that accelerates attention by 2.6x over FlashAttention-2 with up to 8.33x speedup for 512k context lengths. **Paper Link**
- Leveraged a stream-K style partitioning in LeanAttention that *always* provides *equalized* compute loads to underlying hardware resources, ensuring near 100% hardware occupancy and delivering speedup irrespective of problem size and hardware architecture.
- LeanAttention has been integrated into ONNXRuntime: **ONNXRT LeanAttention Link**

Central Electronics Engineering Research Institute (CSIR-CEERI) Chennai, India
Research Intern *May 2022 - Jul 2022*

- Utilized rRPG image scaling through Eulerian Video Magnification by employing spatial decomposition, temporal filtering, and signal amplification of a video recording of the face. The objective was to visually capture blood flow dynamics in the face and extract respiratory rates.
- Localized ROI to skin pixels to reduce artifacts with the aim of improving upon the state of the art.

PUBLICATIONS AND PRE-PRINTS

Rya Sanovar, Srikant Bharadwaj, Renee St. Amant, Victor Rühle, Saravan Rajmohan. *"Lean Attention: Hardware-Aware Scalable Attention Mechanism for the Decode-Phase of Transformers"*
Paper Link: https://arxiv.org/abs/2405.10480

RESEARCH PROJECTS

An IoT and Edge Enabled DNN for Bone Fracture Detection *Dec 2022 - Aug 2023*
Department of Electrical and Electronics Engineering, BITS Pilani

- Designed a custom CNN for automated detection of bone fractures from X-ray images.
- Quantized and pruned the model appropriately for optimizing latency metrics.
- Deployed the model on an FPGA PYNQ-Z2 board for hardware acceleration as well as on android devices for accurate and timely bone fracture detection.

Analysis of Impact of MGNREGA Scheme on India's Green Cover *May 2022 - Aug 2023*
Department of Computer Science and Information Systems, BITS Pilani

- Utilized remotely sensed satellite data to evaluate the progression of NDVI in regions where MGNREGA assets have been constructed.
- Developed ARIMA and XGBoost models along with statistical methods such as synthetic control and Granger causality to make causal inferences on analyzed data.

· *Quantitatively* verified that the scheme had an overall positive impact and led to significant vegetation growth in the target regions.

Testing the Efficacy of Counter Speech Measures Online *Dec 2021 - Mar 2022*
Department of Computer Science and Information Systems, BITS Pilani

· Carried out a literature survey on designing context-free counter speech to deter online hate against minorities on Twitter in the Indian context.
· Collected data on accounts that have a prior tendency to tweet/share/like/engage with hate speech.
· Conducted randomized controlled interventions to assess behavioural changes in supervised accounts.
· Observed a notable change in tweeting activity of test subjects after interventions.

RELEVANT COURSEWORK

· **Computer Science -** Machine Learning, Artificial Intelligence, Image Processing, Data Mining, Foundations of Data Structures and Algorithms, Foundations of Data Science (Audited), Operating Systems
· **Mathematics -** Discrete Mathematics, Probability and Statistics, Multivariate Calculus, Differential Equations, Linear Algebra
· **Electrical and Electronics -** Digital Design, Microprocessors and Interfacing, Digital Signal Processing, Communication Networks

TECHNICAL SKILLS

Programming Languages
C/C++, Python, Java, React JS, HTML/CSS, JavaScript, MATLAB
Libraries and Softwares
CUTLASS, TensorRT-LLM, NSight Compute, HLS4ML, Vivado HLS
Hardware
Modern GPU Micro-architectures and FPGAs

AWARDS AND SCHOLARSHIPS

MHRD Post Matric Scholarship, TSBIE *Every year, 2020 to 2024*
A national level merit-based scholarship for pursuing higher studies, awarded to top percentile students in a relevant stream from the respective board of examination in Grade 12 (Higher Secondary).

EXTRACURRICULARS

Student Alumni Relations Cell (SARC) - BITS Pilani *Jan 2023 - Aug 2023*
Content Head

· Developed content strategies and initiatives for SARC to engage with alumni and students effectively.
· Curated content for SARC's social media and website, as well as wrote articles and interviews highlighting the achievements and contributions of alumni.

Computing and Electronics Research Summit (CEReS) - BITS Pilani *May 2022*
Host and Speaker

· Facilitated sessions, introduced speakers, and ensured that sessions run smoothly and on time.
· Created a detailed schedule and agenda for the research summit, and collaborated with event organizers to invite relevant speakers and researchers.