Ravi Ghadia

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Education

Indian Institute of Technology, Kharagpur **Jul'17 – Jun'21**
Bachelor of Technology in Electronics and Electrical Comms. Engg, CGPA: 9.35/10
Minor in Computer Science and Engineering

Selected Coursework:

- **Electrical and Electronics Engineering:** Analog/Digital Communication, Microcontroller and Embedded Systems, Digital VLSI Circuits
- **Computer Science:** Data Structures and Algorithms, Computer Architecture and Operating System, Computational Number Theory
- **Mathematics / Machine Learning:** Linear Algebra for AI/ML, Probability and Stochastic Processes, Natural Language Processing, Advanced Theory in Machine Learning

Work Experience

GPU Power Architect, NVIDIA, Bengaluru **Jul'21 - Present**
Manager: Raghavendra Bhat

- Improved GPU energy inefficiencies by developing a high-fidelity energy analysis / debug system at micro-unit level
- Enabled management/marketing with key decisions on datacenter GPUs by designing Perf/watt simulation environments for DGX-class systems.
- Collaborated with Software, Hardware, and Product teams to verify and debug performance and power of key NVIDIA features like Deep Learning Super Sampling (DLSS)
- Reduced the power estimation runtime/resource intensity by a mammoth ∼**2000x** by contributing to critical algorithms like MaxQ / Bin-Optimization

Research Assistant, H2Lab, University of Washington (Remote) **Nov'22 – Present**
Advisor: Prithviraj Ammanabrolu

- Targeted the use of natural language feedback to train Large Language Models via Feedback-driven reward models
- Improved correspondence between feedback and generated text by designing a reward distribution algorithm
- Achieved **better factual alignment** by using localized rewards extracted from the feedback

Summer Internship, NVIDIA, Bengaluru (Remote) **Apr'20 – Jul'20**
Mentors: Sivakumar Anandan, Raghavendra Bhat

- Conceptualized the use of Reinforcement Learning (RL) to solve the combinatorial optimization problem of deriving optimal configuration of a GPU
- Delivered proof-of-concept solution promising **massive runtime benefits** for the otherwise NP-hard problem
- Received a **Full-time job offer** for exemplary performance throughout the internship

Publications and Preprints

CORAL: Contextual Response Retrievability Loss Function for Training Dialog Generation Models
Bishal Santra, Ravi Ghadia, Manish Gupta, Pawan Goyal
Bachelor's Thesis — Submitted to NeurIPS 2023[preprint]

- Proposed retriever-based loss function that considers context to evaluate response goodness accounting for human-preferences
- Achieved state-of-the-art results on relevance metrics like MaUde/DEB against strong pretrained baselines

Perf Activity Driven Instantaneous Power Projection
Ravi Ghadia, Sivakumar Anandan, Raghavendra Bhat
Accepted to NTECH India 2022 (NVIDIA Internal Technology Conference)

- Built a framework that allowed high precision energy analysis and helped isolate inefficient regions in the GPU graphics pipeline

MaxQ Optimization using Reinforcement Learning
Ravi Ghadia, Vamsi VVS Krishna Garaga, Karthik Prakash, Sivakumar Anandan, Raghavendra Bhat
Accepted to NTECH India 2022 (NVIDIA Internal Technology Conference)
- Implemented Reinforcement Learning based solution for an NP-hard problem that had significant runtime overhead in the overall power estimation

Selected Academic Projects / Competitions

Maverick 2.0 Hackathon — AB InBev **Apr'21 - May'21**
3-member team, National Finalists (top 8 out of 750+ teams Pan India)
- Developed an application to recommend customized discounts on products sold across various sectors/geographies
- Received special mention for outstanding design among the finalists, implementing modularization and pipelining to process requests in real-time

Secure Authentication via user-behaviour **Aug'20 - Nov'20**
Advisor : Dr. Sudipta Mukhopadhyay
- Authenticated users via their usage profile for mouse activity using click/pause time, velocity of the cursor etc.
- Prevented unauthorized access with an 83% recall using self-organizing maps to extract features from user-activities

Optimal Power Distribution **Nov'18**
Advisor : Dr. Arijit De
- Determined the stability of a network topology's transfer function with varying inductive and capacitive components
- Obtained optimal transfer function for maximal power efficiency through a Monte-Carlo simulation in MATLAB

Skills

- **Programming Languages:** Python, C/C++, MATLAB, HTML, Javascript
- **Frameworks:** Pytorch, Tensorflow, Django, Streamlit
- **Libraries:** HuggingFace, OpenAI Gym, RL4LMs, stable-baselines
- **Profilers:** NVIDIA Nsight, Radeon Graphics Profiler
- **Utilities:** Perforce, Git, Bash, Linux

Academic achievements and awards

- Secured **All India Rank 862** in **JEE Advanced 2017** among more than 150,000 students appearing for the examination
- **Runners Up** at Enigma — Electrical Acumen Competition organized during Impulse'19, annual tech-fest of Electrical Dept. IIT Kharagpur
- **All India Topper** in Chemistry for getting perfect score in the Class 12 examination conducted by the Central Board of Secondary Education (CBSE) in 2017

Extracurricular Activities

- **Certified Instructor — NVIDIA Deep Learning Institute :**
  - Served as an instructor for courses on **Deep Learning** and **Transformer based NLP applications**
  - Conducted sessions during GTC and assisted other instructors as a TA during related courses
- **Volunteered as a Mentor** at Mentor Together, a Non-Profit Organization aiming to assist underprivileged young-minds in their student-to-professional transition
- Served as the Hall Alumni Committee head, orchestrating alumni funds to initiate annual donation drive for Ambassadors Children Home, an orphanage near the IIT Kharagpur campus
- Performed a lead role representing the Rajkot District team in **National Science Dramatics Competition 2014**