

EASHAN GUPTA

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Education

University of Illinois Urbana-Champaign

Master of Science in Computer Science (with thesis)

2021-2023 (Expected)

GPA: 4.0/4.0

Indian Institute of Technology Bombay

Bachelor of Science in Computer Science with Honours

2016-2020

GPA: 9.13/10

Technical Skills & Coursework

Languages: C++, C, Golang, Python, P4, Bash, Racket/Scheme, Haskell, Prolog, MIPS, SQL, Java

Technologies: Kubernetes, GitHub, Keras, Jupyter Notebooks, MATLAB, Simulink, Android Studio, Jenkins, PyTorch

Coursework: Machine Learning for Signal Processing, Advanced Operating Systems, Advances in Intelligent and Learning Agents, Advanced Machine Learning, Functional Programming Languages, Web Search & Information Retrieval, Digital Image Processing, Artificial Intelligence, Computer Graphics, Graph Theory

Work Experience

Nutanix, Bengaluru | Software Developer, Karbon/MSP team

July 2020 - July 2021

- Used **Kubernetes** to deploy microservices on a Hyper-converged Infrastructure using virtual machines
- Worked to support the Karbon platform on **VMware's hypervisor ESX** other than Nutanix's own hypervisor - AHV
- Added multiple features to the Karbon controller like migration to **CoreDNS** on k8s upgrade, network segmentation for efficient traffic handling, redacting logs, and tracking metrics using **Prometheus** and middlewares

Tower Research Capital, Gurgaon | Core Engineering Intern

May-July 2019

- Automated the performance **testing platform** for the software processing the order book data broadcast
- Empirically investigated patterns in performance on using **cache allocation technology** with different configurations

Research Experience

Improving bounds of Policy Iteration Algorithm

February-August 2020

Guide: Prof. Shivaram Kalyanakrishnan | Research Project

IIT Bombay

- Proved exponentially better upper bounds for the number of steps taken by Policy Iteration Algorithm (**PI**) to determine the optimal policy in deterministic Markov Decision Processes (**DMDPs**) by bounding number of path-cycles in a digraph
- Conducted various empirical experiments on lower order AUSOs to observe the family of randomized PI

Towards validation of RTL passes of the GCC compiler

January-June 2020

Guides: Prof. Amitabha Sanyal & Prof. Supratik Chakraborty | Bachelor's Thesis

IIT Bombay

- Analysed the various Register Transfer Language (**RTL**) optimization passes in **GCC-4.7.2** and implemented a **block-by-block** validation technique to validate program transformations done by the passes
- Realized obligations based on the return values, heap memory and function calls of programs in the **Z3 Theorem Prover** tool to prove semantic equivalence between different control flow graphs (**CFGs**)

Optimized DL GPU Task Scheduling for NVIDIA Jetson TX2

[GitHub] | Aug-Dec 2021

Guide: Prof. Tianyin Xu

University of Illinois Urbana-Champaign

- Implemented GPU task scheduling algorithms for deep learning inference models based on greedy longest chains and load balancing in **PyTorch**; Improved performance of Nimble by upto 16% on TX2, a popular embedded AI systems hardware

Key Projects

- Self-Supervised Embedding-based Speech Emotion Recognition:** Trained a **Siamese NN** to distinguish emotions between 2 input speech samples with test accuracy 82% on the **CREMA-D** speech dataset, with upto 54% accuracy for unseen classes. Used the model as an embedding to learn emotion classifier with 81% accuracy
- Abstract Interpretation and Program Verification:** Used domain specific techniques and fixed point analysis to implement **congruence** and **array** abstract domains for integration into the **CAnalyzer** tool
- Reduction in Games played on recursion schemes:** Intern with Prof. Roland Meyer at TU Braunschweig, Germany; Worked on the reduction of parity games to safety games played on higher order recursion schemes (**HORS**), using similar results on reduction in games played on collapsible pushdown automata (**CPDA**)
- Strong Password Generation:** Devised methods to evaluate a password based on the metrics of **guessability** and **memorability** and used them to compare the generative models developed
- Monadic Parser:** Modernised the parser implementation for core language in **Haskell** using Monads
- Handwriting synthesis:** Devised an algorithm to train an LSTM and an encoder-decoder model in an **adversarial** fashion; Used it to string letters smoothly to form complete handwritten words