+91 97915 76891
Chennai, India
pratyush.v.m@gmail.com

# Pratyush Vedamoorthy

Computer Engineering Graduate

Website
Github
Linkedin

## Education

**Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram, India** **2018 — 2022**

- Bachelor of Technology in Computer Science and Engineering (Distinction)
- **CGPA:** 9.17/10.00
- **Relevant Coursework:** High Performance Computing, Advanced Data Structures and Algorithms, Pattern Recognition, Computer Architecture, Computer Organization, Operating Systems, Linear Algebra, Probability Theory, Differential Equations

**SBOA School and Junior College, Chennai, India**

- Class XII - 475/500 (95.0%) **2018**
- Class X - 10.0/10.0 CGPA **2016**

## Work Experience

**NVIDIA** **July 2022 — Present**
*Systems Software Engineer* *Pune, India*

- Working as a DevTools Engineer on the CUPTI API in the Cuda Profiling Tools Development Team.
- Analyzed the performance overheads of tracing and profiling in AI/HPC Workloads using CUPTI Injections.
- Contributed to enabling CUPTI support in the bringup phase of upcoming GPUs.

**KLA-Tencor** **Dec 2021 — Mar 2022**
*Software Intern* *Chennai, India*

- Migrated serial algorithms used in semiconductor defect-detection to GPUs and parallelized them using CUDA.
- Profiled CUDA code using NSight Compute and NSight systems to perform co-optimization.

## Research Experience

**Indian Institute of Technology, Roorkee (IIT-R) - Bachelor's Thesis** **Nov 2021 - June 2022**
*Research Intern ( Guide : Dr. Debiprasanna Sahoo )* *Roorkee, India*

- Studied the design and micro-architecture of GPUs - SIMT Cores, Warp Schedulers and SIMT pipelines, with GPGPU-Sim's model as reference.
- Formalized the Warp Issue Scheduler and verified the safety and liveness properties of the formal model using SAL.

**Indian Institute of Science (IISc), Bangalore - Report, Github** **May 2021- Oct 2021**
*Research Intern ( Guide : Prof. R. Govindarajan )* *Bangalore, India*

- Recipient of the Indian Academy of Sciences' Summer Research Fellowship SRFP '21.
- Constructed pipelined CNNs with multiple GPUs for parallel training using Tensorflow Lingvo and GPipe.
- Analyzed the performance and memory tradeoffs between model-parallel, pipeline-parallel and hybrid-parallel training in CNNs across multiple GPUs.

**Indian Institute of Technology, Madras (IIT-M) - Github Links : MaxFlow, SSSP** **Mar 2020 — Oct 2020**
*Research Intern ( Guide : Dr. Rupesh Nasre )* *Chennai, India*

- Implemented parallel algorithms to compute maximum network flow on GPUs using CUDA.
- Experimented with fundamental graph problems like parallel BFS, parallel Bellman-Ford SSSP on GPUs with CUDA.

**HPRCSE Labs, IIITDM Kancheepuram** **Dec 2019 — Jan 2020**
*Intern ( Guide : Dr. Noor Mahammad Sk )* *Chennai, India*

- Conducted literature surveys on parallel computing taxonomies and gave a talk in the Computer Science Club's High Performance Computing Track (Slides).
- Gained understanding of parallel programming in OpenMP and MPI and explored profiling tools like Valgrind and Gprof.

## Skills

| | |
|---|---|
| **Programming Languages** | C, C++, Python |
| **Frameworks/Libraries** | CUDA, Tensorflow, PyTorch, OpenMP, OpenMPI |
| **Tools** | NSight Compute, NSight Systems, Bash, Git |
| **Other** | MySQL, AWS, GPU Architecture |
| **Interests** | High Performance Computing, Scientific Computing, Artificial Intelligence, Computer Graphics |

## Achievements

- Recipient of the Indian Academy of Sciences' Summer Research Fellowship SRFP '21. May 2021 — Oct 2021
- ICPC 2020 Regionalist (Gwalior-Pune) - rank 222, Regionalist (Amritapuri) - rank 342 Oct 2021
- Winner, Special Mention (Recognition Team Award) at Startup Weekend 2k19. Feb 2019

## Projects

**CUDA Maxflow Solver**

- Implementation of parallel maximum-flow in CUDA using the parallel push-relabel algorithm.
- Asynchronous push-relabel works on static flow networks with non-negative edge capacities.

**CUDA SSSP Solver**

- Implementation of Single Source Shortest Path in CUDA using the parallel Bellman-Ford Algorithm.
- Edge-centric BFS traversal is used.
- Runs on 0.5ms on bitcoin-otc (SNAP dataset) on a MX150 2GB GPU.

**POSIX PathTracer**

- A primitive multi-threaded path tracer built in C++ and PThreads, based on smallpt.
- Can render 200 spp in less than 25 minutes.

**Pipeline Accelerated CNNs**

- A modified fork of Tensorflow Lingvo, with added definitions of AlexNet and VGG16, pipelined with GPipe.
- Experiments conducted to analyze performance-memory tradeoffs across pipeline/model/hybrid parallel training, on multiple GPUs on AWS.

**Garden Buddy - Plant Species Identifier Web App**

- A Machine Learning based Gardener Assistance App that identifies the plant species from a picture of the leaves.
- Performed image augmentation, ensembling and stratified k-fold validation to achieved 96.8% classification accuracy.
- Trained using EfficientNet-B5s on the LeafSnap dataset. Deployed using PyTorch and Streamlit.

## Activities

**Lead Core (2020) / Joint Core (2019), EdITH (Education in IT & Hardware), Computer Science Club** **2019 — 2021**

- Led a team of 20+ juniors to organise numerous CS-related events, workshops and intra-campus competitions.
- Organized bi-weekly sessions on various arenas in computer science.

**High Performance Computing (HPC) Track Lead, Computer Science Club** **2020 — 2021**

- Presented a Talk on Parallel Computing Taxonomies.
- Organized workshops and sessions on HPC and Parallel Programming.

**Organizer - Vashisht 2020 (Inter-Collegiate Technical Fest)** **2020 — 2021**

- Conducted and organized coding competitions and CS-related talks.
- Coordinated a team to raise funds via alumni network.

**Core member, Institute Innovation Council (IIC), MHRD's Innovation Cell (MIC)** **2018 — 2020**

- Organized design ideathons, and summer industry open houses (EHIPASSIKO).

**Coordinator, Music Club, IIITDM** **2019 — 2020**

- Played the drums in the institute band as part of several shows and culturals.
- Conducted music events in SAMGATHA (Inter-collegiate Cultural Fest).

**Coordinator, Tamil Saalaram IIITDM** **2019 — 2020**

- Organized Tamil Language-related competitions in SAMGATHA (Inter-collegiate Cultural Fest).