SUNIL KUMAR

Ph.D. Student in HiPeC Lab @ IIITD

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EXPERTISE

Parallel Programming
Runtime Systems
Analysis and Design of Algorithms

PROGRAMMING LANGUAGE

C/C++ Java Python
gnu-make bash HTML
SQL Shell scripting

TOOLS AND TECHNOLOGY

MPI | OpenMP | HCLIB Cuda-C
LIKWID | PAPI MATLAB
OMPT Map-Reduce
Spark | Kudu | Hadoop | Kafka

TECHNICAL LEARNING

GPU Computing
Computer Architecture
Distributed Systems
Big Data Analytic
Concurrent Data Structure

AWARDS & ACHIEVEMENT

- SC'21 paper is one of the five Best Reproducibility Advancement Finalist papers.
- Received SIGHPC Travel Grant for SC'21
- Selected for Student Volunteer in SC'21
- Received letter of appreciation from IIIT-Delhi for B.Tech project

EXPERIENCE

Ph.D. Student | HiPeC Lab @ IIITD | Collaboration with Lawrence Berkeley National Laboratory

July 2021 – Present Delhi, India

- **Ongoing Research: Power aware Runtime for exascale computing**
  This research is about designing a runtime to improve the energy efficiency of hybrid shared and distributed memory parallel programs written in MPI+X, and modern task-based parallel programming models for exascale computing.
- **Co-Advising B.Tech Research Projects**
  - Implementing a programming model oblivious library for automatic concurrency control in a parallel program.
  - Achieving energy efficiency in priority-aware work-stealing runtime.

Research Assistant | HiPeC Lab @ IIITD

May 2021 – June 2021 Delhi, India

- **Project Title: Energy efficiency in Distributed memory parallel programming**
  I was working on designing a C/C++ library for achieving energy efficiency in Hybrid parallel programming models.

Undergraduate Researcher | In Collaboration with Lawrence Berkeley National Laboratory

Jun 2020 – May 2021 Delhi, India

- **Project Title: Cuttlefish: Library for Achieving Energy Efficiency in Multicore Parallel Programs** (Paper accepted in SC'21 Conference)
  This paper proposes Cuttlefish, C/C++ library for achieving energy efficiency in multicore parallel programs running over Intel processors. Cuttlefish dynamically configure optimal core and uncore frequencies for processors, thereby improving its energy efficiency.

COURSE PROJECTS

- **Holistic Runtime Parallelism Management for Time and Energy Efficiency**
  Implemented ParallelismDial (PD) for dynamically adapting the total number of threads in a work-stealing runtime for achieving an energy efficient execution.
- **Image Segmentation using Level-set method on Heterogeneous System (CPU+GPU)**
  Level-set method requires a lot of computation but provides the best accuracy in segmentation. GPU provides massive parallelism on this method and gives a speedup of 10x on different images.
- **Game Application using Javafx**
  Built an user interactive game, "Plants vs. Zombies" using Javafx. The game was built using OOP concepts in Java.
- **Face Emotion Recognition Model**
  This model supports emotion recognition from the faces of people who were recorded on video or live on a webcam. Built a deep learning model using CNN to achieve an accuracy of 73%.

PUBLICATION

- **Sunil Kumar**, Akshat Gupta, Vivek Kumar, and Sridutt Bhalachandra, "Cuttlefish: Library for Achieving Energy Efficiency in Multicore Parallel Programs", in Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC'21), St. Louis, MO, USA, November 2021. [DOI]

- Paper accepted in SC'21 Conference
- Google Cloud Platform Crash Course Certified in ML, Data science, and App Development

HOBBIES & INTEREST

- Swimming
- Cycling

EDUCATION

Ph.D. (CSE) | IIITD — CGPA: 8.91
July 2021 – Present — Delhi, India

B.Tech (CSE) | IIITD — CGPA: 7.0
Aug 2017 – July 2021 — Delhi, India

12^{th} (CBSE) | R.P.V.V — Perc: 82.4
July 2014 – Mar 2015 — Delhi, India