Rahul Bothra

https://rahul-bothra.github.io rahul.bothra@microsoft.com

Education

Birla Institute of Technology and Science, Pilani Aug. 2016 - Dec. 2019
B.E. in Computer Science (GPA: 8.09/10.00)

Experience

Research Fellow, Microsoft Research 2021 - Present
Advisors: Dr. Venkat Padmanabhan, Dr. Ranjita Bhagwan
Project: Optimizing resource efficiency for Microsoft Teams

- Designed peak-aware resource provisioning and allocation, with time-aware redundancies, which led to estimated cost savings of tens of millions of dollars annually.
- Under submission at **SIGMETRICS 2023**. (Link to preprint).

Project: Network sensitivity of video conferencing applications

- Devised metrics of user engagement and analyzed their sensitivity to network performance. Identified applications in traffic engineering, congestion control, and server allocation techniques.
- Under submission at **PAM 2023**. (Link to preprint).

Advisors: Dr. Ramachandran Ramjee, Dr. Muthian Sivathanu
Project: Identifying communication bottlenecks in ML training

- Fixed issues in how DL communication frameworks interacted with kernel APIs, which were causing latency overheads.
- Reduced ephemeral congestion in All Reduce communication by strategically modifying the size and order of the ring topology.

Software Engineer, Azure Migrate 2020
Managers: Priyank Gaharwar, Charumathy Srinivasan

- Designed components to scale-out and orchestrate migration from multiple servers for customers with large in-house datacenters.
- Built in-application debugging for network and authentication issues and improved the user interface, both of which improved the SLA from 96% to 99.5%.

Projects

P4-TrafficTool 2020
Advisor: Prof. Ben Leong, NUS Singapore
P4-TrafficTool generates protocol and packet templates for frameworks like Scapy, MoonGen, Wireshark, etc. Understood the p4c compiler pipeline and added support in P4-Traffictool to handle more variations of P4 programs. Source.

Reducing image distortion via object aware Seam Carving 2019
Advisor: Prof. Pramod Tanwar, CSIR CEERI
Identified conditions under which important parts of an image can get distorted by Seam Carving and designed an object-aware technique to reduce these distortions.

Google Summer of Code - Sugar Labs 2018
Advisor: Walter Bender, Founder - MIT Media Lab
Improved the Sugar OS and built pedagogy applications on top of it. Source.

Hyperloop India, SpaceX Global Challenge 2017
Designed and manufactured the *MagLev* system with Neodymium magnets for a Hyperloop prototype, and piloted at the SpaceX Global Challenge finals.

Teaching Positions

Teaching Assistant, BITS Pilani 2017 - 2019
Professors: Jagat Sesh., Sundaresan Raman. et. al.
Courses: Logic in Computer Science (CS F211), and Programming (CS F111)

Mentor, Google Open Source Programs 2018 - 2020
Mentored university and high school students in working with open-source projects.

Lecturer, CSD course, BITS Pilani 2019
Introduced and led an audit course *Data Science with Python*. Designed course content and evaluative components and taught over 50 students.

Academic Honors

KVPY 2015 Fellowship by Dept. of Science and Technology, Govt of India
NTSE 2014 Scholarship by NCERT Council, Govt of India