Sagar Bharadwaj

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Education

National Institute of Technology Karnataka, Surathkal — Surathkal, India
Bachelor of Technology in Computer Science, ***GPA : 9.41 / 10.0*** — *May 2019*

Experience

Microsoft Research India — July 2019 – Present
Research Fellow | Dr. Ranjita Bhagwan, Dr. Venkat Padmanabhan, Dr. Saikat Guha — *Bangalore, India*

- Working on data-driven inter-data center network optimization. Estimated savings in order of $ 10s of millions.
- Solving large-scale data discovery problems in datalakes of size in order of Petabytes.

Google Summer of Code Student — May 2018 – August 2018
Mozilla Firefox | Nihanth Subramanya

- Implemented a mechanism to prevent multiple downloads from bombarding the Firefox browser.

Intuit India — May 2018 – July 2018
Software Engineering Intern | DevOps Team — *Bangalore, India*

- Built a data pipeline to consume, store and analyze real time database operational metrics.
- Used open source tools like *Apache Kafka*, *Druid* and *RabbitMQ* to build the project infrastructure from scratch.

Samsung India, R&D — May 2017 – July 2017
Software Engineering Intern | 3G Development Team — *Bangalore, India*

- Automated unification of Time and Frequency Division Duplex code bases written for Shannon chipsets.
- Achieved 30% code size reduction using C parser scripts in Perl.

Selected Projects

Cost-Aware Networking for First-Party Cloud Applications — Aug 2019 - Present
Dr. Ranjita Bhagwan, Dr. Venkat Padmanabhan — *Microsoft Research*

- *Motivation*: Close cooperation between First-party applications and network can lead to WAN cost savings.
- Worked on bandwidth peak reduction and improved network redundancy planning by leveraging large deadline requirements of some first-party applications. Estimated network capacity savings is around 20%.

Discovering Related Data At Scale — Sep 2019 - Present
Dr. Ranjita Bhagwan, Dr. Saikat Guha — *Microsoft Research*

- *Motivation*: Automating discovery of related data in a very large datalake.
- Developed a framework to construct graph of related data from metadata and sampled content. Leveraged user query histories as ground truth to learn properties of related data in the datalake.
- The framework can construct the 'relatedness graph' for a datalake of size 4 Petabytes in around an hour.

Blockchain-Backed Volunteer Computing Platform — Aug 2018 - May 2019
Dr. K Chandrasekaran | Project Link — *National Institute of Technology Karnataka*

- Developed a peer to peer system that acts as a trustless marketplace for buying and selling computation resources.
- Leveraged Blockchain to achieve decentralization and trustlessness.

Virtual Database Administrator (vDBA) — May 2018 - July 2018
DevOps Team — *Intuit India*

- Large quantities of database telemetry is generated that can be leveraged by Database administrators for debugging and maintenance purposes. For example, execution time associated with a query plan.
- Built vDBA: A framework to collect, analyse and visualize large scale telemetry data, specifically database metrics.

EYantra Snakebot — Nov 2017 - Apr 2018
Eyantra Team | Project Link | Finals Video — *Indian Institute of Technology Bombay*

- Team of 4 designed, 3D printed and programmed a snake robot for EYantra, a national level robotics competition.
- Programmed the bot and the controller. National finals winners. Competed with 5932 teams.

Handwritten Equation Solver Oct 2017 - May 2018

IEEE NITK Student Branch | *Project Link* *National Institute of Technology Karnataka*

- Developed a mobile application to solve handwritten mathematical equations using deep learning algorithms.
- Leveraged *SymPy* as the Math Engine and implemented CNN models for symbol recognition.

Low rate TCP DoS Attack Aug 2017 - Dec 2017

Dr. Mohit P Tahiliani | *Project Link* *National Institute of Technology Karnataka*

- Simulated a Low-Rate TCP DoS Attack in ns-3. Achieved by exploiting Retransmission Timeout (RTO) in the congestion control algorithm implemented in TCP Reno.

Parallel Sparse Matrix Vector Multiplication (SpMV) Aug 2017 - Dec 2017

Dr. Basavaraj Talawar | *Project Link* *National Institute of Technology Karnataka*

- Implemented a parallel algorithm for Sparse-Matrix-Vector Multiplication (SpMV) in *CUDA*. Our novel algorithm beat the state of the art implementation in the standard *cuSparse* library for certain inputs.

Operating System Simulator Jan 2017 - Apr 2017

Dr. Shashidhar G Koolagudi | *Project Link* *National Institute of Technology Karnataka*

- Developed a web appplication that simulates various functions of an Operating System. Built using the *Django* web framework and uses Python for backend calculations.

Publications

- **Discovering Related Data At Scale**
  ***Sagar Bharadwaj**, Praveen Gupta, Ranjita Bhagwan, Saikat Guha*
  Under Revision at **International Conference on Very Large Data Bases (VLDB) 2021**
- **All in the Family: Cost-Aware Networking for First-Party Cloud Applications**
  ***S.Bharadwaj**, P.Thakkar, H. Sharma, S.Acharyya, Y. Bansal, R. Bhagwan, V. Kumar, V.N. Padmanabhan, K.Voelbel*
  Under Review at **ACM SIGCOMM's Computer Communication Review (CCR)** | Link
- **CollabChain: Blockchain-Backed Trustless Web-Based Volunteer Computing Platform**
  ***Sagar Bharadwaj**, Samvid Dharanikota, Adarsh Honawad, K. Chandrasekaran*
  Computer Information Systems and Industrial Mgmt (CISIM), 2019. Lecture Notes in Computer Science, Springer | Link
- **SolveIt: An Application for Automated Recognition and Processing of Handwritten Mathematical Equations**
  ***Sagar Bharadwaj**, Vilas Bhat, Arvind Sai Krishnan*
  4th IEEE International Conference for Convergence in Technology (I2CT), 2018 | Link
- **Blockchain Research and Applications: A Systematic Mapping Study**
  ***Sagar Bharadwaj**, Samvid Dharanikota, Adarsh Honawad, K. Chandrasekaran*
  International Conference on Blockchain Technology (IC-BCT), 2019. Springer | Link

Patent Submission

- **Discovering Related Data at Scale**
  Co-inventors: Ranjita Bhagwan, Saikat Guha, Praveen Gupta | Under review

Activities

- Open Source Enthusiast
  - Listed as official contributor to *SymPy*, a Computer Algebra System (CAS)
  - Contributed many patches to *Mozilla Firefox*
- Secretary of *WebClub, NITK* | Organized series of events around Open Source Software.
- Main Coordinator for *IEEE Women in Technology Summit, NITK* | Coordinated 70+ volunteers from all over India.
- Executive Member of *IEEE NITK* | Mentored and completed projects spanning many areas of interest for 3 years.
- Computer Science projects head, *Technites* (a technical fest), NITK

Miscellaneous

- National Winner of *EYantra*, 2018 | Robotics contest. Competed against 23,728 Students in 5,932 Teams
- Ranked 2nd in India, 94th globally out of over 3300 teams in IEEEXtreme 2017, a 24 hour coding contest
- 99.57 percentile in JEE Main (2015) examination among 1.3 million candidates.
- 99.91 percentile in KCET (2015) examination among 153k candidates.