Sandeep Kumar

DOB: 19 September 1989
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Education

2017 - () Doctor of Philosophy in Computer Science
School of Information and Technology,
Indian Institute of Technology, New Delhi, India

2011 - 2013 Master of Engineering in Computer Science, 1^{st} class
Computer Science and Automation Department,
Indian Institute of Science, Bangalore, India
Thesis: "Modeling Storage Performance in a HPC System", Grade "A" (7/8)
Advisor: Prof. K. Gopinath

2007 - 2011 Bachelor of Technology in Computer Science, 1^{st} class
Guru Gobind Singh Indraprastha Univeristy, New Delhi, India

Research Interest

Security, Distributed and Parallel Systems, Operating Systems, Mobile Systems, IOT, Machine Learning.

Research Projects

- Control Flow Integration: Secure Execution
  We are looking at ways to ensure that the control flow integrity of a binary is preserved. Variety of attacks can be mounted on a binary. We are looking into solutions that prevents majority of attacks and whether software based solutions will be enough or do we need to make some changes to the hardware.

  Advisor: Prof. Smruti R. Sarangi

- Tejas: Architectural Simulator
  Contributions to Tejas, an architectural simulator developed and maintained by Srishti research group at IIT Delhi. The simulator is completely written in Java and is used by research groups around the world for testing hardware designs.

  Advisor: Prof. Smruti R. Sarangi
  http://www.cse.iitd.ac.in/tejas/

- Modeling Storage Performance in a HPC System using Machine Learning. **[ME Thesis]**
  We present a mathematical model that can capture the relationship between the *features* (configuration parameters of a file system, hardware configuration and the workload configuration) and the *performance metrics* (Read speed, write speed of disk etc.) and use this to rank the features according to their importance in deciding the performance of the parallel file system (Gluster FS).

  Advisor: Prof. K. Gopinath | Grade: "A" (7/8)
  Thesis: https://goo.gl/eglBjh

Publications

- S. Kumar, K. Gopinath, L. Rocchi, P. T. Sukumar, S. Kulkarni and J. Sampath, "Towards a portable human gait analysis & monitoring system," 2018 International Conference on Signals and Systems (ICSigSys), Bali, 2018, pp. 174-180.
  https://ieeexplore.ieee.org/document/8372660/
- S. Kumar, S. Padakandla, C. L, P. Parihar, G. K and S. Bhatnagar, "Scalable Performance Tuning of Hadoop MapReduce: A Noisy Gradient Approach," 2017 IEEE 10th International Conference on Cloud Computing (CLOUD), Honolulu, CA, 2017, pp. 375-382.
  https://ieeexplore.ieee.org/document/8030611/

Course Projects

- Toy C Compiler [2018]
  Implemented a Toy C Compiler using Flex Bison and LLVM as part of the Compiler Course Work. It contains LLVM IR code generation and implementation of some basic optimizations.
  Code: https://github.com/sandeep007734/Toy-C-Compiler-using-Flex-Bison-LLVM
- Distributed Computing. [2012]
  Wrote Distributed Programs to solve TSP (Travelling sales man problem), ABP (Alpha Beta pruning search) and MST (Minimum spanning tree) using *rpcgen* in C++ and showed a speed up of factor 9, 6 and 2.5 respectively when the number of servers went up from 1 to 6.
  Advisor: Prof. R.C. Hansdah
  Report: https://goo.gl/BnTpTF
- Communication Network. [2012]
  Studied the algorithm SOFA (Sleep optimal Fair attention), which aims the energy conservation in wireless devices by changing the scheduling policy by simulating it to see the performance.
  Advisor: Prof. Shalabh Bhatnagar
  Report: https://goo.gl/Lh5QQ9
- Game Theory. [2012]
  Studied existing scheme for handling Kidney Exchange Programs and proposed a new scheme **SPAR** for this.
  Advisor: Prof. Y. Narahari
  Report: https://goo.gl/3Mujoh

Work Experience

Sept 2014- July 2017	Indian Institute of Science, Bangalore, Karnataka *Research Associate* Worked on auto tuning of Hadoop Map-reduce using Stochastic algorithms and Human gait analysis. Details in the publication section.
Jul 2013-Jun 2014	Dell R&D, Bangalore, India *Software Development Engineer* Responsible for BIOS configuration and system management tools, *DCC* (Dell Command Configure) and *OMCI* (Open Manage Client Instrumentation) respectively. DCC allows BIOS configuration from the Desktop (Windows and Linux) and OMCI allows remote management application programs to access information about the client computer.

References

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Computer Science and Automation
Indian Institute of Science

Interests and Activities

- Apart from field of Computer Science, I love to read books, specially Fiction, Biographies and History books.
  List of Books read so far :https://goo.gl/bEjjJJ
- I love to play an Online strategy game, called Defense of the Ancients 2 (DOTA 2).
  Profile: http://www.dotabuff.com/players/88064784
- I occasionally go for Cycling and Trekking Trips.
  Some Pics: https://goo.gl/ue6qeH
  Strava Profile: https://goo.gl/F1ow46