

Sandeep KUMAR

DOB: 19 September 1989
EMAIL: sandeep.kumar@cse.iitd.ac.in , sandeep007734@gmail.com
HOME PAGE: <http://www.cse.iitd.ernet.in/~kumarsandeep/>, <https://sandeep007734.github.io/>

EDUCATION

- [2017 -] Doctor of Philosophy in Computer Science
School of Information and Technology, Indian Institute of Technology, New Delhi, India
Advisor: Prof. S. R. SARANGI
- [2011 - 2013] Master of Engineering in COMPUTER SCIENCE, First Class
Department of Computer Science and Automation, Indian Institute of Science, Bangalore, India
Adviser: Prof. K. GOPINATH
Thesis: [Modeling Storage Performance in an HPC System](#)
- [2007 - 2011] Bachelor of Technology in COMPUTER SCIENCE, First Division
Guru Gobind Singh Indraprastha Univeristy, New Delhi, India

RESEARCH INTEREST

Security, Distributed and Parallel Systems, Operating Systems, Mobile Systems, IOT, Applied machine Learning.

CURRENT RESEARCH PROJECTS

- **ANALYZING APPLICATIONS PERFORMANCE IN A TEE SETTING**
The impact of running an application in a TEE setting, especially in Intel SGX, has not been studied in-depth. Through this project, we aim to gain a deeper understanding of the working of Intel SGX and open previously unknown avenues for performance optimization and security improvement.

Advisor: Prof. Smruti R. SARANGI
- **HARDWARE ASSISTED CONTROL FLOW INTEGRITY**
We are looking at ways to ensure the control flow integrity of a binary. Several attacks are mounted on the execution of a binary, which violates confidentiality or integrity or both. A trusted execution environment, which guarantees a secure execution environment, has severe limitations in its current form. We are exploring ways to alleviate these problems.

Advisor: Prof. Smruti R. SARANGI

SELECTED PUBLICATIONS

- **Sandeep Kumar**, Aravinda Prasad, Smruti R. Sarangi, and Sreenivas Subramoney. Page Table Management for Heterogeneous Memory Systems . In ISMM, 2021.
<https://doi.org/10.1145/3459898.3463907>
- **Sandeep Kumar**, Diksha Moolchandani, Takatsugu Ono, and Smruti Sarangi. F-LaaS: A Control-Flow-Attack Immune License-as-a-Service Model . In IEEE SCC, Milan, Italy, 2019.
<https://ieeexplore.ieee.org/document/8814192>
- **Sandeep 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/>
- **Sandeep Kumar**, S. Padakandla, C. L. P. Parihar, K. Gopinath, 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/>

WORK EXPERIENCE

| | |
|----------------------|---|
| JUN 2020- JAN 2021 | INTEL LABS, Bangalore, India <i>Research Intern</i> I was involved with improving the support for Intel Optane DC memory in Linux kernel. |
| SEPT 2014- JULY 2017 | INDIAN INSTITUTE OF SCIENCE, Bangalore, India <i>Research Associate</i> 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 <i>Software Development Engineer</i> Responsible for BIOS configuration and system management tools, <i>DCC</i> (Dell Command Configure) and <i>OMCI</i> (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. |

SELECTED 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> (private repository).
- **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>

SCHOLARSHIPS AND GRANTS

- 2018 A grant to spend one month in Kyushu University Japan for research collaboration.
- 2017 Visvesvaraya PhD Scheme for Electronics & IT
- 2011 642 Rank in GATE (Graduate Aptitude Test in Engineering) Exam 2011 (Total Students: 136027)

TRAINING AND CONFERENCES

- June, 2020 ISCA, Valencia, Spain (attended remotely due to Covid-19)
- Dec, 2019 HiPC, Hyderabad, India
- Jul, 2018 Indo-Japan collaboration, Fukuoka, Japan
- Jul, 2019 IEEE SCC, Milan, Italy
- Dec, 2017 HiPC, Jaipur, Rajasthan, India
- Jul, 2017 IEEE Cloud, Hawaii, USA

TEACHING EXPERIENCE

| | |
|----------------------------------|---|
| Operating System | [Fall 2021], [Spring 2019], and [Spring 2018] |
| Advanced Distributed Systems | [Spring 2020] |
| Data structures | [Fall 2019] |
| Introduction to Computer Science | [Fall 2018] |
| Cryptography | [Fall 2017] |

INTERESTS AND ACTIVITIES

1. Reading books
 2. Running, cycling, and occasional hiking trips
- Goodreads profile: <https://goo.gl/bEjjJJ>
Strava profile: <https://goo.gl/F1ow46>

REFERENCES

| | |
|---|---|
| Smruti R Sarangi Associate Professor srsarangi@cse.iitd.ac.in Department of Computer Science Indian Institute of Technology Delhi | K.Gopinath Professor gopi@iisc.ac.in Computer Science and Automation Indian Institute of Science |
|---|---|