Sukirna Roy

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Education

- **University of Central Florida** — Orlando, FL
  Master of Science in Computer Science; GPA: 3.97/4.0 — *August, 2019 – May, 2021*
  - **Courses**: Design and Analysis of Algorithms, Advanced Computer Architecture, Advanced Computer Networks, Multicore Programming, Advanced Artificial Intelligence, Modelling Nueronal Systems, Data Intensive Computing, Complex Adaptive Systems, Network Economics
- **Indian Institute of Space Science and Technology** — Thiruvananthapuram, India
  Bachelor of Technology in Computer Engineering (Avionics) — *August, 2009 – May, 2013*
  - **Courses**: Computer Organization and Operating Systems, Software Engineering, Computer Networks, Wireless Mesh Networks, Computer Graphics, Digital Design, Signals and Systems, Probability and Statistics, Control and Guidance Theory, Linear Algebra

Skills

- **Languages**: Python, SQL, Golang, R, Netlogo, C++, C
- **Frameworks**: Git, Docker, Tensorflow

Experience

- **Evolutionary Computation Lab, UCF** — Orlando, FL
  Graduate Researcher — *May, 2020 - May, 2021*
  - **Experimental analysis [Python]**: Implemented novel methods for improving file compression using cellular automata and associated emergent behavior. Results showed consistent improvement [1% - 5%] over state of the art.
  - **Novel synthetic file corpus**: Created a synthetic file corpus using statistical models generated from the govDocs1 corpus. The corpus is being utilized for performance analysis of data processing algorithms.
- **Indian Space Research Organisation** — Hassan, India
  Software Engineer — *October, 2013 - June, 2019*
  - **Spacecraft launch and de-orbit operations**: Successfully directed and optimized ground support for launch, early phase and de-orbit operations with 33% reduction in resource requirement [5+ launches].
  - **Spacecraft on-orbit operations**: Directed, up-scaled and optimized operations to 2x initial capacity with 66% reduction in resource requirement [Fleet of 25+ spacecrafts].
  - **Geosat linked archival system [Starburst MFTP]**: Designed and developed back-end for sat-link based high throughput data archival systems resulting in 85% cost savings [$93,500 savings/instance].
  - **Low cost Antenna Control System [VisualBasic]**: Engineered and maintained frontend and backend of in-house antenna control system resulting in 80% cost savings [$12,000 savings/instance].
  - **Personnel Training Program**: Successfully coached 75+ new engineers in operational procedures over a span of 5 years.
  - **CCSDS infrastructure deployment**: Successfully orchestrated online deployment of CCSDS compliant infrastructure [70+ communication pipelines].

Publications

- **NASA Interplanetary Overlay Network Emulator: Design Principles and Performance Analysis**: Presented and published in proceedings of ISRO Seminar on Computers & Information Technology 2015, evaluating the performance of NASA's ION-DTN in varying link conditions.
- **Enablers of IoT and their Security and Privacy Issues**: Published in Internet of Things (IoT) in 5G Mobile Technologies, by Springer International Publishing AG, Cham, ISBN 978-3-319-30913-2, a survey of the current state of technologies capable of enabling the Internet of Things and their ability to be used as secure channels of communication.

Projects

- **NASA Interplanetary Overlay Network Emulator [C, Bash]**: Designed and coded emulator to evaluate the performance of protocol stacks over varying link conditions and utilized to evaluate the performance of NASA's ION-DTN.
- **UCF heterogeneous HPC cluster profiling [Python, Geekbench, Slurm]**: Characterized performance and vertical / horizontal scaling profile of the HPC cluster at UCF, with over 4000 cores, for CPU intensive workloads (crytographic, integer and floating point).
- **Performance characterization of DL models under varying input noise profile [Tensorflow]**: Characterised the performance of deep neural network models under distinct colored noise profiles.
- **Lockfree concurrent data structures [C++]**: Designed and coded lockfree, linearizable and concurrent stacks, queues and hashmaps using descriptor objects and atomic instructions.
- **Novel socio-economic cellular automata modelling [Netlogo]**: Extended the civil violence model to incorporate influence of biased media, generating novel socio-economic emergent phenomena.