Ashwin Sekhari

Contact Information

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Interests

I am interested in blockchains, network systems, consensus protocols, penetration testing, and sports programming. (GitHub/CodeChef)

Education

National Institute of Technology (NIT) Rourkela, India 2017-present
Bachelor of Technology in Computer Science and Engineering (GPA 8.51/10).
Achieved Ex (Excellent) grade in 9 courses, awarded to top 10% of the students.

Delhi Public School (DPS), Faridabad, Haryana, India
AISSE (CBSE Board) - 10th Grade (GPA 10/10) 2015
AISSCE (CBSE Board) - 12th Grade (Score 93.8%) 2017

Research Experience

Stanford University, USA Summer 2020
Worked at Tse labs at Stanford University with Prof. David Tse.

University of Waterloo, Canada Summer 2019
Worked with Sirius blockchain research group with Prof. Srinivasan Keshav.

Indian Institute of Technology, Kanpur (IITK), India Summer 2018
Student research associate at Cyber Security Lab, worked with Prof. Sandeep Shukla.

National Hydroelectric Power Corporation Ltd., India Winter 2017
Gained exposure to their infrastructure, communication and Supervisory Control and Data Acquisition (SCADA) system.

Invited Presentations

Indian Institute of Technology, Bombay (IITB) Feb 2019
Presented a paper at the Third Workshop on Blockchain Technologies and its Applications which was attended by more than 100 participants. (slides)

Israel Institute for Advanced Studies, Jerusalem (IIAS) Dec 2018
Presented a poster at the 3rd advanced school in computer science and engineering: blockchains and cryptocurrencies which was attended by more than 150 participants.

Publications

Entangled Blockchains in Land Registry Management
with Rishav Chatterjee, Ras Dwidedi, Rohit Negi, Sandeep K. Shukla (paper).
In Proceedings of the Third Workshop on Blockchain Technologies and its Applications, pp.8-13, Mumbai, February, 2019 .

Polaris: A Scalable Geo-distributed BFT Consensus Protocol for Blockchains
with L. Yang, Q. Duan, S. Lee, S. Rizvi, S. Keshav, B. Wong, P. Shenoy, W. Golab, S. Gorbunov (working paper).

Research Projects

A Secure Scalable Quantum-Safe Blockchain for Critical Infrastructure Summer 19
Supervisor: Prof. Srinivasan Keshav (GitHub/Report)

- Implemented a Byzantine fault-tolerant Global Membership Service (GMS) based on the paper RCanopus. It achieves byzantine fault tolerance by leveraging the features provided by Concord-BFT (VMWare), a generic state machine replication library that can handle malicious (byzantine) replicas.
- GMS was integrated with RCanopus using Remote Procedure Calls (RPC). During the project, I explored different aspects of networking, consensus algorithms, formal verification methods, post-quantum safety, and energy systems through group meetings, talks, and interactions with professors.

Permissioned Blockchains in Land Registry Management Summer 18
Advisors: Ras Dwidedi, Rohit Negi; Supervisor: Prof. Sandeep K. Shukla (IITK) (Report)

- Developed and implemented models to solve the double spending problem in the Indian land registration and maintenance system via blockchains. As a result, achieving significant security and transparency in transactions. This was implemented using "hyperledger-fabric", a permissioned blockchain framework by IBM.
- Developed an efficient document verification algorithm for verification of land registry documents based on merkle trees. Hence, enabling us to verify documents without its physical availability with the use of tokens.

- Explored various aspects of cyber security and computer science through research talks and interactions with PhD students, researchers, and professors.

Course Projects

Energy Efficient Container Consolidation in Cloud Data Centers — Ongoing
Supervisor: Prof. B.D.Sahoo (undergraduate dissertation)
- Developing new energy efficient container migration algorithms with the goal to reduce the environmental impact of data centers.

Analysis of Routing Protocols for Wireless Ad-hoc Sensor Networks — Fall 2020 (Report)
Supervisor: Prof. Arun Kumar (Network Simulation Laboratory, NIT Rourkela)
- Simulated and compared AODV, DSDV, and DSR routing protocols using NS-3 simulator and compared on metrics such as routing overhead, average delay, duplication overhead, packet delivery ratio, throughput and data delivery cost.

Comparison of Face Recognition Algorithms — Fall 2020 (Notebooks)
Supervisor: Prof. Anup Nandy (Machine Learning Laboratory, NIT Rourkela)
- Analysed and compared face recognition using PCA, LDA and ANN algorithms.

Implementation of Cryptographic Ciphers — Fall 2020 (GitHub)
Supervisor: Prof. Sujata Mohanty (Cryptography Laboratory, NIT Rourkela)
- Implemented Caeser cipher, Vigenere cipher, Playfair cipher, Hill cipher, Rail Fence cipher, One Time Pad (OTP), Keyed Transposition cipher and Feistel cipher.

Scholastic Achievements

- Achieved team rank 270 out of 1200+ teams at Codechef Insomnia — 2019
- Ranked 274 in Facebook Hackercup qualification round out of 10,000 participants — 2018
- Secured 96 percentile in JEE ADVANCE and 99.6 percentile in JEE MAIN. — 2017
- Admitted for undergraduate studies to the computer science department at University College London (UK), University of Edinburgh (UK), and University of Toronto (Canada). — 2017
- Achieved AIR 29 in the TECHNOTHLON (conducted by IIT Guwahati). — 2016
- Awarded FreeShip (100% scholarship) at Delhi Public School, Faridabad. — 2016
- Received appreciation letter for excellence in CBSE examinations from Mrs. Smriti Zubin Irani (then education minister). — 2015

Relevant Coursework

- Scaling Blockchains†
- Hyperledger Fabric (IBM)*
- Bitcoin and Cryptocurrency Technologies*
- Google Cloud Platform‡
- Operating Systems
- Distributed Systems
- Machine Learning
- Compiler Design
- Cloud Computing
- Data Science
- Introduction to Computational Thinking and Data Science*
- Object Oriented System Design
- Data Communication
- Linear Algebra
- Discrete Mathematics
- Probability and Statistics
- Data Structure and Algorithms
- Computer Organization and Architecture
- Formal Languages and Automata Theory
- Design and Analysis of Algorithms
- Database Engineering

Skills

Programming Languages: Python (2-3), C++, Go, Solidity, JavaScript

Blockchains: Hyperledger Fabric, Truffle, Ganache, web3.js

Other tools: Git, LaTeX, Docker, gRPC, MySQL, CouchDB, MongoDB

Communication: English (proficient), Hindi (proficient), Spanish (spoken)

Conference Referring

Information Theory Workshop-20 — Nov 20
Reviewer for 2020 IEEE Information Theory Workshop (ITW), Riva del Garda, Italy.

IEEE Blockchain 2020 — Sep 20
Meta reviewer for Blockchain Technology and its Potential Applications (BTPA 2020) workshop organised under 3rd IEEE International Conference on Blockchain, Greece.

† Course taught by Prof. David Tse at Stanford University. I scribed for some lectures.
∗ Online course
‡ 30 Days of google cloud: completed the cloud engineering track (skill badges)

Other Professional Service

Student Mentor (2018-20): Responsible for helping about 10 freshmen students in their transition to college, and addressing their academic, mental and socio-cultural issues.

Google Developer Students Club (2019-20): Core Team Member and Blockchain lead of Google Developer Students Club, NIT Rourkela.

SPAWN (2019): Technical head for the official competitive coding club at NIT Rourkela, and was responsible for introducing people to sports programming.

Social Service

Swachh Bharat Pakhwara Celebrations, Jammu, India (2018): Gave a speech on the importance of sanitation as a part of the cleanliness drive in villages of Jammu, India.

Planatation Drive, NHPC, India (2018): Helped in organizing the event. Together we planted more than 2000 saplings in a landslide prone area in north India.

National Service Scheme (NSS), NIT Rourkela, India (2017): Guided about 100 students (along with 3 other group leaders) in completing various social service activities.