SHRUTI HIRAY

CONTACT INFORMATION

AS6 - 04/25
School of Computing
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EDUCATION

National University of Singapore   *August 2020 - Present*
PhD, Computer Science
Advisor: Dr. Prateek Saxena

Indian Institute of Technology Bombay   *July 2014 - June 2019*
Bachelor and Master of Technology, Electrical Engineering
Minor degree, Computer Science
Advisor: Dr. Saravanan Vijayakumaran
CGPA: 8.58/10

PROFESSIONAL EXPERIENCE

Visiting Scholar at *School of Computing, NUS*   *Autumn 2019*
- Implemented a type inference system using unification and constraint generation.
- Inferring variable types in binaries with type rules.
- Developed using **Datalog** and **Ghidra** tool.

Summer Risk Analyst at *American Express*   *Summer 2017*
- Built **dynamic pricing engine** for Membership Rewards using **Gradient Boost**.
- Achieved **80%** accuracy of prediction of expected points redeemed by customer.
- Received **pre-placement offer** for remarkable work in the internship.

Android Application Developer at *Carnot Technologies*   *Summer 2016*
- Developed APIs for data sync with hardware device via **BLE communication**.
- Analyzed user activity with **CleverTap** and crashes with **Crashlytics**.
- Developed **JUnit** Test Cases using **Espresso Test Framework** to test the app features on various mobile devices present in **Google Cloud Testing Lab**.

RESEARCH PROJECTS

Lightning Network Simulator - Dual Degree Thesis
Guide: Prof. Saravanan Vijayakumaran   *Spring 2017 - Spring 2019*
- Implemented a discrete event simulator for efficient analysis in **Python**
- Successfully mirrors subset of messaging protocol of lightning network.
- Scales upto **ten thousand nodes** on a 8 GB RAM machine.

Multisource and Multipath Content Transfer
Guides: Prof. D. Manjunath & Prof. Nikhil Karamchandani   *Autumn 2018*
- **Parallel download** through Cellular and WiFi from multiple sources.
- Implemented browser plugin using **Javascript & Google Native Client**.
- Parts of file downloaded from cache in WiFi access points reduces network congestion considerably and increases throughput.

TEACHING ASSISTANTSHIP

EE720: Number Theory & Cryptography   *Prof. Saravanan Vijayakumaran*
EE308: Communication Systems   *Prof. S. N. Merchant*

AWARDS	• Awarded NUS Research Scholarship • Excellence in Teaching Assistantship for EE720: Number Theory & Cryptography • Recipient of IIT Bombay Heritage Foundation Scholarship • Dhirubhai Ambani Scholarship for exceptional performance at Intermediate Level • Awarded Kishore Vaigyanik Protsahan Yojana (KVPY) mentorship.

KEY ACADEMIC PROJECTS

Algorand Simulator   *Spring 2019*
• Discrete event simulator of Algorand using **Gossip, Cryptographic sortition**.
• Tested for **Fail-Stop** adversary, **Byzantine** adversary.

Chord based Dictionary   *Spring 2019*
• Implemented a distributed word dictionary using a **Distributed Hash Table**.
• Performed insert and lookup operations using the **Chord protocol**.

Optimal Relay Node Placement in LTE-A Cellular System   *Spring 2018*
• Jointly optimized for downlink and uplink for **coverage extension**.
• Analyzed the effect of decoding threshold and probability of subcarrier activity.

Speech Watermarking   *Autumn 2017*
• Developed watermark extraction algorithm for proving ownership, tampering.
• Implemented using **Autoregressive model** & **Psychoacoustic model**.

Automatic Speech Recognition system   *Autumn 2017*
• Classified speech signals of spoken numerical digits using labelled data.
• Used **Cepstrum, K-means clustering, Dynamic time warping**.

Microprocessor Design   *Autumn 2016*
• Designed a 16 bit - 8 register **RISC** computer system of 14 instructions.
• A 6 staged pipeline processor with **hazard mitigation** using data-forwarding.

RELATED COURSEWORK

Computer Science: Data Structures & Algorithm, Operating Systems, Machine Learning, Blockchain Technology, Number Theory & Cryptography, Network Security, Computer Networks, Discrete Structures, Computer Graphics

Electrical: Error Correcting Codes, Speech Processing, Wireless Communications, Advanced Communication Networks, Advanced Signal Processing, Microprocessors

Others: Probability, Data Analysis, Economics.