Sarthak Grover

Masters in Computer Science

Contact

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Interests

Computer Research; Network Measurement and Security; Internet of Things; Data Analysis and Visualization

Education

Princeton University **Jan 2015 – Sep 2017**
Masters (PhD incomplete), Computer Science
- Advisor: Prof. Nick Feamster
- Transferred from Georgia Institute of Technology **Jan 2013 – Sep 2014**

Indian Institute of Technology (IIT) Roorkee, India **Aug 2005 – Dec 2010**
B. Tech, Electronics and Communication Engineering & M. Tech, Wireless Communication
- Dissertation: Performance Evaluation of Wireless Body Area Networks using Cross Layer Approach
- CGPA: 8.062/10.00 (India)

Skills and Coursework

Relevant Courses: Computer Networks, Network Security, Advanced Operating Systems, Machine Learning, Analysis of Algorithms, Software Defined Networks, Neural Networks and AI, Functional Programming

Languages: Python, Java, Scala, C/C++, JavaScript

Tools: SBT, Apache Spark, iPython, Pandas, PostgreSQL, PCAP, Wireshark, Docker, Openwrt, Node.js, GNURadio, MATLAB, Octave, NS-2, TinyOS, Xilinx ISE, GPSS

Others: Unix, Adobe Photoshop, Corel Draw, Adobe Flash, Dreamweaver, MS Office, LaTeX

Professional Experience

Freelancing/Self-Employed **Dec 2018 Onwards**
- **CDN performance analysis:** Created a CDN estimation algorithm for websites using xcache, whois data, and DNS information; Tested reachability of top websites; Comparing CDN page-load times with website ASN showed that performance can be improved by moving to different CDNs. [Link]

Graduate Research Assistant at *Department of CS,* Princeton University **Jan 2015 – Sep 2017**
- **DNS data for real time IoT query system:** Analyzed packets of various IoT devices in lab using pcap, extracted relevant features to identify devices and outliers; Simulated user behavior and captured activity periods and background traffic for 10 different IoTs. [Link]
- Developed a filtering algorithm to discard non-IoT traffic at ISP; Transformed network traffic using FFT and PCA, and utilized clustering techniques to successfully fingerprint different IoT devices in lab.
- Developed data pipeline in Spark to extract destination, size, time and frequency based features from home network IoT traffic for clustering network behavior to detect malicious or misconfigured IoTs.
- **Security and privacy of the Internet of Things:** Tested multiple IoT devices in lab and exposed security and privacy issues at PrivacyCon 2016; Found that a digital photoframe was susceptible to eavesdroppers and fails to encrypt photographs, nest thermostat exposed private location information to the ISP (now fixed); [Link]
- **Broadband traffic analysis:** Analyzed broadband usage patterns of a user group offered higher speed broadband without their knowledge; Found that difference in traffic demand was higher for moderate users as compared to high-volume subscribers; Presented at CableLabs (Jul 2016) and FCC (Oct 2016); [Link]
- **Fog Networks and the Internet of Things:** Teaching Assistant for Coursera MOOC; [Link]

Graduate Research Assistant at *School of CS,* Georgia Tech **Jan 2013 – Dec 2014**
- **Analysis of home network availability, infrastructure, and traffic using BISmark:** Analyzed active and passive network data from multiple homes to study network availability in various countries, popular devices in homes, and traffic usage with time; [Link]
- Found most home traffic is exchanged from a few devices to a small number of popular domains;
- **QoS control using SDN for home networks:** Identified application and programmed appropriate rate shaper based on a set of filtering rules to map traffic to outgoing network flow; [Link]
- **SAZO: Constant guard for home network security:** Used bloom-filters and DPI on home routers to create a blacklist based malware identification and notification system for Comcast; [Link]

Research Scholar at *Department of CS,* NC State University, Raleigh, NC. **Spring 2012**
- Mentor: Prof. Injong Rhee
- Indoor Localization for Samsung Smartphones using Radio: Implemented FM/AM transceiver systems on GNURadio to utilize RDS information for indoor localization;

Junior Research Fellow at *Department of ECE,* IISc Bangalore, India. **Mar 2011 – Dec 2011**

- Mentor: Prof. Anurag Kumar
- *WSNs for Societal Needs and Disaster Management:* Prepared work-plan proposal for submission to the Department of Science and Technology (DST), Govt of India; Computed closed-formed expressions for network reliability, and evaluated information theoretic bounds for random hybrid networks.
- *SmartConnect: DIT-ASTEC WSN Project*: Deployment of industrial wireless sensor networks, project demonstrations and experimental data analysis; Studied tessellation algorithm for WSN drop and placement to ensure end-to-end connectivity in the wild;

Internships

Research Intern at *Comcast,* Philadelphia, PA. **Summer 2016**

- Mentors: Jason Livingood and Nirmal Mody
- Customer Owned and Managed (COAM) Internet of Things (IoT) security: Used DPI to study connectivity, security, and privacy of a subset of Comcast smart homes; Developed script to search for PII in unencrypted IoT data and identified a malfunctioning XBOX in one of the subscribers.

Research Engineer at *Inria,* Paris. **Summer 2014**

- Mentor: Prof. Renata Teixeira
- Home network diagnosis for performance bottleneck detection: Tested uplink and downlink broadband performance from devices to detect if bottleneck is in the local wireless network or at the edge router.

Research Engineer at *Laboratoire dInformatique de Paris 6,* UPMC Paris. **Summer 2013**

- Mentor: Prof. Renata Teixeira
- Home network troubleshooting platform using Fathom and BISmark: Programmed active traceroute test on bismark router and analyzed latency and throughput performance from routers.

Research Intern at *University of New South Wales*, Sydney, Australia. **Summer 2009**

- Mentor: Prof. Vijay Sivaraman
- Wireless Body Area Networks for Athlete Monitoring: Analyzed wireless data collected from WSN nodes.

Publications

S. Grover, R. Ensafi, N. Feamster, "A Case Study of Traffic Demand Response to Broadband Service-Plan Upgrades", *Passive and Active Measurement Conference (PAM)*, March 2016.

S. Grover, N. Feamster, "The Internet of Unpatched Things", *FTC PrivacyCon*, January 2016.

B. Jones, S. Burnett, N. Feamster, S. Donovan, **S. Grover**, S. Gunasekaran, K. Habak, "Facade: High-Throughput, Deniable Censorship Circumvention Using Web Search", *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*, August 2014.

M. S. Seddiki, M. Shahbaz, S. Donovan, **S. Grover**, M. Park, N. Feamster, Y. Song, "FlowQoS: QoS for the Rest of Us", *ACM SIGCOMM Workshop on Hot Topics in Software Defined Networking (HotSDN)*, August 2014.

S. Grover, M. Park, S. Sundaresan, S. Burnett, H. Kim, N. Feamster, "Peeking Behind the NAT: An Empirical Study of Home Networks", *ACM SIGCOMM Internet Measurement Conference (IMC)*, October 2013.

S. Grover, N. Feamster, "Panoptes: Detecting Malware Activity in Home Networks", *HomeSys: Workshop on Design, Technology, Systems and Applications for the Home (UbiComp)*, September 2013.

A. Gupta, **S. Grover**, "mPaaS: Delivering Mobile Platforms as a Cloud Service", *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, April 2013.

V. Sivaraman, A. Dhamdhere, H. Chen, A. Kurusingal, **S. Grover**, "An Experimental Study of Wireless Connectivity and Routing in Ad-hoc Sensor Networks for Real-Time Soccer Player Monitoring", *Ad Hoc Networks (Elsevier)*, Vol. 11 Issue 3, pp.798-817, May 2013.

V. Sivaraman, **S. Grover**, A. Kurusingal, A. Dhamdhere, A. Burdett, "Experimental Study of Mobility in the Soccer Field with Application to Real-Time Athlete Monitoring", *IEEE Wireless & Mobile Computing, Networking and Communications (WiMob)*, November 2010. **(Best Paper Award)**

S. Grover, "Performance Evaluation of Wireless Body Area Network using Cross Layer Approach", *Master's Thesis*, Indian Institute of Technology Roorkee, June 2010.

V. Saxena, **S. Grover**, S. Joshi, "A Real Time Face Tracking System using Rank Deficient Face Detection and Motion Estimation", *IEEE Cybernetic Intelligent Systems (CIS)*, September 2008.

References

Available on request.