Varshika Srinivasavaradhan

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RESEARCH INTERESTS

My research interests broadly lie in the areas intersecting Network Measurement, Broadband Networks and Public Policy, with a focus on understanding internet quality, network performance, and reliability under varying load conditions in both broadband and cellular networks. I am particularly interested in Quality of Service, Quality of Experience and Network Reliability measurements of fixed broadband networks as well as exploring the performance and evolution of cellular networks over time. I am also keen on utilizing statistical analysis and machine learning techniques to extract valuable insights from data collected through my own experiments as well large-scale crowdsourced datasets with the ultimate goal of identifying and addressing disparities in digital access among communities and developing tools that can help bridge the digital divide.

EDUCATION

• **University of California, Santa Barbara** **Sep 2022 - Present**
Doctor of Philosophy in Computer Science, GPA: 4.0.
Courses: Distributed Systems, Database Systems, Machine Intelligence, Computer Vision, Quantum Computing

• **Purdue University - Main Campus** **Aug 2018 - May 2020**
Master of Science in Computer Science, GPA: 3.8.
Courses: Algorithm Design and Analysis, Data Communication Networks, Distributed Systems, Data Mining

• **Anna University, India** **June 2014-May 2018**
Bachelor of Engineering in Electronics and Communication, GPA: 3.9.
Courses: Data Structures and Algorithms, Computer Networks, Numerical Optimization, Data Science

RESEARCH EXPERIENCE

Student Researcher, Google LLC **Oct 2024 - Present**
Manager: Ms. Helena Dworak
• Investigating latency measurements on Google networks in order to define network Service Level Objectives (SLOs) that accurately capture customer experience while reducing false positives and negatives. This work involves simulating network conditions and analyzing real measurements, including those during outages, to assess how well different SLO calculation methods reflect actual network performance, aiming to enhance benchmarks for Internet quality that are both resilient and customer-centric.

Internet Quality Barometer Fellow, Measurement Lab **Jun 2024 - Present**
Supervisor: Dr. Lai Yi Ohlsen
• Developing an application-specific metric for Internet quality that goes beyond raw speed metrics, translating Quality of Service (QoS) metrics into Quality of Experience (QoE) scores. Each QoS metric is assigned a weighted score based on its statistical importance for various applications, creating a nuanced framework that better captures user experience across network conditions.

Performance Analysis of Fixed and Mobile Broadband Networks **Sep 2022 - Present**
Advisor: Dr. Elizabeth Belding
• Leading a project on the in-depth study of cellular networks, specifically 5G networks, such as 4G vs 5G latency and throughput, latency under load, performance in various network conditions, specifically 5G performance in congestion environments, comparison of sub-6 GHz 5G performance to that of 5G mmWave technology, standalone 5G performance vs non-standalone 5G, spatial and temporal patterns and trends in deployments and performance, as well as the features of the user equipment that impact performance.
• I also work on identifying trends and patterns from crowdsourced speed test measurements and metadata to gain insights into network outages at the edge. This includes analyzing the scale and type of network outages, aiming to enhance our understanding of the factors contributing to service disruptions.

Assessing the Impact of the Connect America Fund **Nov 2023 - Feb 2024**
Principal Investigators: Dr. Elizabeth Belding, Dr. Arpit Gupta, Dr. Tejas Narechania
• Conducted in-depth assessment of the impact of the high cost Connect America Fund's (CAF) on fixed broadband availability and pricing in the USA, while also focusing on compliance of internet service providers in

terms of speeds and pricing as well as their behavior in the presence of market competition. Our work has been submitted to SIGCOMM 2024 and is currently under review.

The CellWatch Project **Sep 2022 - Present**

Principal Investigators: Dr. Elizabeth Belding, Dr. Ellen Zegura, Dr. Morgan Vigil-Hayes, Dr. Yao Xie

• I am involved in the CellWatch project, an open-source cellular network measurement suite for taking speed test measurements that comply with the FCCs requirement to initiate a challenge claim. It also includes a data portal allowing public access to aggregate anonymous data collected by the app; a community coordination tool to help communities organize measurement campaigns; and a prediction engine capable of synthesizing multiple datasets to predict quality of coverage in a given area.

C-STARS Research Intern, Oak Ridge National Laboratory, TN **May - July 2019**

Supervisor: Mr. Giriprakash Palanisamy, ARM Data Center

• Researched, implemented and tested different unsupervised machine learning algorithms to automatically classify cloud types based on climate data obtained from sky cameras and ceilometers.

Indian Academy of Sciences Summer Research Fellow **May 2017-April 2018**

Advisor: Dr. C. Pandu Rangan, Indian Institute of Technology Madras, Chennai

• Developed a new collusion-resistant Identity based Proxy Re-encryption (IB-PRE) scheme that satisfied adaptive Chosen Ciphertext Security (CCA) security under the decisional bilinear Diffie-Hellman hardness assumption and its variant in the random oracle model. The motive of the scheme was to prevent malicious access of the delegator's secret key by a colluding proxy and delegatee.

PEER REVIEWED PUBLICATIONS

•A CCA-Secure Collusion Resistant Identity-Based Proxy Re-encryption Scheme, ProvSec 2018.
•The Efficacy of the Connect America Fund in Addressing US Internet Access Inequities, SIGCOMM 2024.
•Mapping Cellular Network Evolution and Infrastructure Criticality: A Nationwide Analysis, TPRC 2024.

POSTERS

• Beyond the Bars: Decoding the Complexities of Cellular Network Performance through Speedtest Data, *HotMobile 2024*
• Characterizing Cellular Speed Test Performance: An In-Depth Analysis of What Matters, *N2Women Workshop, ACM SIGCOMM 2023*

PROFESSIONAL EXPERIENCE

Software Development Engineer - Amazon.com Inc., Bellevue, WA **July 2020 - Jun 2022**

Amazon Enterprise Access Mobile:

• Worked on the Amazon Enterprise Access(AEA) mobile application for Amazon employees that offers secure access to Amazon's internal services without the use of VPN.
• Designed and implemented the key feature to enforce AEA for Amazon internal email access on mobile devices.

Amazon Prime Tech:

• Developed features for the frontend user interface for Prime Incentive creations.
• Worked on workflows for Prime Referrals, Prime Gift cards, Prime Incentives for Amazon Prime customers.

TEACHING EXPERIENCE

Graduate Teaching Assistant, UC Santa Barbara **Sep 2022 - Jun 2023**
Graduate Teaching Assistant, Purdue University **Aug 2018 - May 2020**

SKILLS

• **Proficient:** C++, Python, Java, SQL, Socket Programming, R, HTML, CSS, MATLAB, Windows, AWS
• **Exposure in:** Linux, Tensorflow, Javascript, Go, Apache Spark, Cassandra, MongoDB, Latex

ACADEMIC ACHIEVEMENTS

• Graduate Fellowship from University of California Santa Barbara. (2022)
• CS Departmental scholarship from Purdue University. (2018-2020)
• Gold Medal of Excellence for Best Student award from Thiagarajar College of Engineering, Anna University.
• Indian Academy of Sciences Summer Research Fellow 2017.
• Top 1% in the higher secondary public examinations in Tamil Nadu, India (Out of 800,000 students, 2014).
• Top 1% in the secondary school public examinations in Tamil Nadu, India (Out of 1,000,000 students, 2012).