Udit Paul

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Education

University of California Santa Barbara **September 2023**
Doctor of Philosophy (Ph.D.), Computer Science

University of Cape Town **June 2018**
Master of Science (M.S.), Electrical Engineering

Research Interests

I am a seasoned computer scientist, well-versed in communication networks. My professional journey has been marked by comprehensive involvement in data science and machine learning, consistently leveraging these competencies to foster insights and data-driven solutions addressing a multitude of network-related challenges.

Professional Experience

Data Analyst II **August 2023 – current**
Ookla *Seattle, Washington*

- Created a methodology to benchmark over **100 M** end user's quality of experience while accessing web pages for over 150 countries.
- Developed a novel methodology to perform anomaly detection in both large and sparse datasets, yielding over **90%** accuracy; thereby, significantly enhancing the system's ability to identify and respond to irregular data patterns.
- Engineered and deployed a robust data engineering pipeline using **Airflow**, specifically tailored to implement the newly developed anomaly detection methodology in a production environment.
- Part of the Ookla for Good team helping to create a template for better engaging with the universities and research communities.

Graduate Research Assistant **September 2018 – September 2023**
University of California Santa Barbara *Santa Barbara, California*

- Developed Broadband-plan Querying Tool (BQT) that employs web scrapers for multiple internet service providers' web services to scalably obtain broadband services offer-related information such as download speed and cost of access at any given street address in the US. Using BQT, a dataset of over **1 M** residential broadband plans for 8 ISPs were curated.
- Developed Broadband Subscription Tier (BST) methodology which is a two-stage hierarchical unsupervised classification technique to identify broadband subscription tier information from crowdsourced network measurements. BST is able to classify subscription tiers of measurements with **99%** accuracy.
- Curated a data set of 17,000 tweets obtained from the social media platform, Twitter, and developed a natural language processing framework to detect and isolate power and communication outage-related tweets to assist first responders in the event of natural disasters. Implemented 22 different machine learning algorithms and achieved close to **90%** accuracy in performing the required classification task.

PhD Research Intern **June 2022 – September 2022**
IBM *Yorktown Heights, New York*

- Contributed to an Agent-Based Model (ABM) that simulates the impact of lack of good quality internet connectivity on populations of different socioeconomic statuses.
- Conducted a longitudinal analysis on a dataset of **30M** to understand how the internet quality has changed for different population groups.

Awards

- UCSB CS Department Outstanding Dissertation Award, 2023.
- UCSB CS Department Outstanding Publication Award, 2023.
- Best Paper Award winner, ACM SIGCOMM IMC'22.

Refereed Publications

- **Udit Paul**, Jiamo Liu, Vinothini Gunasekaran, Tejas N Narechania, Arpit Gupta, and Elizabeth Belding, "Decoding the Divide: Analyzing Disparities in Broadband Plans Offered by Major US ISPs", Proceedings of the ACM SIGCOMM 2023 (**SIGCOMM'23**).
- **Udit Paul**, Jiamo Liu, Mengyang Gu, Arpit Gupta, and Elizabeth Belding, "The Importance of Contextualization of Crowdsourced Active Speed Test Measurements", Proceedings of the ACM SIGCOMM Internet Measurement Conference 2022 (**IMC'22**).[***Best paper***].
- Tarun Mangla, **Udit Paul**, Arpit Gupta, Nicole Marwell, and Nick Feamster, "Internet Inequity in Chicago: Adoption, Affordability, and Availability", Proceedings of the 50^{th} Research Conference on Communications, Information and Internet Policy (**TPRC'22**).
- **Udit Paul**, Jiamo Liu, David Farias-Llerenas, Vivek Adarsh, Arpit Gupta, and Elizabeth Belding, "Characterizing Internet Access and Quality Inequities in California M-Lab Measurements", Proceedings of the Conference on Computing and Sustainable Societies (**COMPASS'22**).
- Vivek Adarsh, Michael Nekrasov, **Udit Paul**, Tarun Mangla, Arpit Gupta, Morgan Vigil-Hayes, Ellen Zegura, and Elizabeth Belding, "Coverage is not binary: Quantifying mobile broadband quality in urban, rural, and tribal contexts", Proceedings of the International Conference on Computer Communications and Networks (ICCCN) 2021 (**ICCN'21**).
- Vivek Adarsh, Michael Nekrasov, **Udit Paul**, Alex Ermakov, Arpit Gupta,Morgan Vigil-Hayes, Ellen Zegura, and Elizabeth Belding, "Too Late for Playback: Estimation of Video Stream Quality in Rural and Urban Contexts", Proceedings of the Passive and Active Measurement Conference (**PAM'21**).
- Vivek Adarsh, Michael Nekrasov, **Udit Paul**, and Elizabeth Belding, "Estimation of congestion from cellular walled gardens using passive measurements", IEEE Transactions on Mobile Computing, vol. 21, no. 10, 2021.
- **Udit Paul**, Alex Ermakov, Michael Nekrasov, Vivek Adarsh, and Elizabeth Belding, "#Outage: Detecting Power and Communication Outages from Social Networks", Proceedings of the World Wide Web Conference (**WWW '20**).
- Michael Nekrasov, Vivek Adarsh, **Udit Paul**, Esther Showalter, Ellen Zegura, Morgan Vigil-Hayes, and Elizabeth Belding, "Evaluating LTE coverage and quality from an unmanned aircraft system", International Conference on Mobile Ad Hoc and Sensor Systems **(MASS'19)**.

Invited Talks

- **Improving understanding of crowdsourced measurements** **September 2022**
  Google - Measurement Lab
- **Contextualizing crowdsourced measurements** **October 2022**
  Ookla

Teaching

- Introduction to Computer Networks (CMPSC 176A) - Spring, 2019.
- Computer Networking (CMPSC 176B) - Winter, 2019.
- Introduction to Computer Networks (CMPSC 176A) - Fall, 2018.

Technical Skills

Languages	Python, Ruby, C/C++, JavaScript, MySQL, PostgresSQL, Bash.
Developer Tools	Google Cloud Platform, Amazon Web Services, Android Studio.
Technologies/Frameworks	Linux, GitHub, Hadoop, Spark, Airflow, Docker, Tensorflow, Pytorch.

Professional References

- Elizabeth Belding, Professor of Computer Science, UCSB.
- Arpit Gupta, Assistant Professor of Computer Science, UCSB.