

# UDIT PAUL

Scarsdale, New York

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## Education

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**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

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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

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**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 crowd-sourced 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

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

## Refereed Publications

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- **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<sup>th</sup> 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

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| • <b>Improving understanding of crowdsourced measurements</b><br><i>Google - Measurement Lab</i> | <b>September 2022</b> |
| • <b>Contextualizing crowdsourced measurements</b><br><i>Ookla</i>                               | <b>October 2022</b>   |

## Teaching

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

## Technical Skills

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

## Professional References

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