Udit Paul

312 Ellwood Beach Drive 50, Goleta, CA 93117

📞 805-568-8956 ✉ u_paul@ucsb.edu 🌐 u-paul.github.io ⚙ github.com/u-paul

Education

University of California Santa Barbara — **Expected: June 2023**
Doctor of Philosophy (Ph.D.), Computer Science

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

Research Interests

Inquisitive computer scientist engaged in measuring and evaluating the quality of internet access for different user groups. Presently concentrating efforts on characterizing digital inequality through the collection and analysis of large-scale internet measurement data sets to identify disenfranchised communities. Long-term research objective is to identify and understand factors that contribute to internet disparity amongst communities and develop solutions that would enable stakeholders in mitigating the persistent digital gap.

Selected Publications

- **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**).
- **Udit Paul**, Jiamo Liu, David Farias-Llerenas, Vivek Adarsh, Arpit Gupta and Elizabeth Belding, "Characterizing Internet Access and Quality Inequities inCalifornia M-Lab Measurements",Proceedings of the Conference on Computing and Sustainable Societies (**COMPASS '22**).
- Vivek Adarsh, Michael Nekrasov, **Udit Paul**, Alex Ermakov, Arpit Gupta,Morgan Vigil-Hayes, Ellen Zegura, 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**).

Professional Experience

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

- Designed and developed a new "broadband offering tool" and statistical frameworks to scalably collect and analyze data points in the order of millions, enabling enhanced insights into the problem of digital divide. Currently focused on utilizing this tool and methodology to characterize the presence and extent of digital inequity between various geographical locations and demographics within the US.
- 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 status. Built the component of the model that estimates the effect of poor quality internet for different households. Additionally, contributed to the building of a web application that provides the whole model as a service to the public. Work under review for publication.
- Conducted a longitudinal analysis on a dataset of **30M** to understand how the internet quality has changed for different population groups. Applied statistical tests to determine the magnitude of difference in interent quality between sub-populations. Finally, deployed machine learning models to predict internet performance from demographics and infrastructure metrics. Work under review for publication.

Telecommunications Engineering Intern   June 2020 – September 2020

CTC Technology & Energy   *Kensington, Maryland*

- Implemented an active network measurement test suite as part of the company's CAF II compliant measurement kit.
- Implemented data monitoring dashboards using Tableau for the Alabama Broadband Connectivity for Students project.
- Conducted background research on various physical level properties of 4G and 5G small cells.
- Implemented a computer vision enabled machine learning framework for automated classification of utility poles from static images.
- Created a data storage and processing pipeline for a large-scale Internet Service Provider data collection project for the state of Alabama.

Research Assistant   September 2016 – June 2018

University of Cape Town   *Cape Town, South Africa*

- Designed a network selection algorithm for handover for users of multiple applications.
- Designed and implemented a traffic load based infrastructure planning mechanism to support user demand in 5G networks.

Selected Projects

Broadband Offering Tool

- Created web scrapers for multiple internet service providers web services to scalably obtain service offer related information such as download speed and cost of access at any given street address in the US.
- Asynchronous calls were made using Python selenium and requests libraries to gather information about internet service providers' offers to better understand existing practices.

Emergence: A delay tolerant web application for disaster relief

- Developed a progressive web application that stores user messages locally in periods of break in internet connectivity. When connectivity is established, the locally stored messages are automatically pushed for transmission.
- Utilized Javascript ServiceWorker that allowed background processing and pre-caching of pages and data.

Steam Price Tracker

- Jointly developed a Ruby on Rails based scalable web app to track price of games found in Steam.
- Provided a social networking component in the form of comments and chat service.

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, Tableau, Docker, Tensorflow, Pytorch