ZEAL SHAH

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EDUCATION

University of Massachusetts Amherst   Amherst, MA
Ph.D. in Electrical & Computer Engineering, GPA:3.93/4.00   Aug 2018 - May 2023 *(Expected)*
Honors: Dean's Fellowship recipient (2018-19)

Carnegie Mellon University   Pittsburgh, PA
M.S. in Energy Science, Technology & Policy (*concentration: ECE*), GPA:3.78/4.00   Aug 2016 - Dec 2017

Pandit Deendayal Energy University   Gandhinagar, India
B.Tech. in Electrical Engineering   Jun 2012 - Jun 2016

COMPUTING SKILLS

Programming: Python, SQL, Matlab; **Python Libraries:** Pandas, Numpy, PyTorch, Scikit-learn, Flask, Matplotlib, Plotly, Geopandas, Rasterio, Shapely; **GCP tools:** BigQuery, Bucket, Compute Engine, Earth Engine; **Others:** Presto, Dataswarm (Airflow), Slurm, QGIS

EXPERIENCE

University of Massachusetts Amherst   Amherst, MA
Graduate Research Assistant   Aug 2018 - Present

- Building a novel neural network-based tool for inferring power grid outages in time-series satellite imagery of the US. Utilizing transfer learning to create the first-ever high-resolution outage maps for 300 African cities from 2012-present.
- Developed a machine learning model for power outage detection in daily nighttime satellite images of Accra, Ghana. Achieved detection of outages as small as $1km^2$ in size. Resulted in 1 publication.
- Created an innovative, geography-agnostic tool to analyze the impact of power outages on racial and socioeconomic groups in disaster-stricken areas using satellite imagery. Publication under review.
- Utilized CNNs to estimate the extent and type of electrification in 9 million satellite images spanning Kenya, supporting the Rockefeller Foundation's research on energy access planning. Top 3 papers at ML4D workshop at NeurIPS'21.
- Engineered computer vision techniques to measure electric grid voltage, frequency and phase using digital cameras – a low-cost grid monitoring solution for utilities in developing countries. Best paper nominee at ACM BuildSys'19.
- Developed an in-house pipeline for acquiring, processing and integrating large volumes of satellite imagery and both private and public geospatial datasets to aid multiple in-house research projects.
- Managed 2 graduate, 4 undergraduate, and 1 high-school research projects focused on alternative power grid sensing techniques.

Meta Reality Labs   Burlingame, CA
Data Engineering Intern (RL Privacy)   May 2022 - Aug 2022

- Built ETL pipelines to create a dynamic event inventory table – a source of truth for all events emitted by Reality Lab (RL) devices/apps, facilitating consistent cataloging and discovery of RL events and their metadata.
- Collaborated with RL compliance team to integrate privacy metadata into dynamic event inventory, streamlining the process of assigning, propagating, and tracking privacy policies.
- Worked on improving the coverage and consistency of the dynamic inventory in collaboration with RL data engineers.
- Analyzed RL telemetry datasets using Presto and Daiquery, created and managed pipelines using Python and Dataswarm (Airflow), and visualized data through Unidash.

Atlas AI   Palo Alto, CA
AI Engineering Intern (Remote)   May 2020 - Aug 2020

- Designed a satellite data processing pipeline and ML model to generate monthly electrification data layers for Africa (2012-20), providing locational intelligence for Atlas AI clients to identify potential investment and infrastructure sites.
- Contributed to the development of a satellite imagery-based classifier to estimate energy demand, providing insights to energy/retail clients for locating target customers based on local energy consumption levels.
- Utilized Google Earth Engine to ingest satellite data, employed Python on Google Compute Engine to train and evaluate ML models, and stored results in Google Bucket and BigQuery.

SparkMeter   Washington, DC
Data Science Intern   Feb 2018 - Sep 2018, May 2017 - Aug 2017

- Developed and implemented smart meter data intelligence reports using Python and SQL to deliver periodic insights into technical and commercial operations of 68 customer grids (10,000+ smart meters).
- Designed real-time monitoring dashboards using Grafana and SQL to track the health of company's deployed metering systems, improving team's response efficiency.

PUBLICATIONS

- **Z. Shah** et al. "*The inequitable distribution of power interruptions during the 2021 Texas winter storm Uri.*" Under review.
- **Z. Shah** et al. "*The Electricity Scene from Above: Exploring Power Grid Inconsistencies Using Satellite Data in Accra, Ghana.*" Applied Energy 2022.
- A. Yen, **Z. Shah** et al. "*EffiSenseSee: towards classifying light bulb types and energy efficiency with camera-based sensing.*" ACM BuildSys'22.
- S. Correa, **Z. Shah** et al. "*PowerScour: tracking electrified settlements using satellite data.*" ACM BuildSys'22.
- **Z. Shah** et al. "*A Higher Purpose: Measuring Electricity Access Using High-Resolution Daytime Satellite Imagery.*" ML4D workshop at NeurIPS'21. **Ranked among top 3 papers.**
- S. Correa, **Z. Shah** et al. "*This Little Light of Mine: Electricity Access Mapping Using Night-Time Light Data.*" ACM e-Energy'21. (Short paper)
- **Z. Shah** et al. "*Mapping Disasters & Tracking Recovery in Conflict Zones Using Nighttime Lights.*" IEEE GHTC'20.
- **Z. Shah** et al. "*GridInSight: Monitoring Electricity Using Visible Lights.*" ACM BuildSys'19. **Best paper nominee**.

SELECTED COURSEWORK

Computing: Distributed & Operating Systems, Machine Learning, Neural Networks, Probability and Random Processes, Applied Stochastic Processes, Data Structures & Algorithms, Linear Systems, Data-driven Energy Management

Power & Energy: Optimization in Energy Networks, Engineering Economics in Electric Energy Systems, Smart Grids, Energy Conversion & Supply, Energy Demand & Utilization, Energy Policy & Economics