

ZEAL SHAH

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EDUCATION

University of Massachusetts Amherst

Ph.D. in Electrical & Computer Engineering, GPA:3.93/4.00

Honors: Dean's Fellowship recipient (2018-19)

Leadership: Supervised 3 undergraduate research projects and 1 high-school research project.

Amherst, MA

Aug 2018 - Present

Carnegie Mellon University

M.S. in Energy Science, Technology & Policy (*concentration: ECE*), GPA:3.78/4.00

Leadership: Head teaching assistant for 2 senior-level ECE courses.

Pittsburgh, PA

Aug 2016 - Dec 2017

Pandit Deendayal Petroleum University

B.Tech. in Electrical Engineering

Gandhinagar, India

Jun 2012 - Jun 2016

SELECT COURSEWORK

Neural Networks, Machine Learning, Distributed & Operating Systems, Algorithms, Probability and Random Processes, Computer Architecture, Data-driven Building Energy Management

COMPUTING SKILLS

Programming: Python, SQL; **Python Libraries:** Flask, GeoPandas, Numpy, Pandas, Plotly, PyTorch, Rasterio, Scikit-learn, Shapely, SQLAlchemy; **Geo-spatial tools:** Google Earth Engine, QGIS; **Google cloud products:** BigQuery, Bucket, Compute Engine

EXPERIENCE

STIMA Lab, University of Massachusetts Amherst

Graduate Research Assistant

Amherst, MA

Aug 2018 - Present

- Create a novel, open source, satellite data-based tool for spatio-temporal monitoring of electric grid reliability at global scale; achieved ROC-AUC of 0.93 for estimating grid reliability in Accra, Ghana.
- Produce spatially-explicit historical records of outages using time series satellite data for 300 cities in Sub-Saharan Africa and 500 cities in the USA, to study the equity of outages across regions; make records publicly available.
- Devise a camera-based sensing solution to map and measure quality of electricity systems, for helping resource-constrained utilities improve the quality and consistency of their electricity services.
- Supported on-going research in energy access planning by estimating number of (un-)electrified (non-)residential structures in 9 million daytime satellite images spanning Kenya, using convolutional neural networks (CNN) producing an R^2 of 0.8.

Atlas AI

AI Engineering Intern (Remote)

Palo Alto, CA

May 2020 - Aug 2020

- Developed a Machine Learning (ML) model to detect electrification in satellite images and scaled it to produce high-resolution monthly electrification records for Africa from 2012-20 – a commercial product offered by Atlas AI to assist its clients with strategically identifying sites for new infrastructure projects.
- Strategized and developed an ML model to predict energy demand at 0.5km spatial resolution, to help clients locate clusters of target customers using granular insights into local energy demand.
- Ingested satellite data using Google Earth Engine, trained and evaluated the ML models using Python on Google Compute Engine, and stored the results in Google Bucket and BigQuery.

SparkMeter

Data Science Intern

Washington, DC

Feb 2018 - Sep 2018, May 2017 - Aug 2017

- Designed and developed smart meter data intelligence reports to periodically provide utilities with actionable insights into commercial and technical operations of their grids.
- Analyzed smart meter data to quantify the evolution of electricity quality, reliability and consumption across 68 sites in Africa with 200+ smart meters per site, for SparkMeter's keynote presentation at Microgrid Global Innovation Forum'18.
- Created a Grafana dashboard for monitoring 4000+ deployed metering systems and related services in real-time to help reduce company's average resolve time for technical issues.

SELECT PUBLICATIONS

- **Z. Shah** et al. "A Higher Purpose: Measuring Electricity Access Using High-Resolution Daytime Satellite Imagery." ML4D workshop at NeurIPS'21.
- **Z. Shah** et al. "The Electricity Scene from Above: Exploring Power Grid Inconsistencies Using Satellite Data in Accra, Ghana." Under review at Applied Energy.
- **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.**