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 - Present
Honors: Dean's Fellowship recipient (2018-19)
Leadership: Supervised 1 graduate, 3 undergraduate and 1 high-school research projects.

Carnegie Mellon University — Pittsburgh, PA
M.S. in Energy Science, Technology & Policy (*concentration: ECE*), GPA:3.78/4.00 — Aug 2016 - Dec 2017
Leadership: Graduate Teaching Assistant for 2 senior-level ECE courses.

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

SELECTED COURSEWORK

Neural Networks, Machine Learning, Distributed & Operating Systems, Algorithms, Probability and Random Processes, Data-driven Energy Management, Smart Grids, Energy Policy & Economics, Energy Markets

COMPUTING SKILLS

Programming: Python, SQL; **Libraries:** PyTorch, Scikit-learn, Pandas, GeoPandas, Numpy, Matplotlib, Shapely, SQLAlchemy, Rasterio, Flask; **Geo-spatial tools:** Google Earth Engine, QGIS; **Big data tools (Google)**: BigQuery, Bucket, Compute Engine

EXPERIENCE

STIMA Lab, University of Massachusetts Amherst — Amherst, MA
Graduate Research Assistant (Adviser: Prof. Jay Taneja) — Aug 2018 - Present

- Created a novel machine learning (ML) tool to detect power outages in time series satellite data for evaluating grid reliability across Accra, Ghana. Achieved 3x performance improvement on state-of-the-art.
- Scale the outage detection tool to produce time-series outage maps for 500 cities in the USA and 300 cities in Africa, to study equity of outages across geographies.
- Trained a VGG-Net (CNN) on 9 million high-resolution daytime satellite images, to generate estimates of electrification status and density of residential structures across Kenya.
- Engineered image data acquisition and processing techniques to enable monitoring and mapping of electricity systems quality using digital cameras.
- *Collaborators:* UC Berkeley, CMU, Columbia University, Colorado School of Mines, LBNL, Atlas AI

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

- Developed and scaled an ML model to produce high-resolution monthly electrification records for the continent of Africa from 2012-20 – a locational intelligence product offered by Atlas AI.
- Assisted with building strategies to help clients identify sites for new infrastructure projects using the new electrification product.
- Developed an ML model to predict energy consumption at 0.5km resolution, to assist energy and retail companies locate clusters of target customers based on local energy demand.
- Explored and 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 — Washington, DC
Data Science Intern — Feb 2018 - Sep 2018, May 2017 - Aug 2017

- Designed, built and automated smart meter data intelligence reports to deliver clients with actionable commercial and technical insights into their grid operations.
- Analyzed time-series data recorded by 10,000+ smart meters over 4 years to quantify evolution of electricity quality, reliability and consumption across 68 microgrid sites in Africa.
- Created a Grafana dashboard using SQL scripting for monitoring status of all the deployed metering systems in real-time, to help reduce engineering team's troubleshooting time.

SELECTED PUBLICATIONS

- **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.**
- **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**.