

Energy Infrastructure Map of the World

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The Problem

An estimated 1.06 billion people of the global population lack access to electricity. This problem is exacerbated by a lack of comprehensive data about existing energy infrastructure.

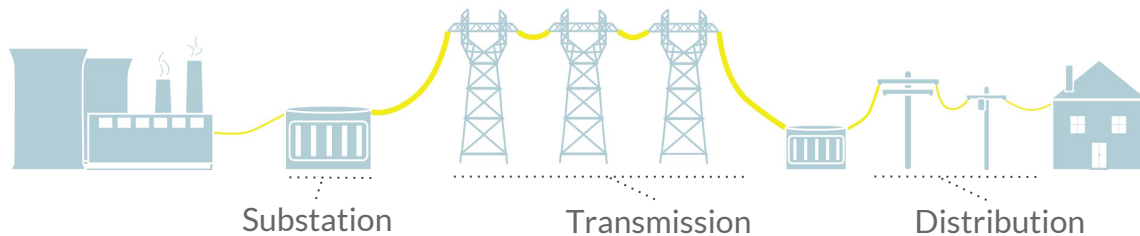
Our Solution

Our team created a dataset of electricity infrastructure that can be used to automatically map the distribution and transmission components of the electric power grid.

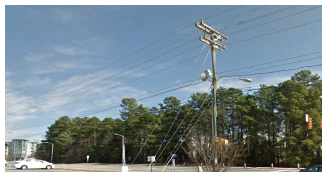


This is the first publicly available dataset of its kind, empowering policymakers and others to bring electricity to the people that lack it most.

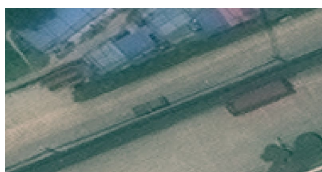
Approach to Dataset Creation



Ground view



Shanghai China



Shanghai China (labeled)



Our dataset consists of high resolution, geographically representative satellite images in which transmission and distribution infrastructure are labeled. The dataset covers 321 km² across 14 cities on 5 continents.

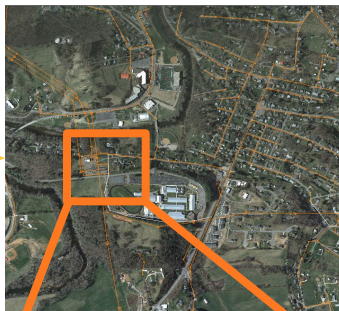
Images were labeled using Pyimannotate, a python-based image labeling tool developed by Artem Streltsov of the Duke Energy Initiative. Transmission towers, distribution towers, and substations were labeled with polygons while transmission and distribution lines were labeled with lines.

figshare Database

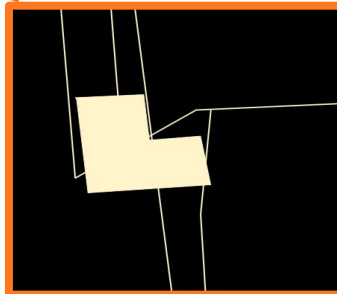
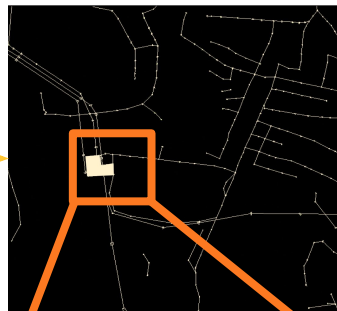
Unlabeled Image



Labeled Image



Mask for Machine Learning



The dataset is published on figshare, an online data sharing platform. Each image is published with:

1. Raw satellite imagery (.tif)
2. Annotations in multiple formats (.csv, .geojson)
3. Multiclass mask (.npz, .tif)

The raw imagery and mask can be directly used to train machine learning models, which can then automatically map the electricity grid anywhere in the world.

14
Cities

318
Sq km of
Imagery

936
km of Lines

18,572
Towers