

Detection of Residential Photovoltaic Systems in Satellite/Aerial Imagery

[Using Convolutional Neural Networks Architecture]

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IDEA

This work aims to develop a custom-trained Convolutional Neural Network (CNN) that can achieve comparable accuracy to the state-of-the-art in image classification for PV systems, while improving the temporal resolution of resulting PV deployment databases. To this end, the CNN should be able to operate on satellite imagery that is available with higher frequency, and should have limited computational complexity in order to improve the rate of image processing. As a potential means of improving classification accuracy, it should be possible to train the CNN on imagery containing near-IR channels in addition to the standard red, green, and blue imagery channels.

Data Source

- <https://iiw.kuleuven.be/onderzoek/eavise/solarpaneldataset/home>

Or,

- <https://www.kaggle.com/c/solar-pv-in-aerial-imagery/>

Or,

- Google Earth static images source

Expectation

This work aims to develop a custom-trained Convolutional Neural Network (CNN) that can achieve comparable accuracy to the state-of-the-art in image classification for PV systems, while improving the temporal resolution of resulting PV deployment databases.

Reference

- D. House, M. Lech and M. Stolar, "Using Deep Learning to Identify Potential Roof Spaces for Solar Panels," 2018 12th International Conference on Signal Processing and Communication Systems (ICSPCS), Cairns, Australia, 2018, pp. 1-6. doi: 10.1109/ICSPCS.2018.8631725
- Assouline D, Mohajeri N, Scartezzini J-L. Large-scale rooftop solar photovoltaic technical potential estimation using Random Forests. Applied Energy 2018;217:189–211. doi:10.1016/j.apenergy.2018.02.118