

# Machine Learning for Solar Array Soilage Identification

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IRES 2020

- The International Research Experience for Students (IRES) addresses multidisciplinary research at the overlap of **sustainability**, **power systems** and **signal processing** with the aim of improving efficiency in PV power generation.
- Engages faculty at ASU's SenSIP Center and the University of Cyprus' KIOS Center.
- IRES participants are trained to use **machine learning**, **perform research**, and **present results** in international settings.



# Machine Learning for Solar Array Soilage Identification

IRES Program in Sensors and Machine Learning for Energy Systems

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# Machine Learning for Solar Array Soilage Identification

This project would normally take place in Cyprus, though it is being performed remotely this year due to Covid-19.



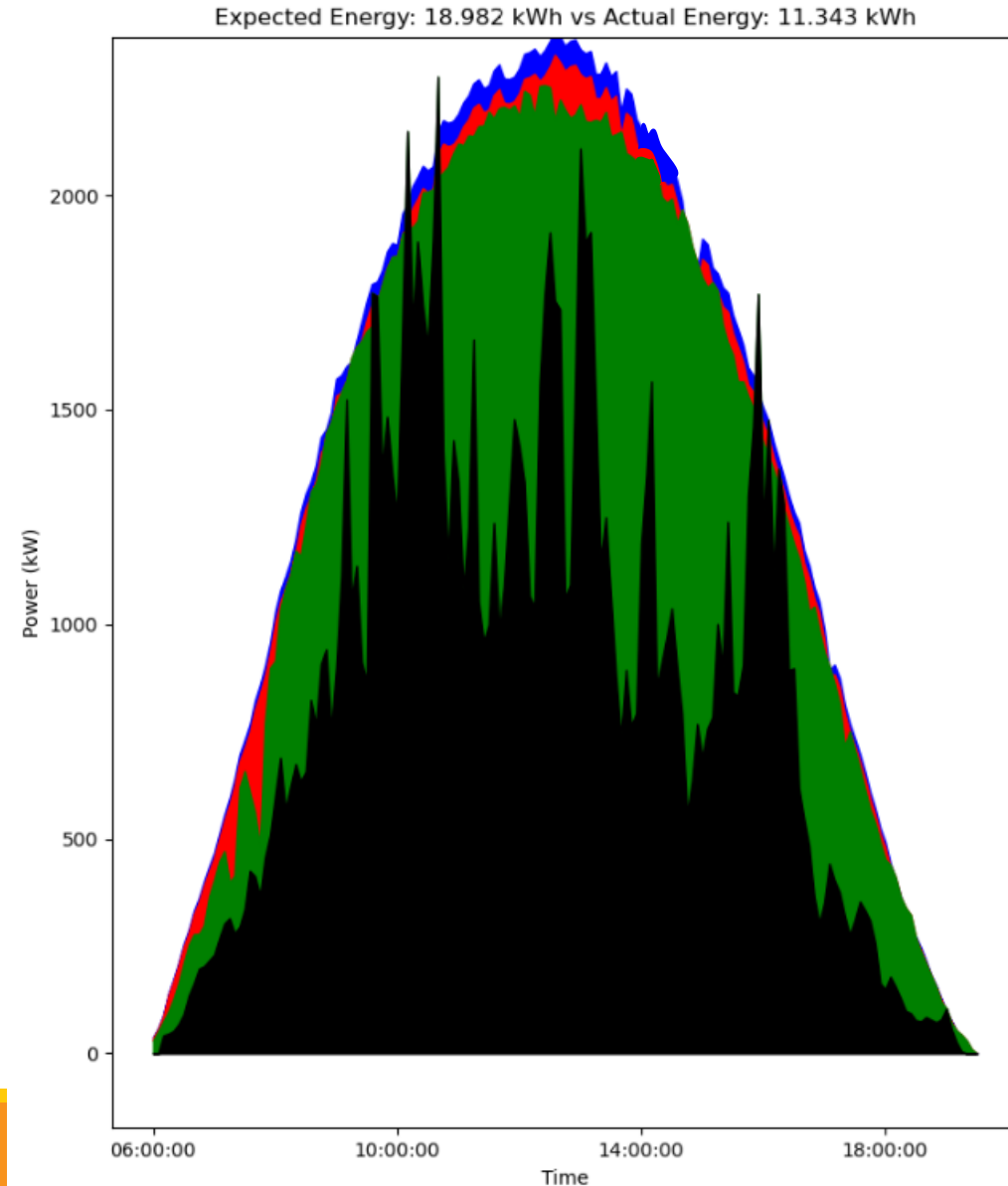
# Machine Learning for Solar Array Soilage Identification

- New, unlabeled solar data from homes across Cyprus.
- Goal: Identify soiled solar panels using ML.
- Approach 1: Estimate and compensate for factors that reduce energy production.

## Expected Production for:

- Energy Produced
- Weather Compensation
- Maximum Possible
- Degradation
- Soilage Loss

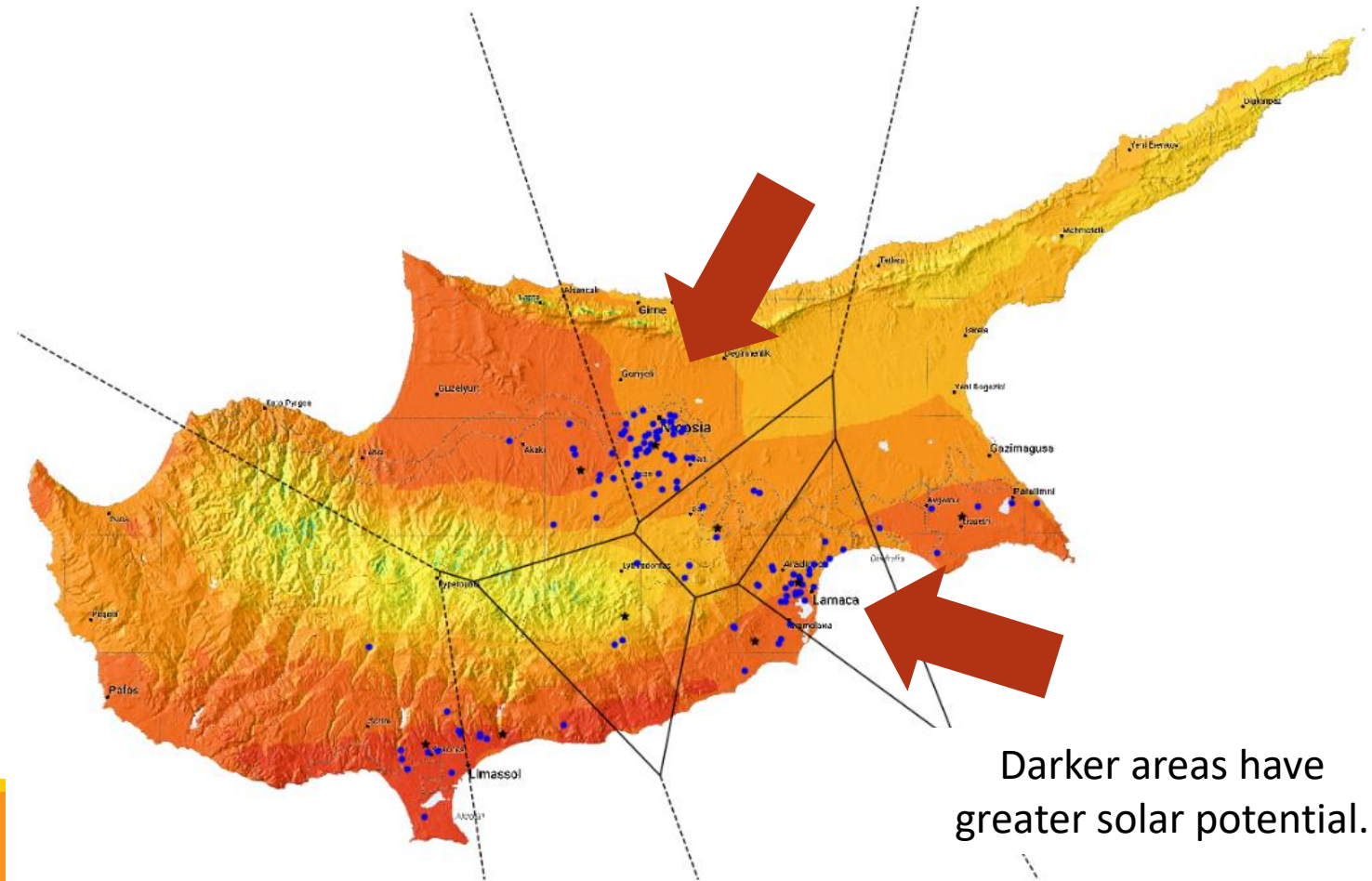
Data provided by  
**solar**edge



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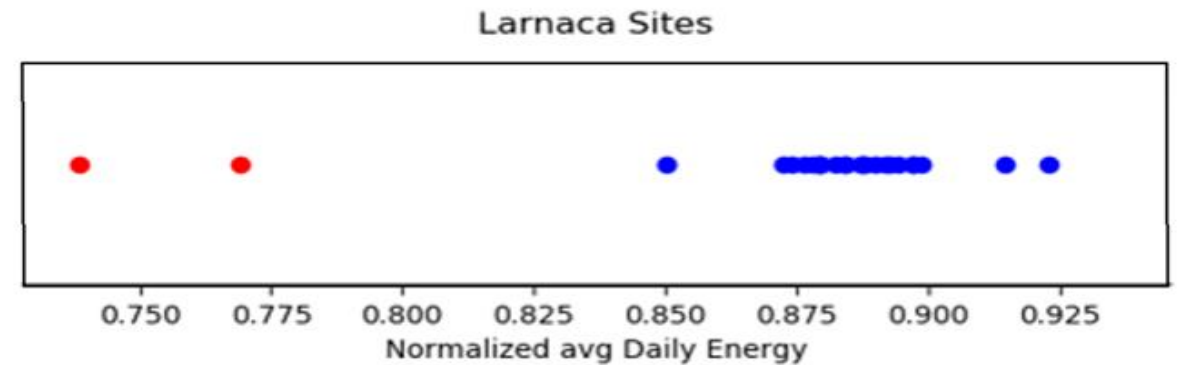
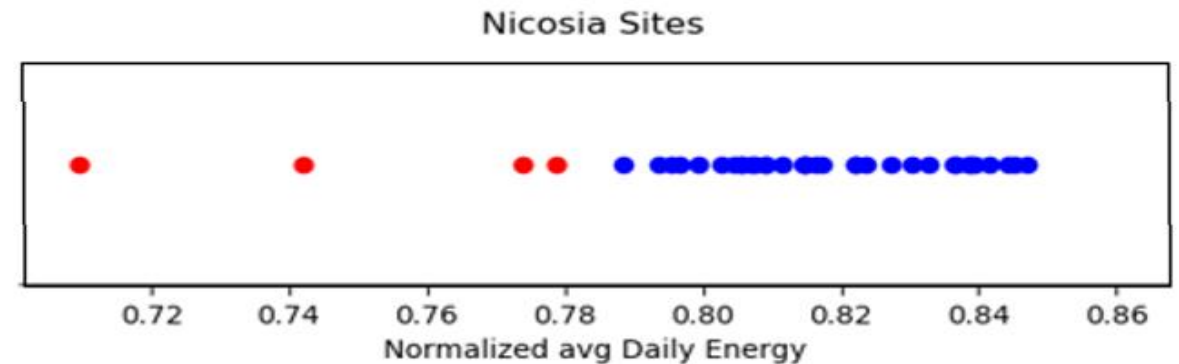
- Approach 2: Use unsupervised learning algorithms to perform a three-step soilage estimator.
- Step 1) Cluster using geographical and climactic information.

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- Approach 2: Use unsupervised learning algorithms to perform a three-step soilage estimator.
- Step 1) Cluster using geographical and climactic information.
- Step 2) Normalize energy production.
- Step 3) Cluster each home by normalized energy production.



Time Period: 2020-05-04 - 2020-05-17

Close the loop: Feet on the ground confirmation of soilage.