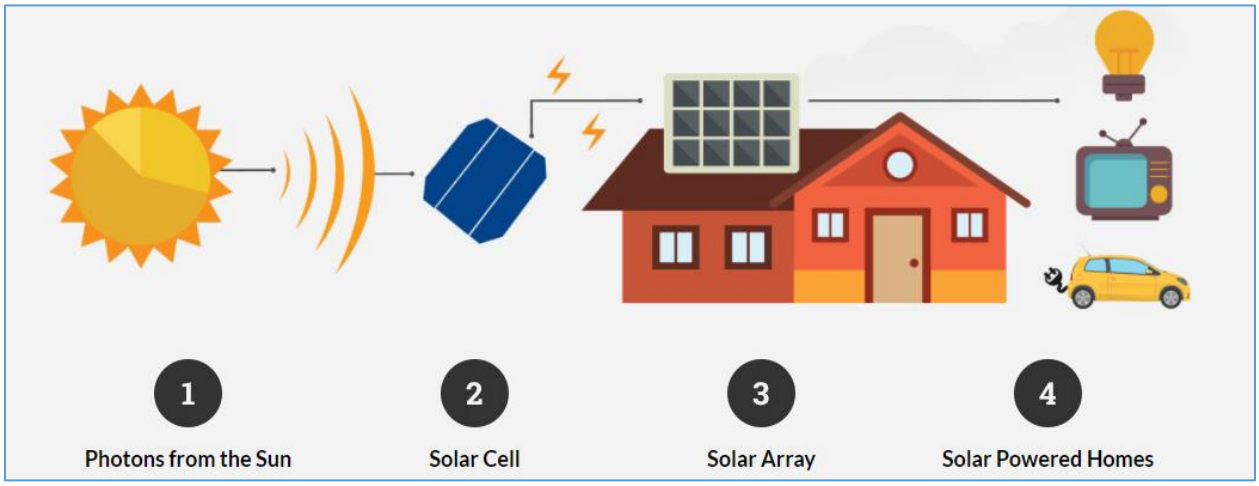
Solar Panel Energy Prediction Study

Short description of possible student projects

Solar energy and panels have now become a more popular alternative to traditional electricity to power residences. The main question is whether utilizing solar panels are a more cost efficient alternative when all costs are factored in. This research study will benefit both the interested consumer and the solar panel manufacturers. Using data science, data analytics, and machine learning to predict (Forecast) Residential, Commercial Building, and Farm Solar Energy and make decisions. More techniques will be used, not limited, to modeling, optimizing, simulation, and visualization analytics in three-dimensions to solar energy.

Due to the growing integration of renewable energy into the national power grid and its variable nature, there is a need for a more accurate prediction of the solar panel energy output. With this project, we may and not limited to intend to analyze past weather and solar panel data to develop a model with the aid of statistical techniques that will help grid operators forecast solar panel energy output based on current given weather data (nowcasting). For example, not limited, our research will be based on the data obtained from the National Solar Radiation Database (NSRDB), etc.



Source: https://www.8msolar.com/

https://agsolarsolutions.com/grid-off-grid-solar-power-whats-best-farm/

https://www.thekickassentrepreneur.com/solar-farm-business/

Student Eligibility Requirements

List the academic majors or required skills, experience, and relevant coursework students should have

Computer science, Computer science, data science (familiar with Python or SAS), and engineering.

Dr. Majed Al-Ghandour is an adjunct Professor.

Brainstorming:

How much money can a solar roof save you in North Carolina?

Predict (Forecast) Residential, Commercial Building, and Farm Solar Energy and make decisions.

What is the Predict Cost of Solar Energy? Installation

Solar Array Investment Prediction? Find savings by month.

Predict Daylight, rain precipitation, energy daily consumptions KWh and rates

Predict Profit, if you got surplus power and you want to sell it back onto the power grid?

What are the challenges! Geographic areas, Environmental weather, Seasons, snow, rain, and clouds hid sun, etc.?

Use different prediction model and compare the results.

Create decision tree interactive

Optimize energy use and comfort: Optimization and Simulation

Visualize analytics in three-dimension

Data Collection

Weather and rain data!

Cost of solar panel kits

Average solar cost data

Data ETL

Create Solar Energy Data Dictionary and standards to store in data warehouse on the Cloud (AWS or Azure or Google)

Prepare Data

- Column/Row transform
- Calculated field
- Casing
- Extraction
- Parsing
- Partition

Data Analytics 4 Types

Explore and visualize

Build Model

Build Decisions

Model Comparison

- Misclassification Rate
- Performance

Unstructured: Sentiment

Computer Vision: Signs

Improve Operations using Data

Recommendations

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