Project Progress

FIND A SOLUTION TO INCREASE THE EFFICIENCY OF SOLAR CELLS FOR SUSTAINABLE POWER GENERATION AND REDUCE THE CONSUMPTION OF FOREIGN FOSSIL FUELS FOR POWER GENERATION



Scope

▶ Efficiency of the power generation using solar energy is quite less than the other modes of electricity generation. Hence increasing the efficiency of the power generation of Solar Cell is greatly beneficial.

If we can increase solar power generation efficiently, considering the cost of Solar Panel, this will help to reduce required capital and resource wasting while installing a solar power plant.

Objectives

- Compare the results of this project that expect with the manufacturer's specified operating temperature to conclude the impact on efficiency.
- ► Find the best PV panels that suits to the temperature conditions in certain area.
- Minimize the overuse of Solar Panels
- Calculate the required solar panel quantity for a given power output by:
 - Panel size
 - Manufacturer Specified solar panel parameters
 - Power output at standard conditions
 - Area temperature



About the web app

Current Stage:

- Visualize three datasets:
 - a climate dataset of the areas
 - Solar panel efficiency dataset
 - dataset of research findings about solar panel efficiencies in different climate conditions
- Analyse each dataset

Next:

- Compare & cross analyze
- Estimate efficient Temperatures that can deliver maximum power output for a given Solar Panel
- Calculate the cost & benefit

We expect to popularize the efficient use of solar panel systems which can be fulfilled customer requirements without wasting capital and resources

Datasets

TempSenz

■ Dataset

∠ Data Analysis

127.0.0.1:3033/#shiny-tab-data

Climate Dataset



Research Data For Different Climate Conditions

how 5 v entries				Search:		
Current.A 🌣	Voltage.V	Power	Panel.Temp	Relative.Humidity	Ambient.Temp	
0.13	3.3	0.043	25.6	87.5	28.6	
0	0.35	0.3	25.2	84.9	28.8	
0.77	e ea	0.353	20. 4	05.3	20.2	

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0.13	3.3	0.043	25.6	87.5	28.6
0	0.35	0.3	25.2	84.9	28.8
0.77	5.51	0.352	26.7	85.2	29.2
1.13	6.2	0.701	27.8	84.2	29.5
1.95	6.95	1.355	29	82.5	30.4

Solar Panel Dataset

how 5	∨ entries					Search: nkv31	
	Company	Power.Watt 🍦	Size	<pre>♠ Material ♦</pre>	Efficient.Temperature	Power.Loss.per.1.C 🍦	Price
nkv31	ABC	234	24x24	Silicon	27	0.05	250

Dataset Summary

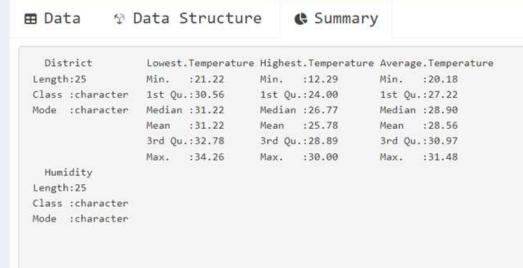
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■ Dataset

□ Data Analysis

Climate Dataset



Research Data For Different Climate Conditions

Show 5 v entries				Search:	
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0	0.35	0.3	25.2	84.9	28.8
0.77	5.51	0.352	26.7	85.2	29.2

Data Structure of a Dataset

TempSenz

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■ Dataset

∠ Data Analysis

Climate Dataset

Show 5 v entries

Research Data For Different Climate Conditions

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Search:

Climate Dataset

TempSenz

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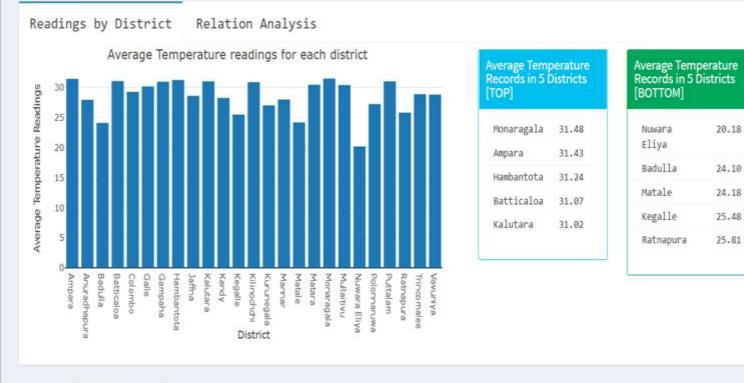
■ Dataset

□ Data Analysis

Climate Reading Type

- Lowest.Temperature
- Highest.Temperature
- Average.Temperature
- Humidity

Climate Data Analysis



Presenting climate conditions of the districts of Sri Lanka, which is useful to find the exact climate conditions to select the best-fit location to install a solar panel system.

Research Data Analysis

Plots

Y variable

Y variable

TempSenz

Dataset

∠ Data Analysis

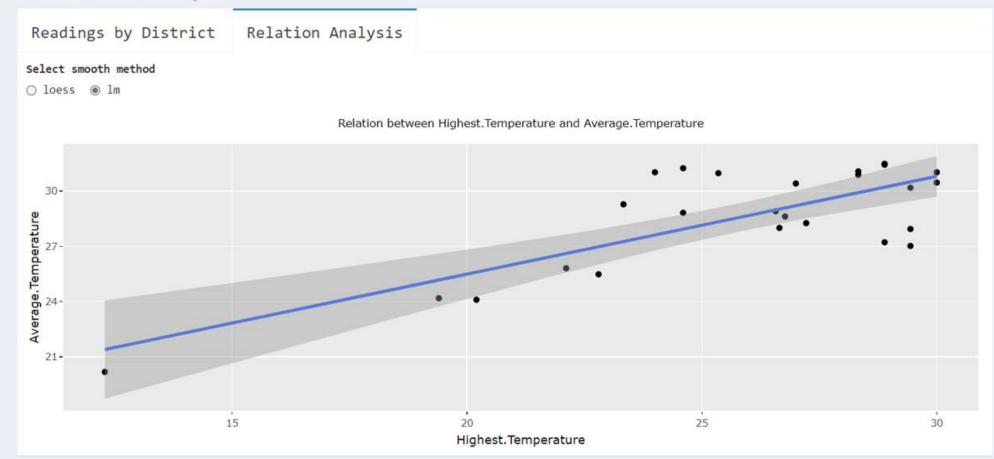
Climate Data X variable

- O Lowest.Temperature
- Highest.Temperature
- Average.Temperature
- Humidity

Climate Data Y variable

- Lowest.Temperature
- Highest.Temperature
- Average.Temperature
- Humidity

Climate Data Analysis



Research Data Analysis

TempSenz

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- **Dataset**
- ∠ Data Analysis

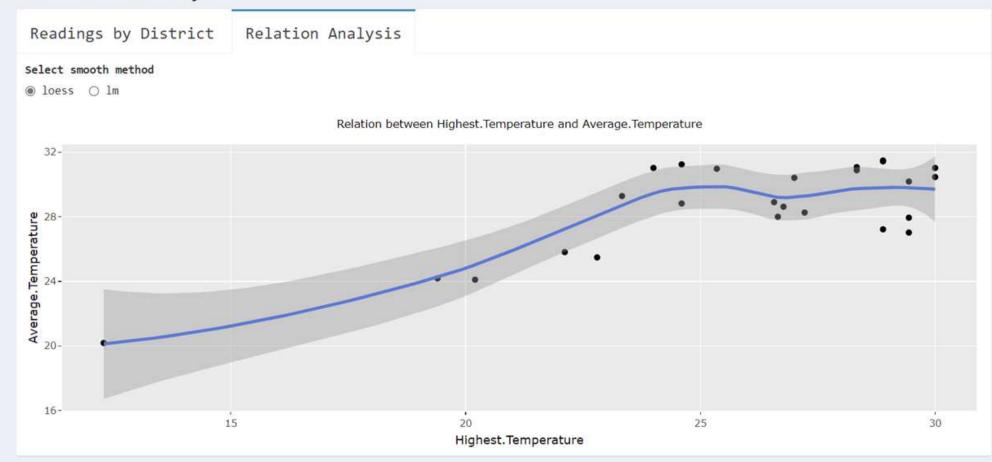
Climate Data X variable

- Lowest.Temperature
- Highest.Temperature
- Average.Temperature
- Humidity

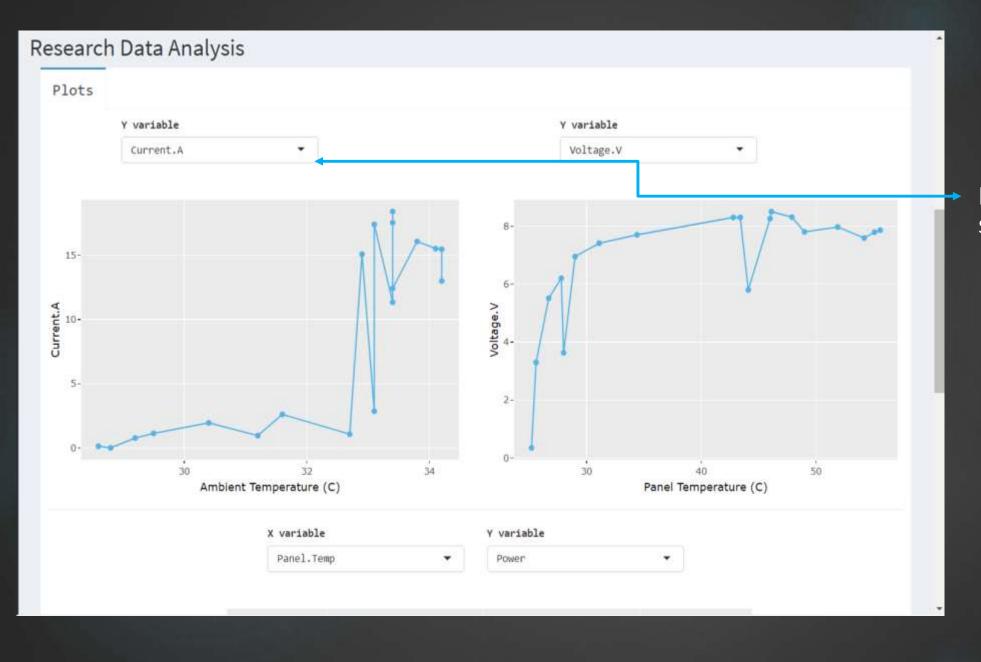
Climate Data Y variable

- Lowest.Temperature
- Highest.Temperature
- Average.Temperature
- Humidity

Climate Data Analysis

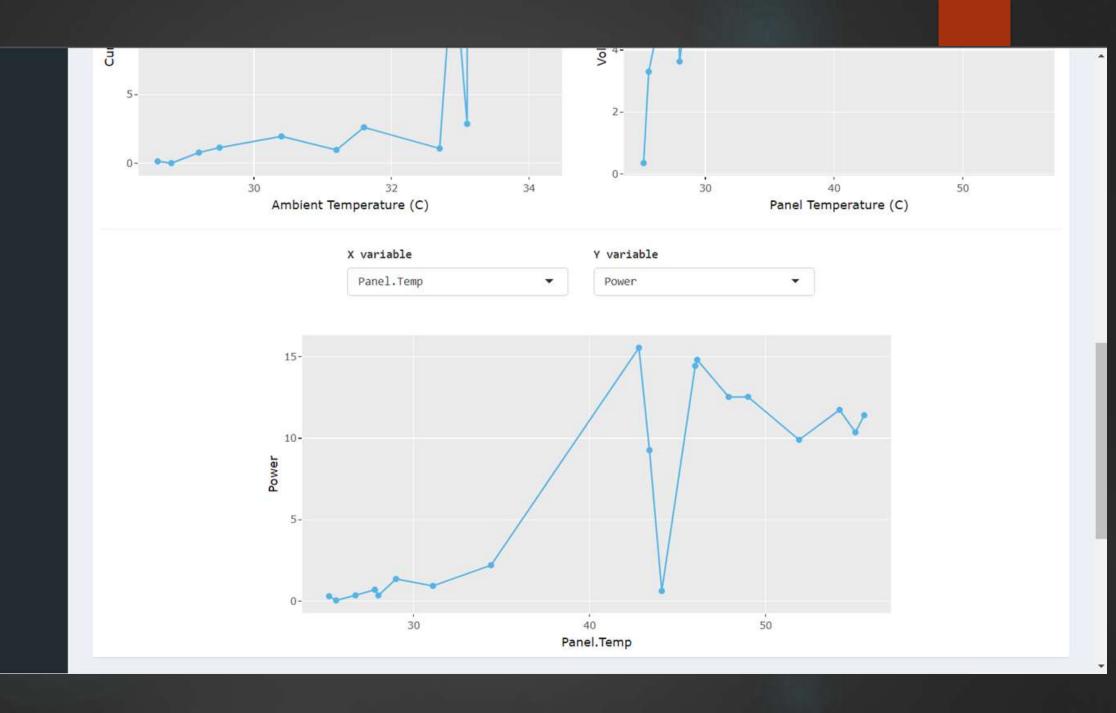


Research Data Analysis

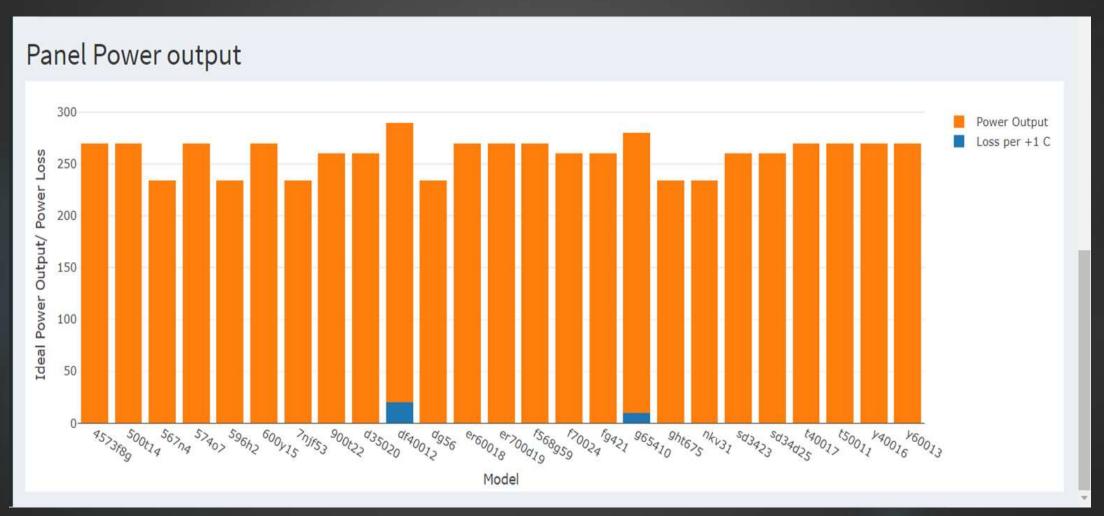


Drop down menu to select the options:

- Current
- Temperature
- Voltage
- Power
- Efficiency



Panel power output data Vs the main Panel models



Further developments in the app

- Hope to use MySQL databases rather than using CSV data files
- Compare & cross analyze
- Estimate efficient Temperatures that can deliver maximum power output for a given Solar Panel

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Thank You