

Problem-Solution fit

Project Title: Predicting the energy output of wind turbine based on weather condition

Team ID:PNT2022TMID34159

Define CS - fit into CL

1.Customer Segments (S)

The onshore segment dominated the market very highly and held a revenue share of 71.66% in 2021.

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2. Problems/Pains •Its Frequency

The biggest problem with the wind turbines is that they would be loud and unsightly, sometimes harming the physical environment.

Identify Strong TR EM

3. Triggers to act

The energy output of a wind farm is highly dependent on the weather conditions present at its site.

4. Emotions Before/After

Most significant is the hub height wind speed, followed by the hub height turbulence intensity and then wind speed shear across the rotor disk.

6. Customer Limitations EG; Budgets,Devices

- Budget , Complexity of the device, Environment, Accuracy
- Wind turbine revolves around harnessing wind energy to power a daily used product

9. Problem Root / Cause

This mechanisms of leading edge erosion, adhesive joint degradation, trailing edge failure, buckling and blade collapse phenomena are considered.

10. Your Solution

Predicting the energy output of wind turbine based on weather condition

5. Available Solutions pros and cons

- Available solution tasks lot of time in identifying the energy output of wind turbine.
- Utilised aerostructural simulations data for a turbine and applied regression trees to forecast turbine power output, accounting for wind speed.

7. Behaviour •Its intensity

Wind energy is tied to variabilities of weather patterns, especially wind speed, which are irregular in climates with erratic weather conditions.

8. Channels of Behaviour

Online

To assess the accuracy of Machine Learning (ML) is used, output can be predicted from available weather data by random forest regression algorithm.

Offline

The formula is:

capacity factor = $\frac{\text{actual output}}{\text{maximum possible output}}$

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