

APAN56 Datathon

The Problem: Renewable Energy Site Selection for Efficient Power Generation in Sri Lanka

Problem Statement:

Welcome to the Renewable Energy Site Selection competition, focused on harnessing wind and solar resources for optimal power generation in various regions of Sri Lanka. This challenge tasks participants with leveraging a diverse dataset encompassing weather and geographical information to advise potential investors in the renewable energy sector. The goal is to craft a strategic report that recommends suitable cities for wind and solar energy projects, accounting for both efficient power generation and attractive return on investment (ROI).

Competition Tasks:

1. Exploratory Data Analysis (EDA):

Your initial task involves thoroughly analyzing the dataset through exploratory data analysis. Uncover insights, visualize patterns, and detect anomalies in the various data categories, enabling a comprehensive understanding of the information at hand.

2. Feature Engineering:

The dataset contains a wealth of information. Your role is to engineer relevant features from the data, potentially incorporating data transformations, aggregations, or combinations to enhance the quality of insights gained.

3. Resource Efficiency Identification:

Participants are required to research and establish the optimal criteria for efficient wind and solar power generation. This entails defining the ideal conditions, thresholds, or ranges for solar radiation, wind speed, and other pertinent variables.

4. Cost-Effective Construction:

Incorporate the geographical attributes, including elevation and terrain information, to estimate the construction costs associated with each potential site. Develop a model that takes into account the terrain's complexity and elevation, allowing for more accurate cost projections.

5. Return on Investment (ROI) Modeling:

Construct a robust model to calculate the potential return on investment for wind and solar energy projects in each city. This model should factor in installation expenses, maintenance costs, energy production estimates, and local energy market dynamics.

6. Site Recommendation Strategy:

Based on the insights gained, build a strategic approach to recommend the most promising cities for renewable energy projects. Consider resource efficiency, construction costs, ROI, and any other relevant factors to formulate a coherent and compelling site selection strategy.

Consider the following aspects of the report:

- **ROI Model Accuracy:** The accuracy of your ROI prediction model demonstrates your ability to estimate potential returns for renewable energy projects.
- **Depth of Analysis:** The thoroughness of your data analysis, feature engineering, and consideration of essential factors for efficient power generation and cost-effective construction.
- **Quality of Recommendations:** The clarity, rationale, and depth of your recommended site selection strategy, demonstrating a comprehensive understanding of the dataset and its implications.
- **Innovative Approaches:** Creative utilization of data science techniques and innovative strategies to address the renewable energy site selection challenge effectively.