PREDICTING THE ENERGY OUTPUT OF WIND TURBINEBASED ON WEATHER CONDITION

Solution Architecture

Problem Statement:

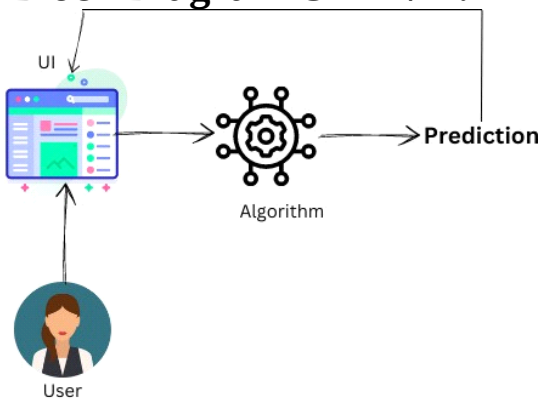
- Wind power consists of converting the energy produced by the movement of wind turbine HYPERLINK "https://www.acciona.com/renewable-energy/wind-energy/wind-turbines/" blades driven by the wind into electrical energy.
- Wind power generation differs due to the stochastic nature of wind.
- The prediction of wind power plays an indispensable role in maintaining the stability of the entire power grid.
- This solution aims to forecast the wind power values efficiently by correlating the parameters of weather conditions and wind turbines.

Proposed Solution:

- Long-term wind power forecasting is to be performed based on daily wind speed data using machine learning algorithms.
- A Minimal Viable Product is aimed to be built by integrating a machine learning algorithm with a front end UI to fetch the user inputs which will be evaluatedand the wind power results are fed back to the UI.
- This architecture is further enhanced as the customer base expands by integrating with a weather forecasting API which assists in the prediction from any geographical location and by training the model using IBM Watson's machine learning service with its scoring endpoint fed to a Flask framework-built UI to process the

API’s and energy prediction requests from the user and rendering the results back to the UI.

Block Diagram Of MVA:



Block diagram

Conclusion:

The Minimal Viable Product is developed with basic features that provide the critical need of predicting wind power output based on weather conditions built with a simple UI powered by a regressor algorithm and statistical methods that can process the user’s requests to predict the wind power values. The MVA is suitable for incremental development to augment the additional features or changes in the requirements to build a flexible and scalable version of the application architecture.