

WEATHER BASED PREDICTION OF WIND TURBINE ENERGY OUTPUT

TEAM DETAILS

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ABSTRACT

This project focuses on predicting wind turbine energy output using machine learning techniques based on weather conditions. Renewable energy is essential for sustainable development. By analyzing environmental parameters such as wind speed, temperature, and pressure, the system predicts the energy generated by wind turbines and helps in efficient power planning.

INTRODUCTION

Wind energy is one of the fastest growing renewable energy sources. Predicting wind turbine output helps maintain a stable power grid and improves efficiency. This project uses machine learning algorithms to analyze weather data and predict energy production for better renewable energy management.

OBJECTIVES

1. Study impact of weather on wind energy production.
2. Develop ML model for energy prediction.
3. Analyze and visualize weather data.
4. Build prediction system using trained model.

TECHNOLOGIES USED

Python Programming
Machine Learning
Pandas, NumPy
Matplotlib, Seaborn
Scikit-learn
Flask (Web Interface)

METHODOLOGY

Data collection from weather datasets.
Data preprocessing and cleaning.

Model training using ML algorithms.
Prediction of wind turbine output.
Visualization of results.

SYSTEM REQUIREMENTS

Hardware: Laptop/Desktop with minimum 4GB RAM
Software: Python, Jupyter Notebook, VS Code

ADVANTAGES

- Helps renewable energy planning
- Improves efficiency
- Reduces cost and energy loss
- Accurate prediction using ML

FUTURE SCOPE

This system can be enhanced by integrating real-time weather APIs and deploying on cloud for live prediction and monitoring.

CONCLUSION

The project successfully predicts wind turbine energy output using machine learning and supports efficient renewable energy management.

PROJECT LINKS

GitHub Repository:
<https://github.com/pavan5405/Wind-Turbine-Energy-Prediction>

Dataset Link:
https://github.com/pavan5405/Wind-Turbine-Energy-Prediction/blob/main/Wind_Data.csv