Project Initialization and Planning Phase

Date	7th July 2024
Team ID	SWTID1720449665
Project Title	Predicting The Energy Output Of Wind Turbine Based On Weather Condition
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

Project Overview	
Objective	The project aims to develop a predictive model for forecasting wind turbine energy output based on weather conditions. This model seeks to optimize operations, enhance energy production efficiency, schedule maintenance proactively, and improve wind energy integration into the electrical grid, providing actionable insights for better resource management and cost savings for wind farm operators.
Scope	The project involves collecting and processing historical weather and wind turbine performance data to develop a machine learning model for predicting wind turbine energy output. Real-time weather data will be integrated for ongoing predictions. The aim is to optimize turbine operations, provide maintenance insights, and improve grid integration by offering stable energy supply forecasts. Additionally, the project includes creating a user-friendly interface for accessing predictions, conducting testing, and ensuring continuous model updates for accuracy and effectiveness.
Problem Statement	
Description	Wind farm operators grapple with unpredictable energy output due to varying weather conditions, leading to difficulties in meeting demand and increased costs. They need an accurate predictive model to forecast energy output based on weather data, optimizing operations and ensuring a stable energy supply.
Impact	Accurate wind energy predictions optimize operations, reduce costs, and foster renewable energy adoption while improving reliability through proactive maintenance.

Proposed Solution	
Approach	We have used random forest regressor model and fit the data.
Key Features	Key features include real-time weather integration, theoretical power curve modeling, machine learning for accurate predictions, user-friendly interface, and performance validation metrics.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	2 x NVIDIA V100 GPUs
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	scikit-learn, pandas, numpy
Development Environment	IDE, version control	Jupyter Notebook, Git
Data		
Data	Source, size, format	Kaggle dataset, 10,000 images