Project Initialization and Planning Phase

Date	17 July 2024
Project Title	Machine Learning Approach For Predicting The Price Of Natural Gas
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

Project Overview	
Objective	The primary objective is to predict the consumption and demand of natural gas based on weather conditions and other relevant factors using advanced machine learning techniques, enabling better management and optimization of natural gas distribution.
Scope	The project encompasses the analysis of historical weather, consumption, and demand data, development of predictive models, and implementation of these models to forecast natural gas consumption and demand, aiding in operational decision-making and distribution optimization.
Problem Statement	
Description	The project aims to address the problem of predicting natural gas consumption and demand based on variable weather conditions and other influencing factors. Accurate predictions are challenging due to the fluctuating nature of weather and other variables, which impact consumption forecasting. This issue affects supply chain management, maintenance scheduling, and distribution efficiency.
Impact	Solving this problem will improve the accuracy of natural gas consumption and demand forecasts, leading to more efficient supply chain management, optimized maintenance scheduling, and better distribution efficiency. This will enhance operational efficiency, reduce costs, and contribute to effective natural gas production and distribution.
Proposed Solution	

Approach	The methodology involves analyzing historical weather, consumption, and demand data to develop predictive machine learning models. Techniques such as data preprocessing, feature selection, and model training will be employed. Models like Random Forest Regressor and Gradient Boosting will be utilized to forecast natural gas consumption and demand based on current weather conditions and other relevant factors. The approach includes validating and tuning the models to ensure accuracy and reliability.
Key Features	• **Predictive Modeling**: Utilizes advanced machine learning algorithms to forecast natural gas consumption and demand. • **Historical Data Analysis**: Incorporates historical weather, consumption, and performance data to enhance model accuracy. • **Real-time Predictions**: Provides timely forecasts to support operational decisions and distribution optimization. • **Dynamic Adjustments**: Adapts to varying weather conditions and other factors for more accurate and responsive consumption and demand predictions.

Resource Requirements

Resource Type	**Description**	**Specification/Allocation**
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	Intel Core i5-9300H, NVIDIA GeForce GTX 1650
Memory	RAM specifications	8 GB
Storage	SSD/HDD specifications	512 GB SSD

Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	scikit-learn, pandas, numpy, matplotlib, seaborn
Development Environment	IDE, version control	Vs code,Git,Jupyter Notebook
Data		
Data	Source, size, format	daily_csv (5938 rows , 2 columns)