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Final Project

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ENERGY CONSUMPTION PREDICTION

AGENDA

- Problem Statement
- Overview
- End users
- Solution
- Modelling
- Result

PROBLEM STATEMENT

Predicting energy consumption accurately is crucial for efficient energy management, resource allocation, and sustainability initiatives.

The goal of this project is to develop machine learning models capable of accurately forecasting energy consumption based on historical data and external factors. Specifically, we aim to predict energy usage for a given time period (e.g.Day) and with the temperature, Humidity for regions with Energy consumptions.

PROJECT OVERVIEW

The project addresses the challenge of accurately predicting energy consumption for buildings, cities, or regions. The goal is to develop machine learning models capable of forecasting energy usage for different time intervals, ranging from hourly to monthly predictions. The project focuses on commercial or residential buildings and explores the impact of various factors on energy consumption.

WHO ARE THE END USERS?

The end users of the energy consumption prediction project may vary depending on the specific application and context. However, potential end users could include:

- Utility Companies
- Building Owners and Facility Managers
- Smart Building and IoT Solution Providers
- Research Institutions and Academia
- Government Agencies and Policy Makers

YOUR SOLUTION AND ITS VALUE PROPOSITION

The solution offered by the energy consumption prediction project lies in its ability to accurately forecast energy usage for buildings, cities, or regions. The data and external factors such as weather conditions, occupancy patterns, and building characteristics, the project aims to provide valuable insights and predictions that can be utilized by various stakeholders in the following ways:

- Optimized Energy Management
- Informed Policy Making
- Effective Resource Allocation
- Research and Innovation
- Environmental Sustainability

THE WOW IN YOUR SOLUTION

The energy consumption prediction project lies in its transformative potential to revolutionize the way we manage energy resources and promote sustainability.

- Precision and Accuracy
- Predictive Insights
- Scalability and Adaptability
- Impactful Results
- Real-time Monitoring and Adaptation

MODELLING

1.Data Preparation:

Clean and preprocess the dataset, handling missing values and encoding categorical variables. Apply feature engineering techniques to extract relevant features and enhance prediction accuracy.

2.Model Selection:

Choose suitable machine learning algorithms like linear regression, decision trees, or neural networks for energy consumption prediction. Consider algorithmic strengths and dataset characteristics to make informed selections.

3.Feature Selection:

Choose relevant features based on importance analysis or domain expertise to improve model accuracy.

4.Model Training:

Split the dataset into training and testing sets to train and evaluate the models. Train the selected machine learning algorithms on the training data.

5.Model Evaluation:

Evaluate the trained models using appropriate performance metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), Root Mean Squared Error (RMSE), or R-squared (R2) score. Compare the performance of different models to identify the best-performing one.

RESULTS

The result of the energy consumption prediction project typically includes the performance metrics and insights gained from the trained models. This include:

- Prediction Accuracy: Evaluation metrics like MAE, RMSE, or R-squared indicating accuracy.
- Model Comparison: Determining the best-performing algorithm or model.
- Feature Importance: Identification of influential variables impacting energy consumption.
- Optimized Models: Tuned models ready for deployment in real-world scenarios.
- Recommendations: Actionable insights for stakeholders to optimize energy usage.
- Future Trends: Insights into future energy consumption patterns for long-term planning.

https://github.com/shapssss/energy-consumption