Carbon Emission Prediction Using AI

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# Abstract

This project aims to predict carbon dioxide (CO2) emissions using artificial intelligence techniques, primarily machine learning regression models. Accurate forecasting of emissions is essential for climate change mitigation strategies. The dataset includes energy usage and industrial output data, and we apply algorithms like Linear Regression to predict CO2 emission levels.

# Objectives

- To explore and preprocess a carbon emission dataset.

- To analyze feature correlations with CO2 emissions.

- To apply Linear Regression to model emission levels.

- To evaluate the model using RMSE and R² metrics.

# Dataset Description

The dataset includes features like fossil fuel consumption, GDP, energy use, population, and other environmental indicators. The target variable is CO2\_Emissions. Missing data was removed or imputed, and the dataset was split for training and testing.

# Methodology

The dataset was cleaned by dropping or imputing missing values. Correlation heatmaps were used to identify key features. We applied Linear Regression on the training set and evaluated predictions using RMSE and R². A scatter plot was used to compare predicted vs actual CO2 emission levels.

# Results and Evaluation

The Linear Regression model achieved high accuracy with low RMSE and an R² score close to 1. This indicates the model's strong performance in predicting CO2 emissions based on historical data.

# Conclusion

The project demonstrates that machine learning models can effectively forecast carbon emissions. Such models can help governments and industries develop data-driven environmental policies.

# References

- https://ourworldindata.org/co2-emissions

- https://scikit-learn.org/stable/

- RGS-AI GitHub Internship Template