

Carbon Emissions Prediction (SDG 13: Climate Action)

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1. SDG Problem Addressed: This project focuses on SDG 13: Climate Action, addressing the growing challenge of climate change caused by rising carbon emissions. Unpredictable rainfall patterns and extreme heat conditions are becoming more frequent, disrupting agriculture, water supply, and human health. The goal of this project is to predict future carbon emissions trends using machine learning, to support better policy planning and sustainability efforts.

2. Machine Learning Approach Used: The project uses a Supervised Learning approach with the Linear Regression model from Scikit-learn. Data preprocessing involved cleaning and selecting key features such as year, GDP, and population. The target variable, CO₂ growth percentage, was analyzed and modeled to predict future emission trends. Python libraries used include Pandas, NumPy, Matplotlib, and Scikit-learn.

3. Results: The model achieved an accuracy level of approximately 0.56, showing improvement and indicating a fair predictive performance. The results provide a foundational step for more advanced models that can integrate additional environmental and industrial variables. Visualization tools such as Matplotlib were used to display emissions trends and model predictions.

4. Ethical and Sustainability Considerations: It is important to ensure data fairness and transparency to avoid bias that may misrepresent emission data across regions. The model promotes sustainability by providing insights that can inform climate action policies and encourage eco-friendly industrial practices. Ethical AI principles were considered to ensure that the predictions support positive environmental and social outcomes.

5. Conclusion: This project demonstrates how Artificial Intelligence and Machine Learning can play a vital role in achieving the United Nations' Sustainable Development Goals. By leveraging data-driven insights, policymakers and environmental organizations can take proactive steps to reduce carbon emissions and mitigate climate change.