Analyzing CO2 Emissions for Strategic Environmental Planning

A Data-Driven Approach to Understanding and Predicting CO2 Emissions

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Introduction

CO2 emissions are a critical driver of climate change. Understanding emission trends and identifying the biggest contributors is essential for informed decision-making.

Objective

- Analyze historical CO2 emissions data.
- Identify key trends and correlations.
- Predict future emissions using a machine learning model.
- Provide actionable recommendations for reducing emissions.

Dataset Description:

- Data Source: CO_2 emissions data by country (years, CO_2 emissions in kilotons, metric tons per capita).

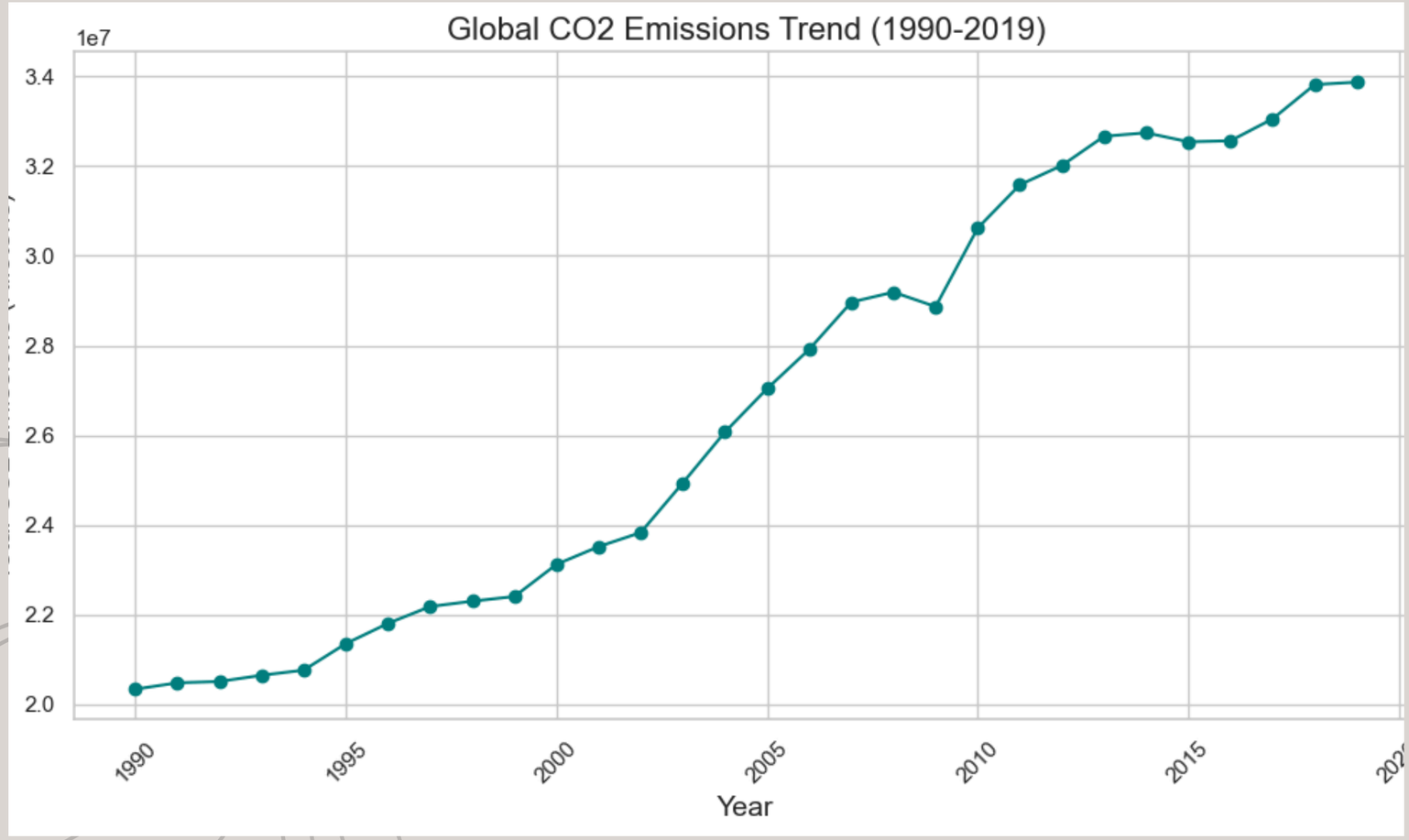
- Key Metrics:
  - Total CO_2 Emissions (Kilotons)
  - CO_2 Emissions Per Capita (Metric Tons)

Data Preprocessing Steps:

- Cleaning missing values.
- Handling duplicates.
- Aggregating data by country.

Global CO2 Emissions Trends

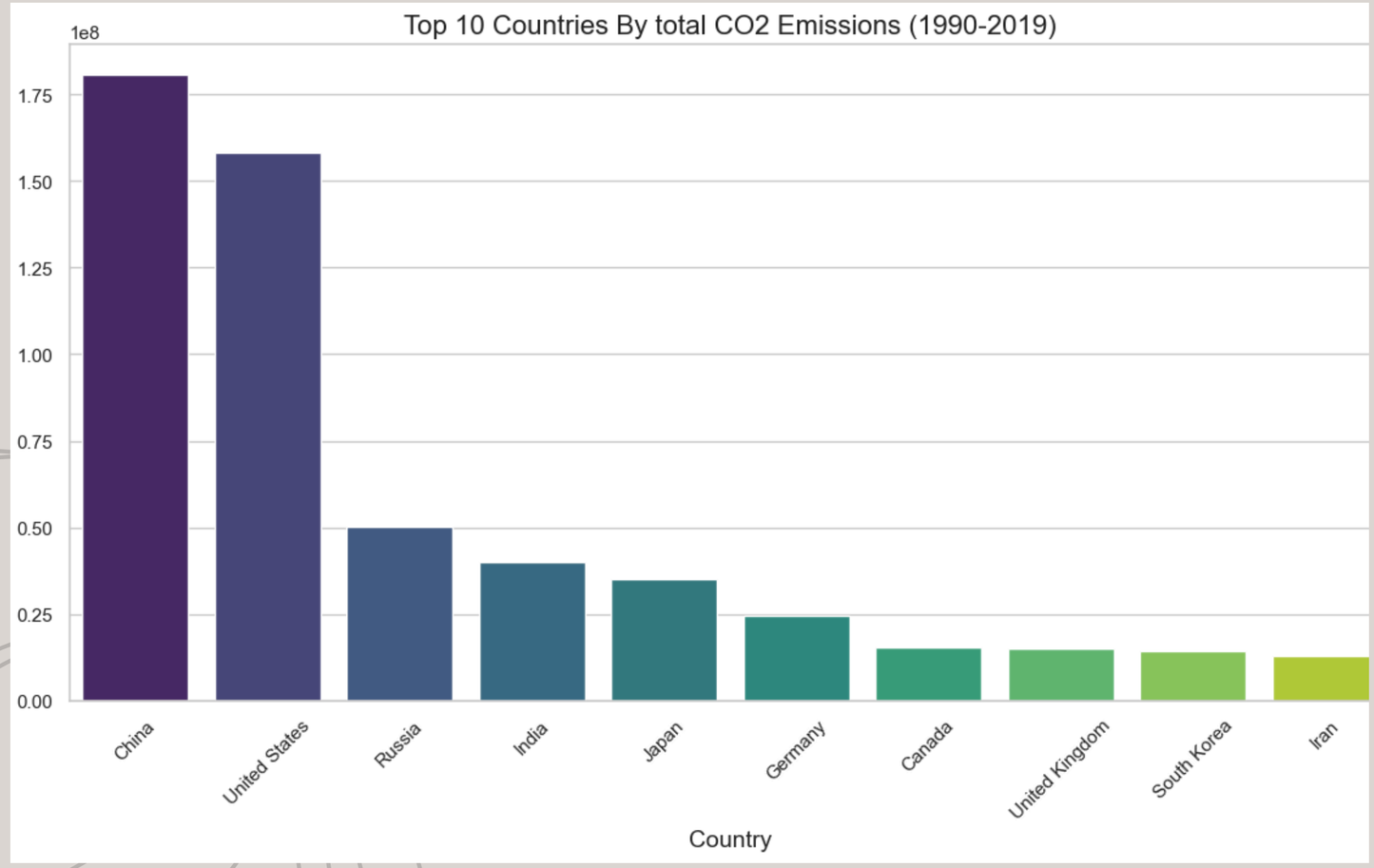
Line chart showing global CO2 emissions trend from 1960 to 2020.



- Global emissions have been increasing steadily, with significant growth in the last 50 years.
- Recent dips observed during major global events (e.g., COVID-19 pandemic).

Top Contributing Countries

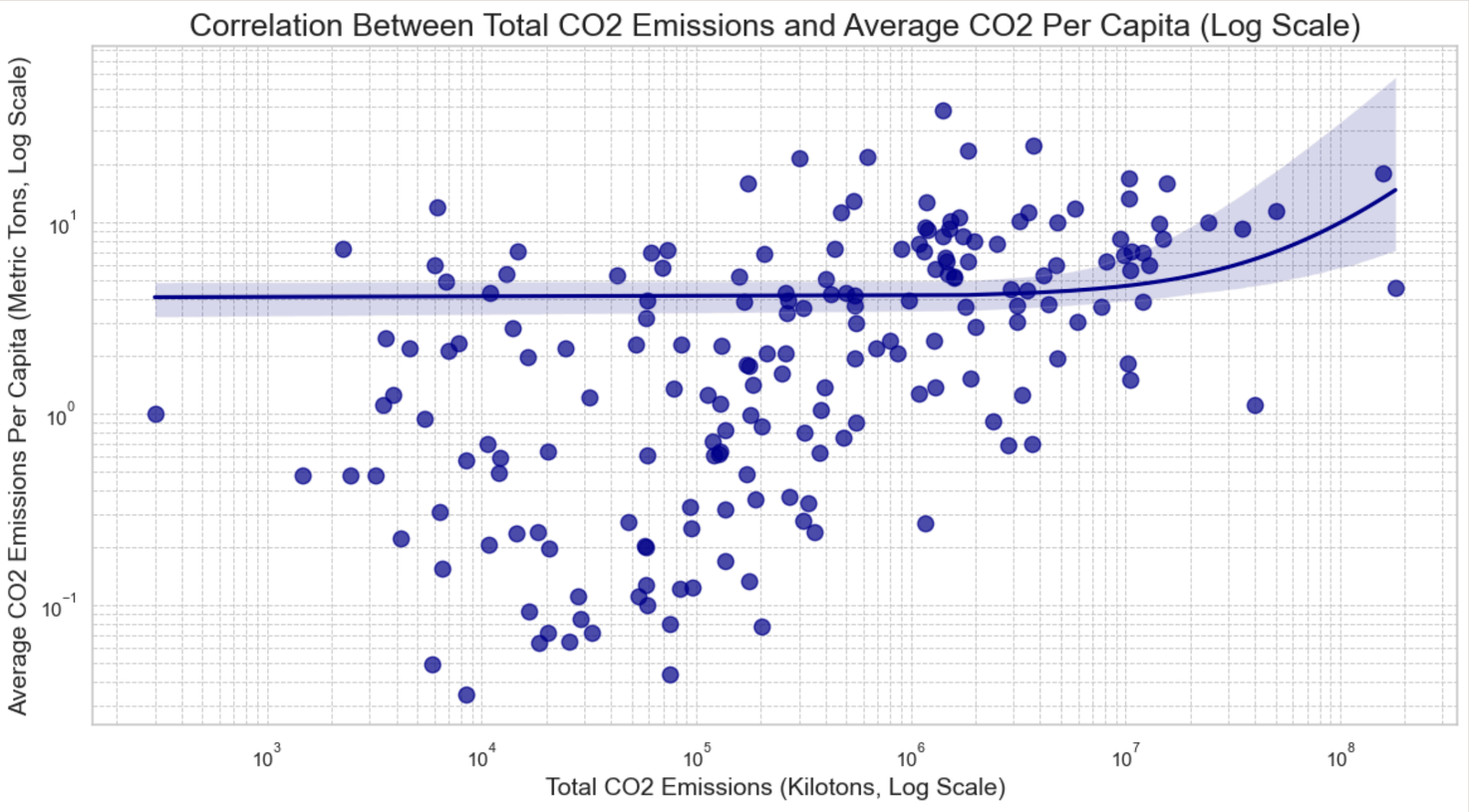
Bar chart showing the top 10 countries with the highest total CO2 emissions.



- The top 5 countries contribute to over 60% of global CO2 emissions.
- The United States, China, India, Russia, and Japan are the largest emitters.

Correlation Analysis

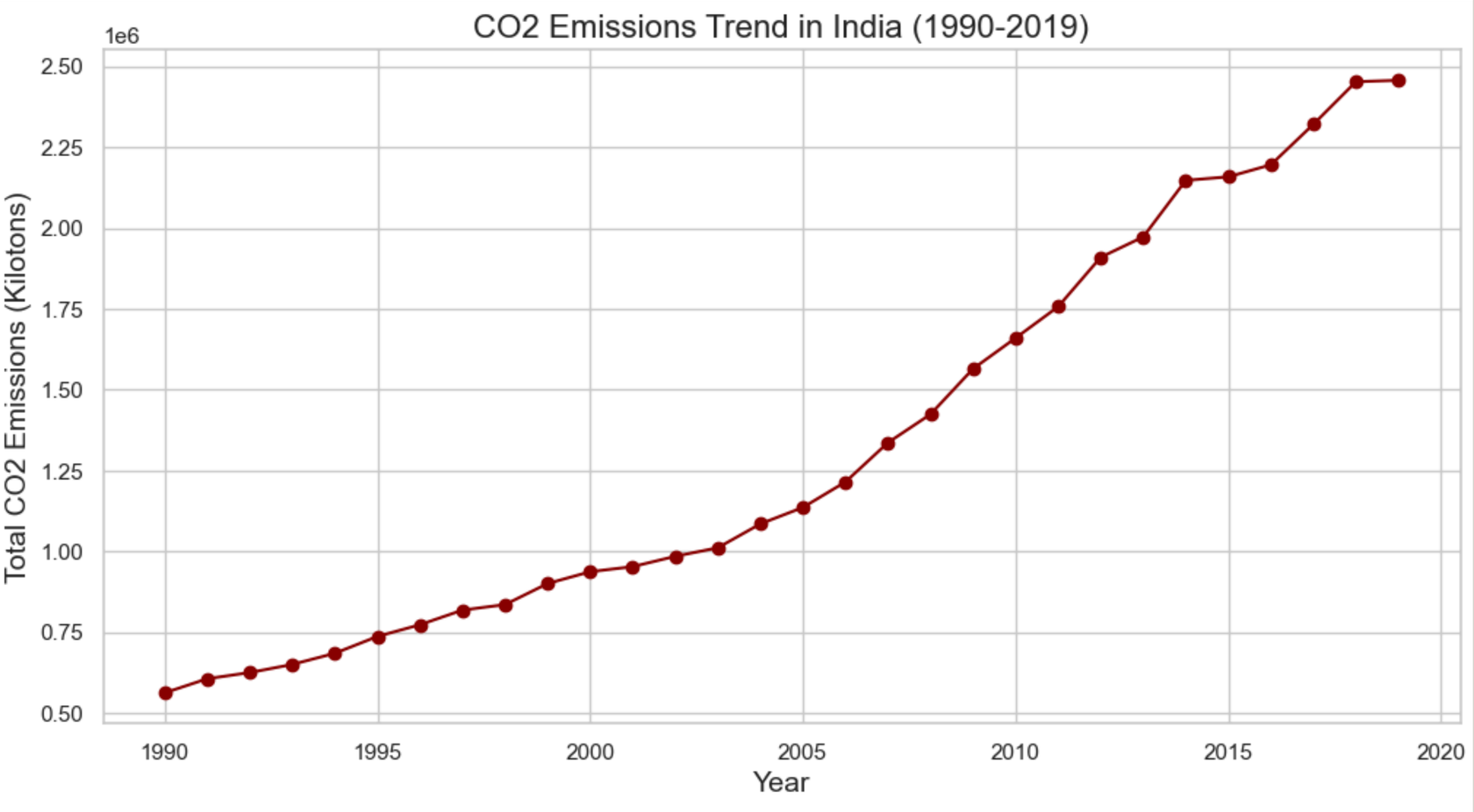
Scatter plot with regression line (log scale) showing the correlation between total CO2 emissions and CO2 per capita.



Positive correlation indicates that countries with high total emissions also tend to have higher per capita emissions.

Country-Specific Analysis: India

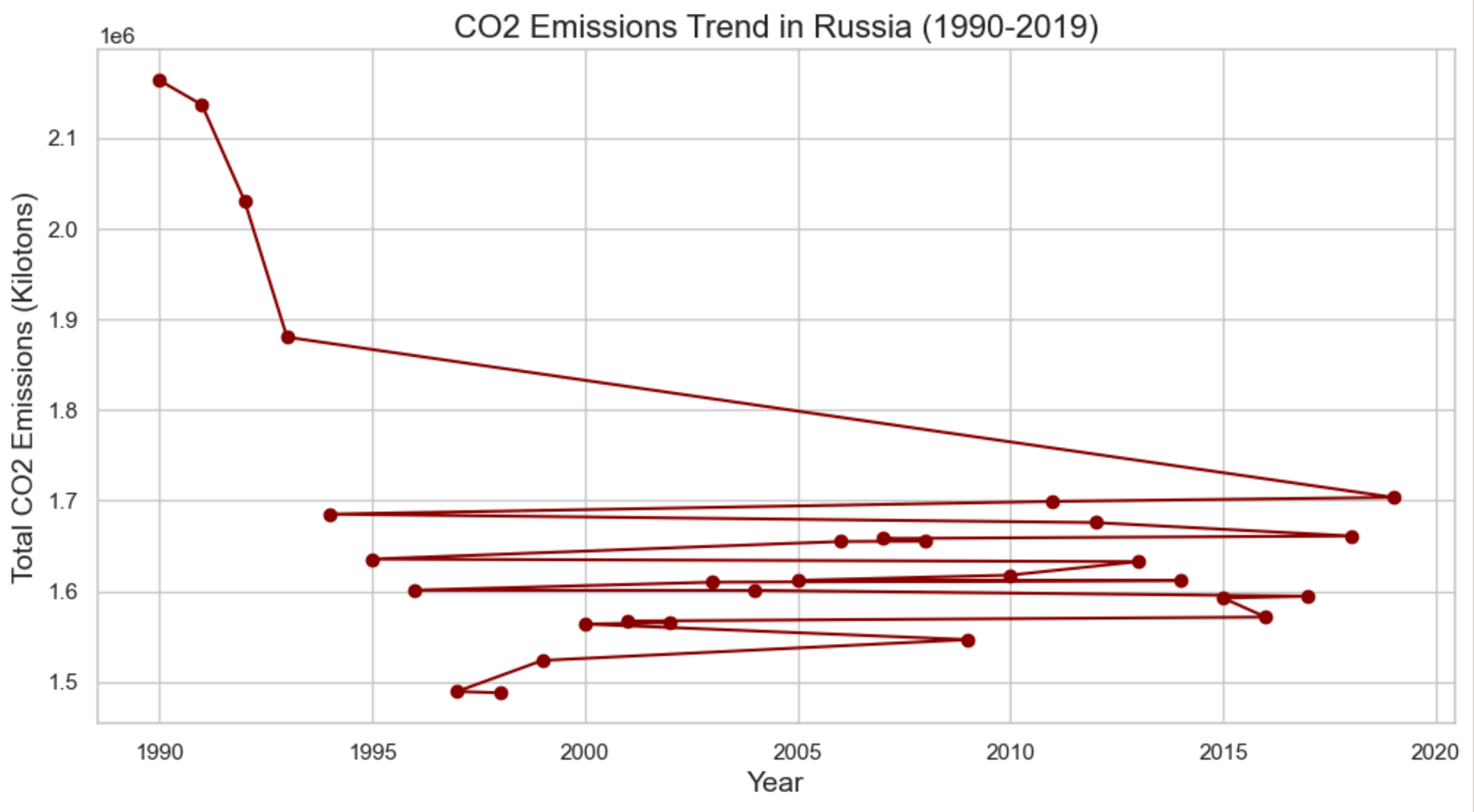
Line charts showing CO2 emissions trends for India.



- India: Rapid increase in emissions aligned with industrial growth.

Country-Specific Analysis: Russia

Line charts showing CO2 emissions trends for Russia.



- Russia: Fluctuations due to economic transitions and geopolitical events.

Key Recommendations

- Focus on High Emitters: Prioritize emission reduction policies in the top 10 emitting countries.
- Promote Renewable Energy: Invest in and advocate for renewable energy sources to reduce dependency on fossil fuels.
- International Collaboration: Strengthen global climate agreements and support developing countries in adopting green technologies.
- Continuous Monitoring: Utilize data analytics and machine learning for ongoing monitoring and predictive analysis of CO2 emissions.

Thank You

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