Predicting US Carbon Dioxide Emissions Using a Time Series Model

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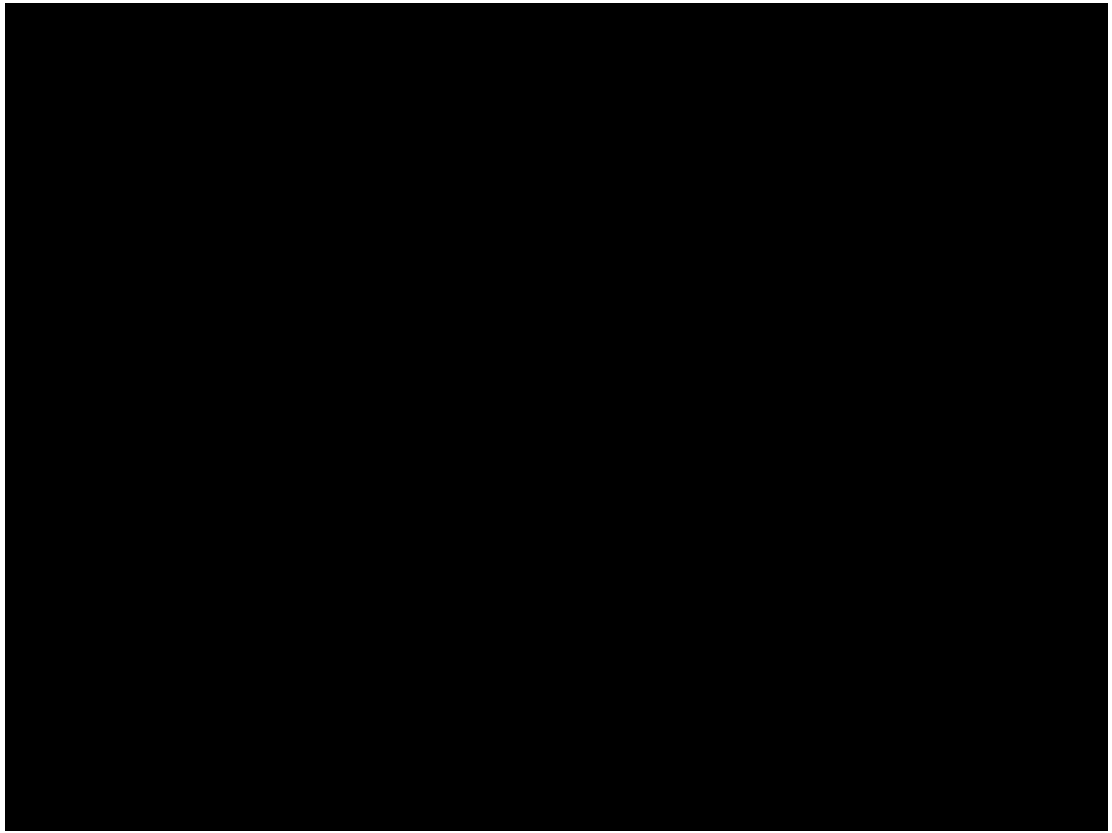
Business Problem

- Understanding the past
- Understanding the future

Data

- Sourced from the Our World in Data CO2 database
- 24,017 rows, 38 columns

Exploring the Data



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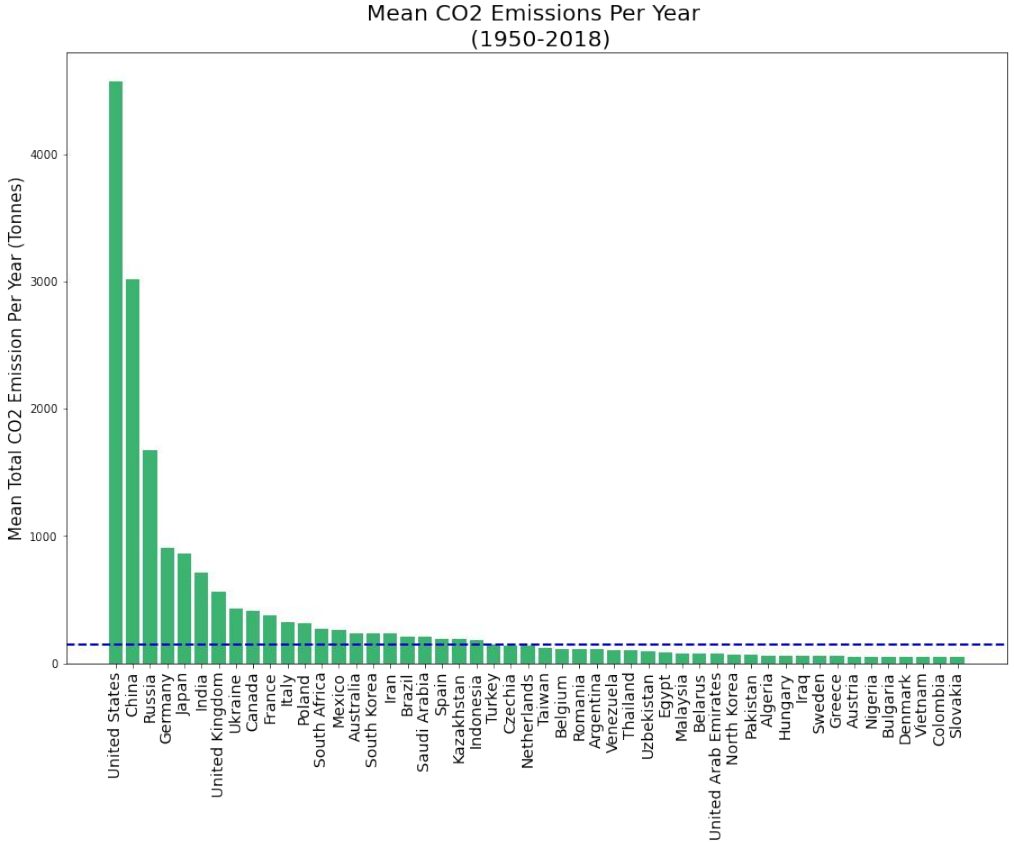

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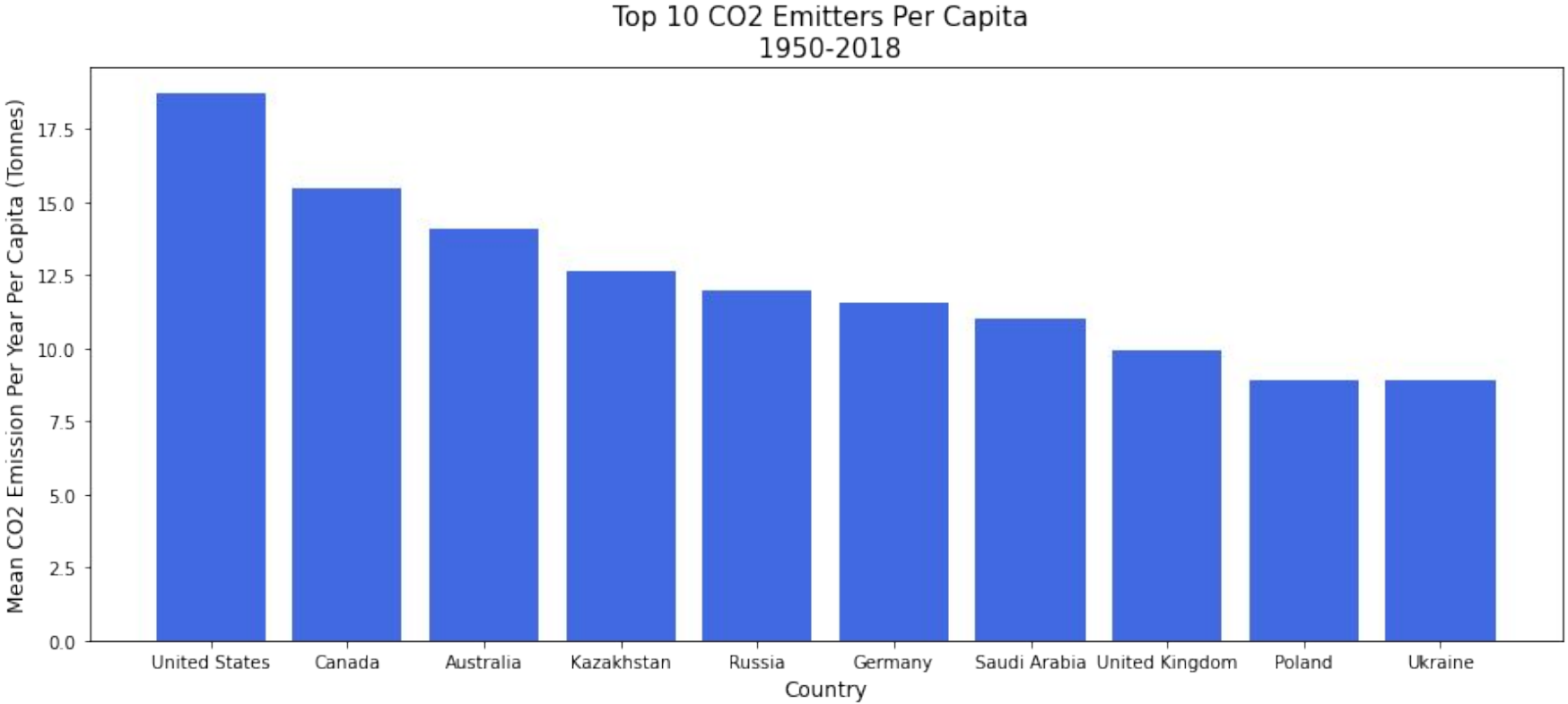

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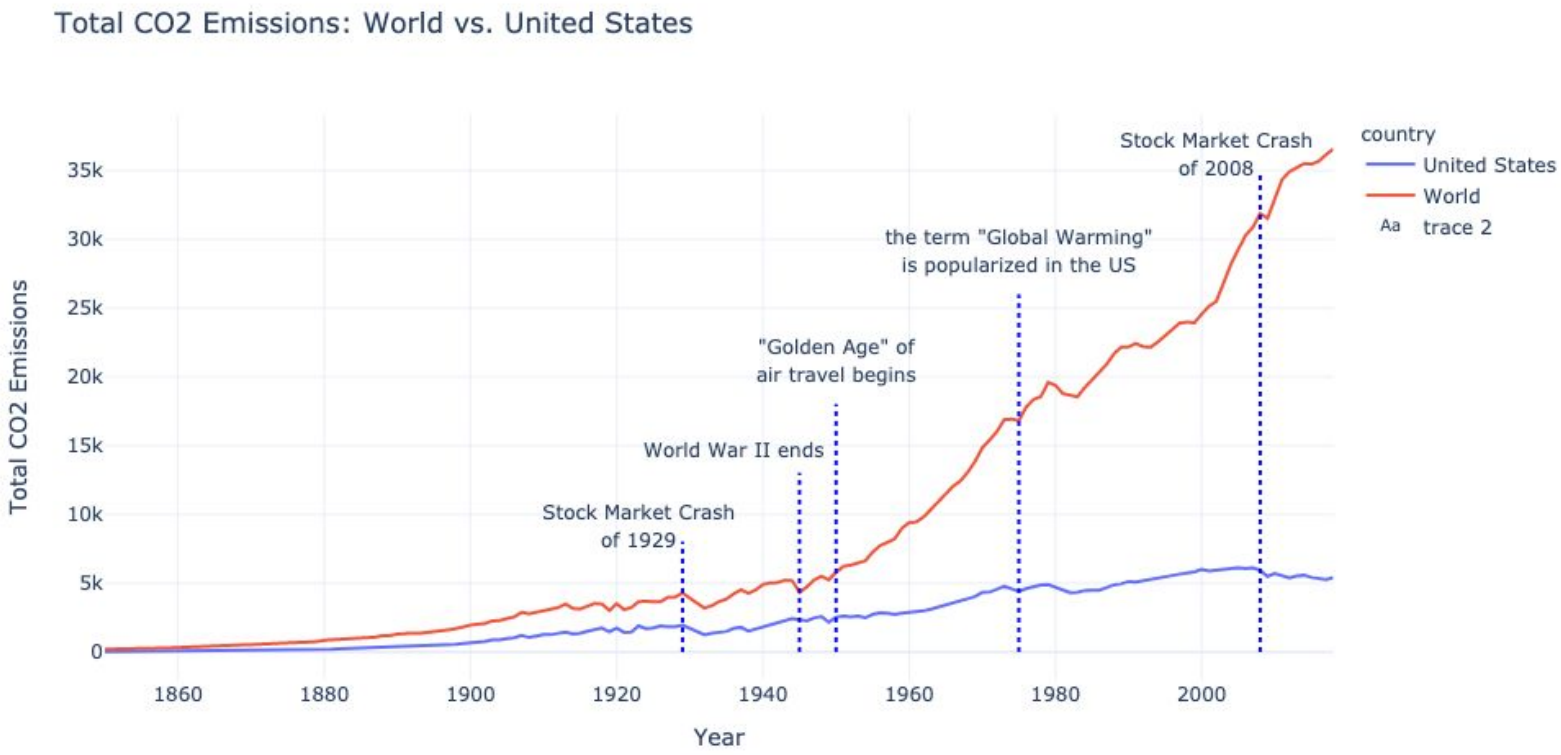
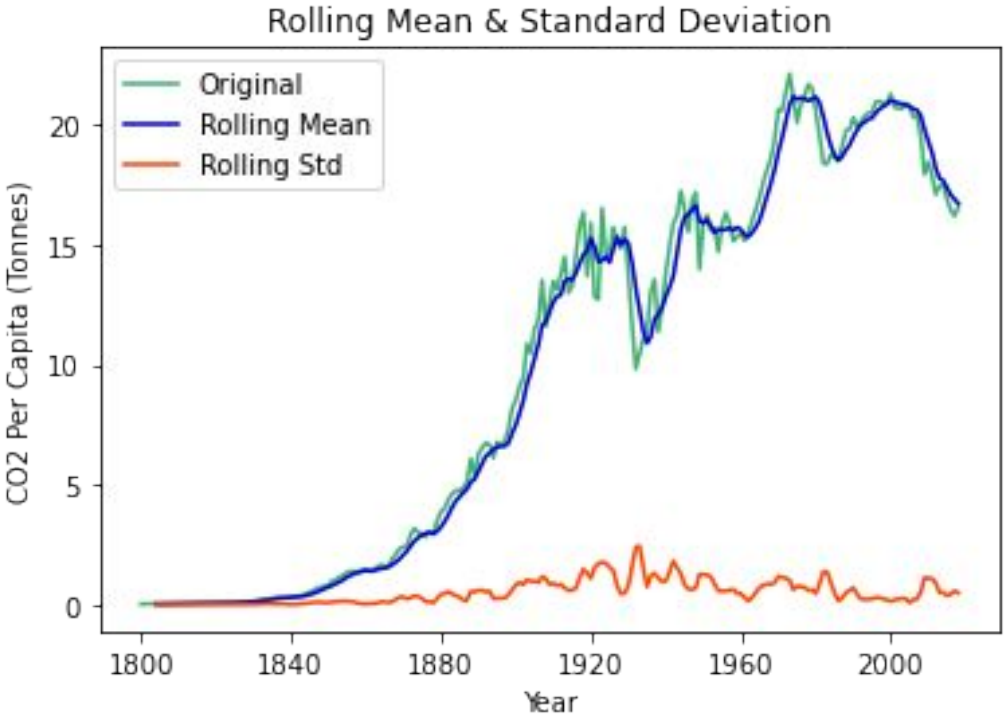


Model Focus: United States CO2 Emissions Per Capita

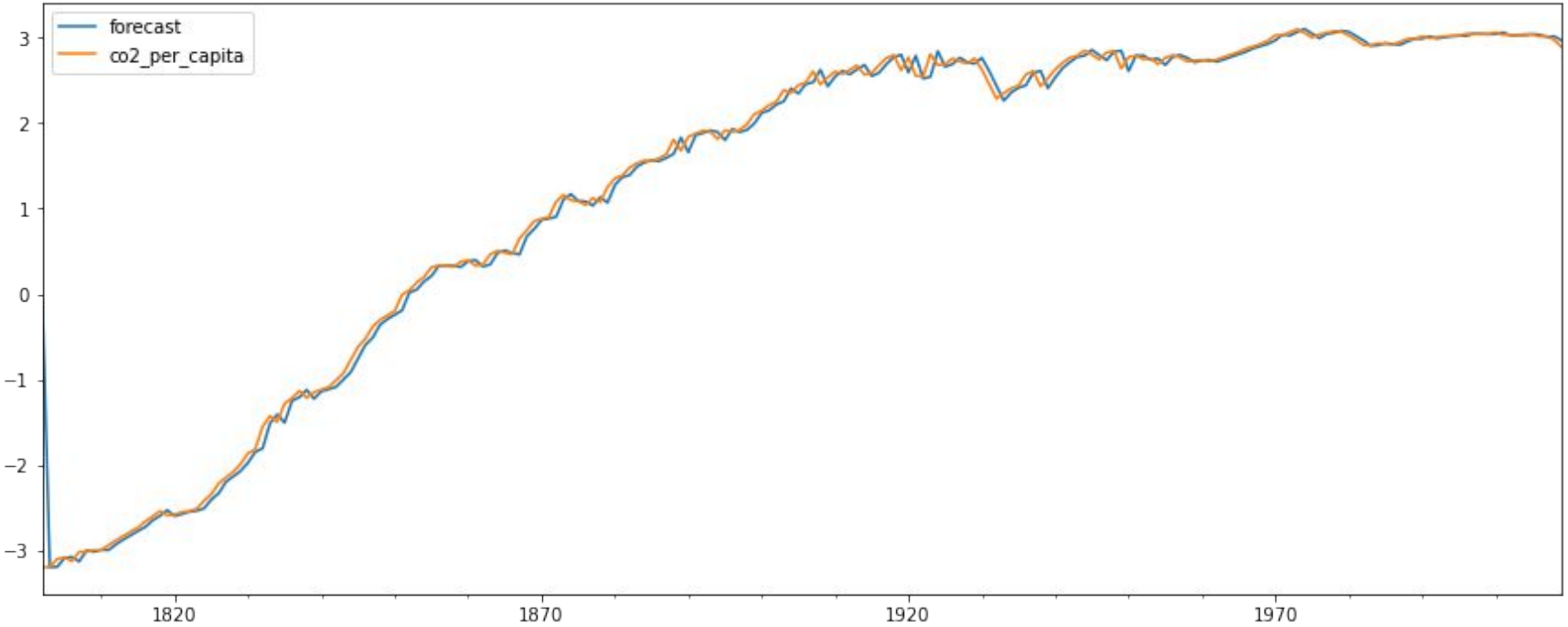
- Dickey-Fuller p-value: 0.73
- Achieved stationarity via log transformation and differencing



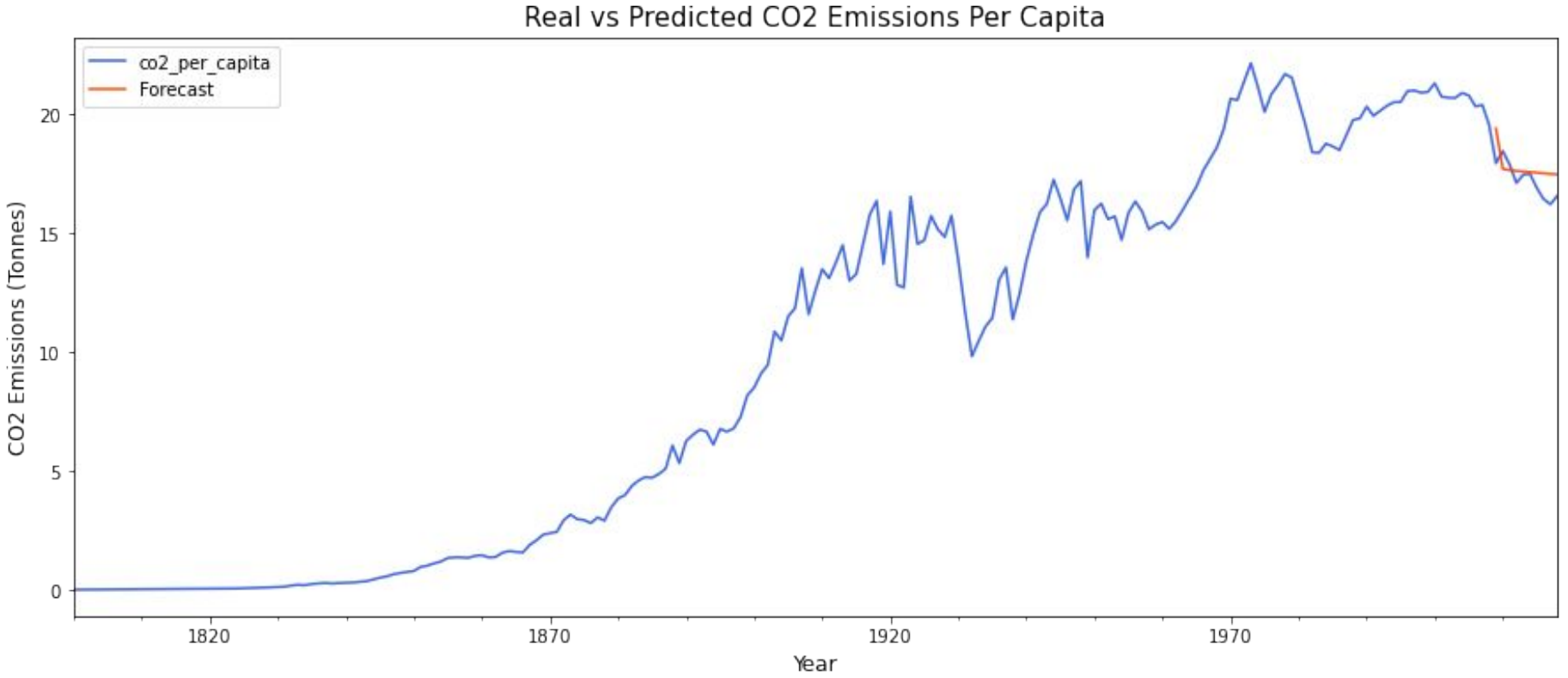
Final Model Results

- AR model on logged data
- RMSE: 0.84
- AIC: -442.84

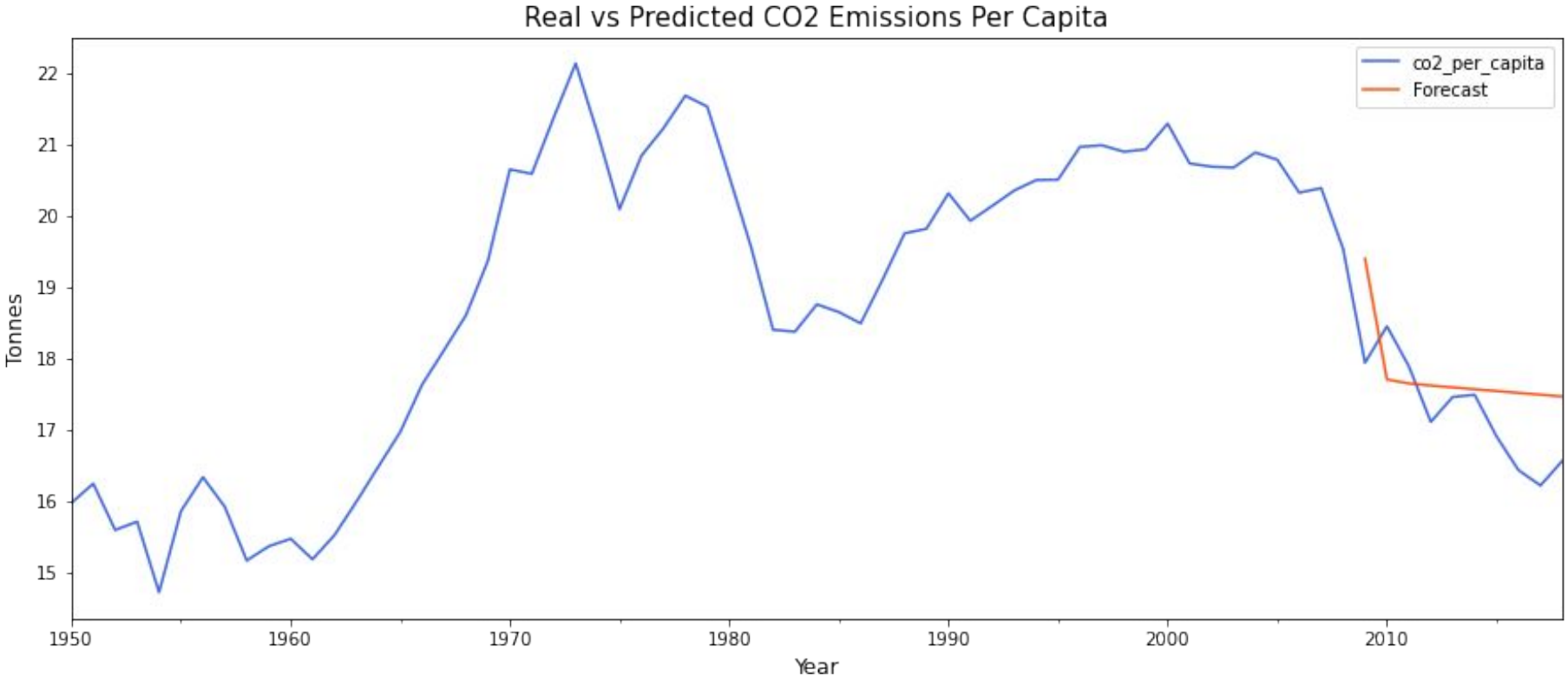
Final Model Predictions: Train Set



Final Model Predictions: Test Set



Final Model Predictions: Test Set



Recommendations

- Continue to spread awareness of the dangers of climate change and CO2 emissions' impact.
- Be cognizant of financial and sociopolitical events' impacts on CO2 emissions.

Next steps

- Apply predictions to the future
- Analyze and predict CO2 emissions for other high-emitting countries and the world overall
- Include exogenous variables in a multivariate model, such as population and GDP
- Utilize neural networks to improve model

Thank you!

Github Repository:

https://github.com/Davida1014/CO2_TimeSeries