CO_2 Emissions of Different Car Models

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Problem Overview

How can we predict CO_2 emissions of a car?

Potential Impact:

Quantify CO_2 emissions for a given car

Potentially quantify vehicular CO_2 emissions in a city

Dataset and Preprocessing

Target variable: CO_2 emissions (g/km)

Features:

Car year
Car make
Car Model
Vehicle class
Engine size (L)
Fuel Type
Transmission
Cylinders
Fuel consumption (city/hwy/combined)
Smog rating
CO_2 rating

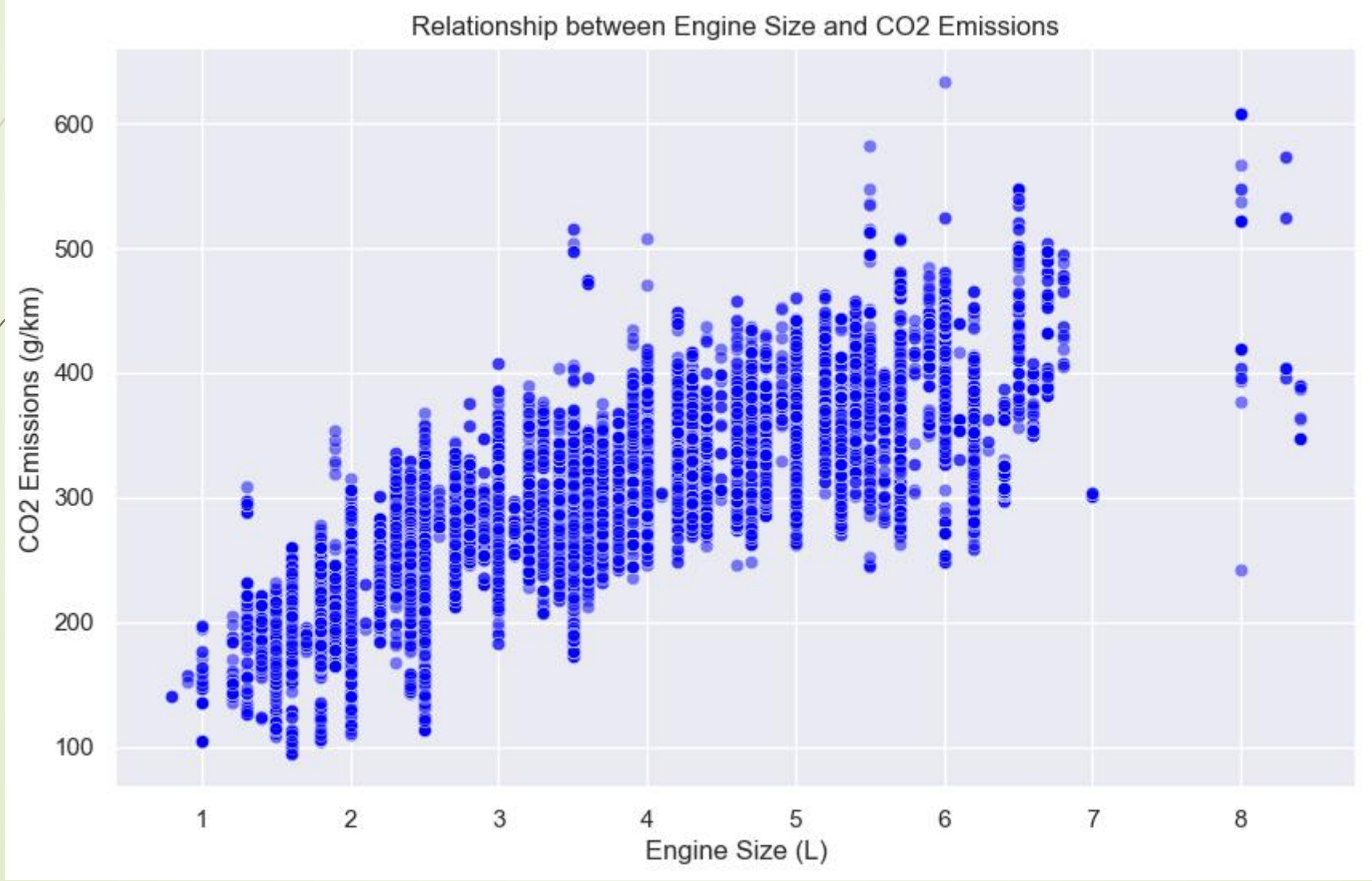
Preprocessing and EDA

Strong positive correlation between CO_2 emissions and:

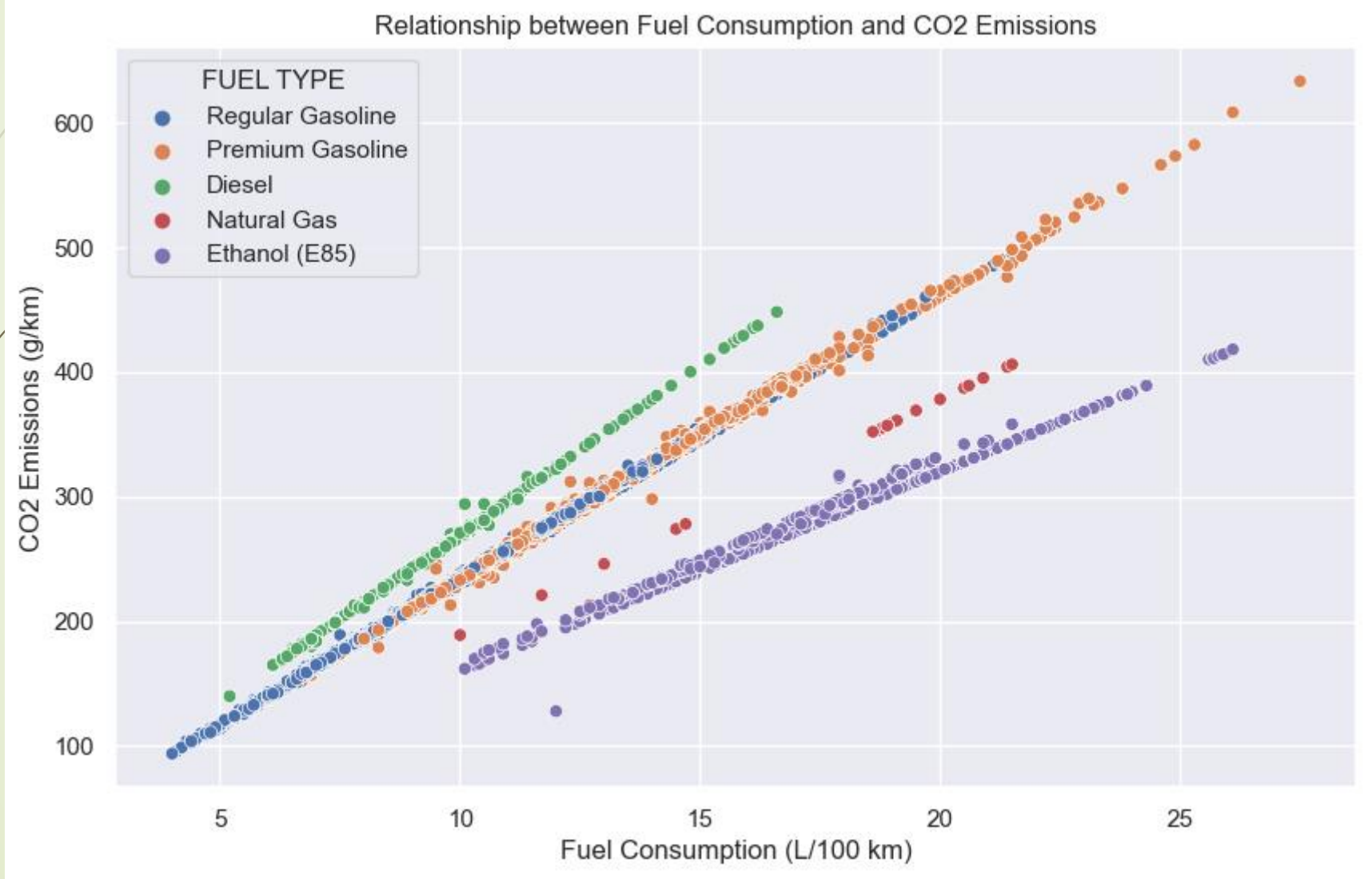
- Fuel consumption
- Engine size
- Cylinders

Bigger vehicles emit more CO_2

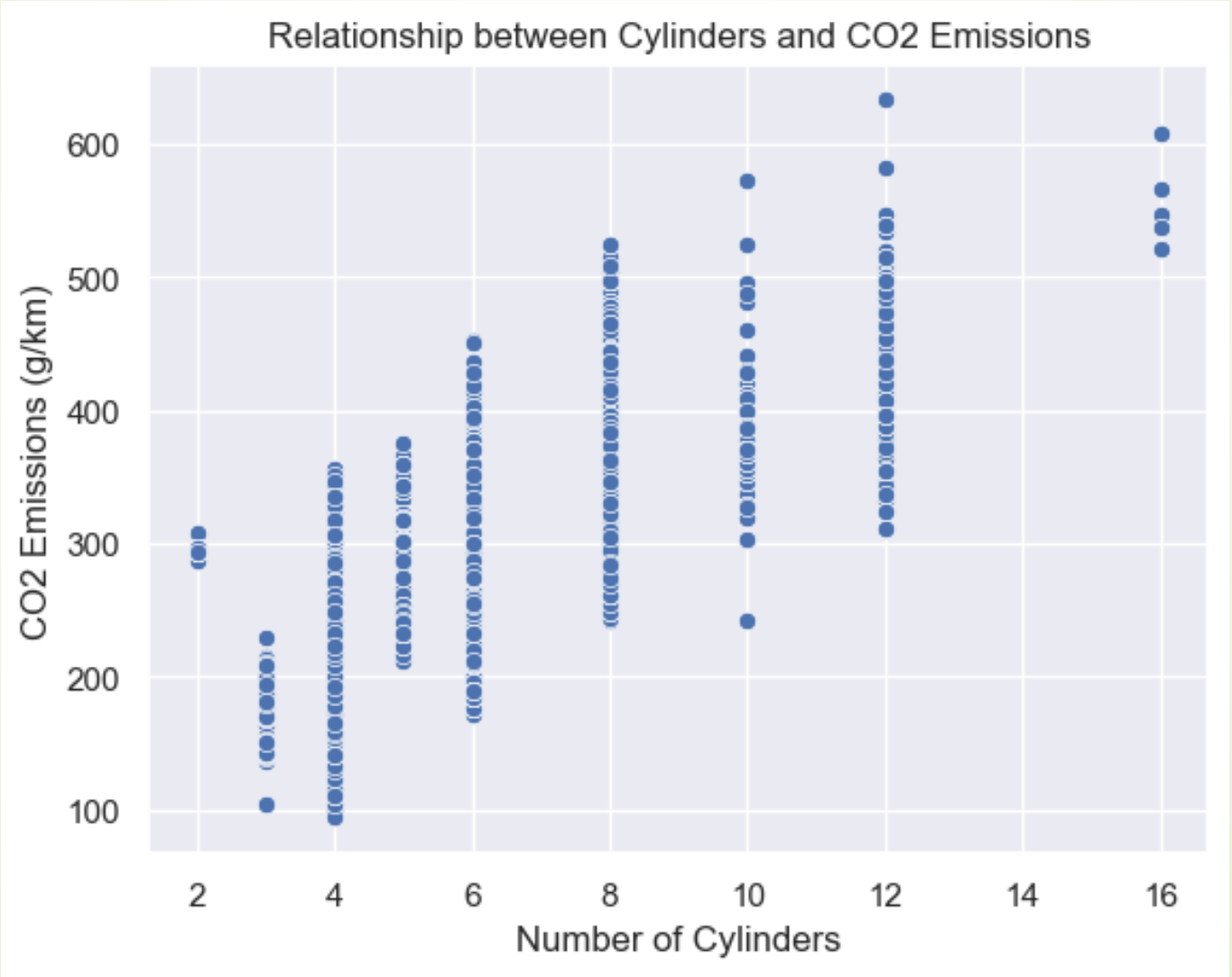
Preprocessing and EDA



Preprocessing and EDA



Preprocessing and EDA



Features Used for Modeling

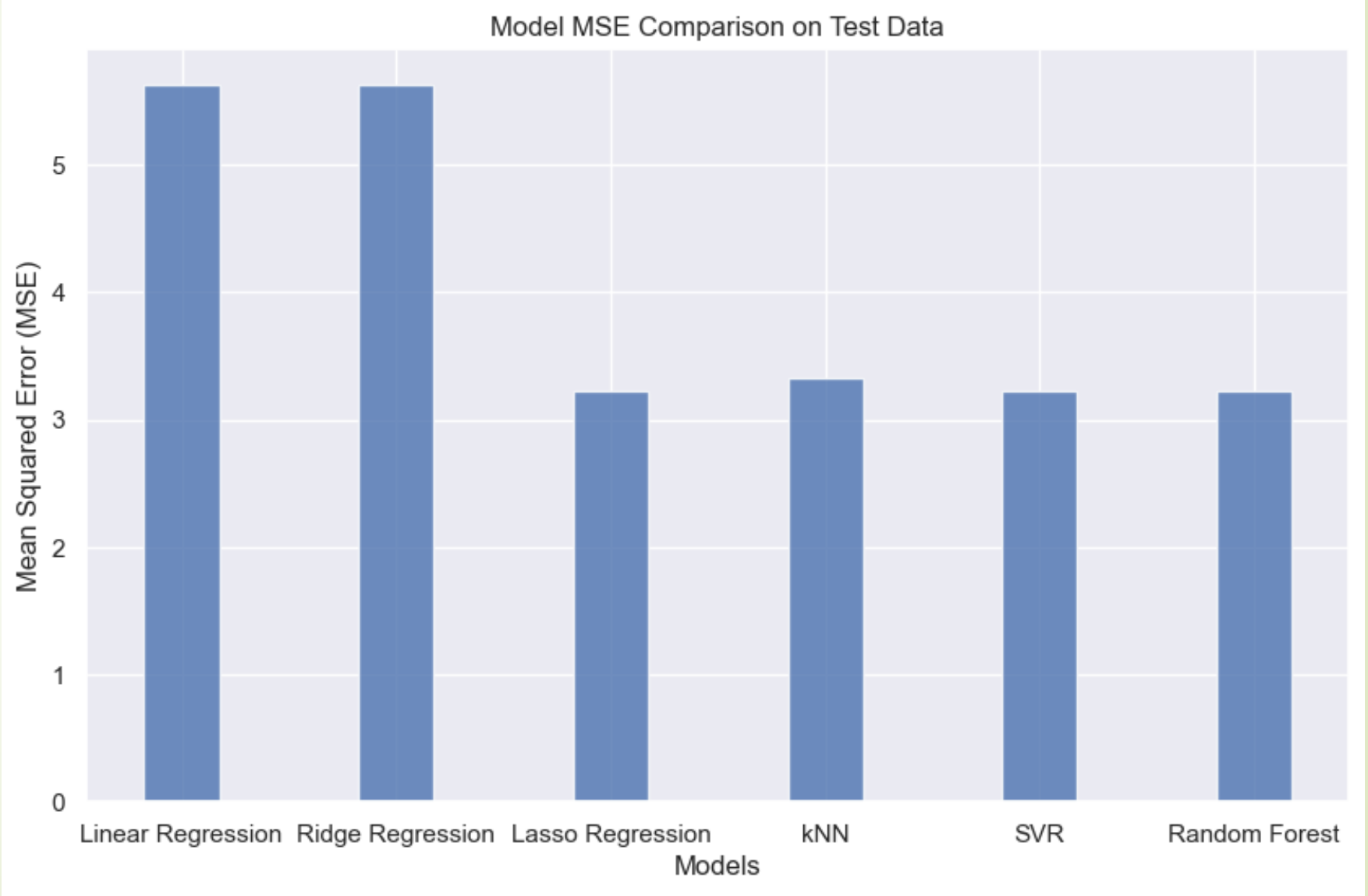
- Fuel consumption combined (L/100 km)
- Engine size (L)
- Number of cylinders
- Fuel type

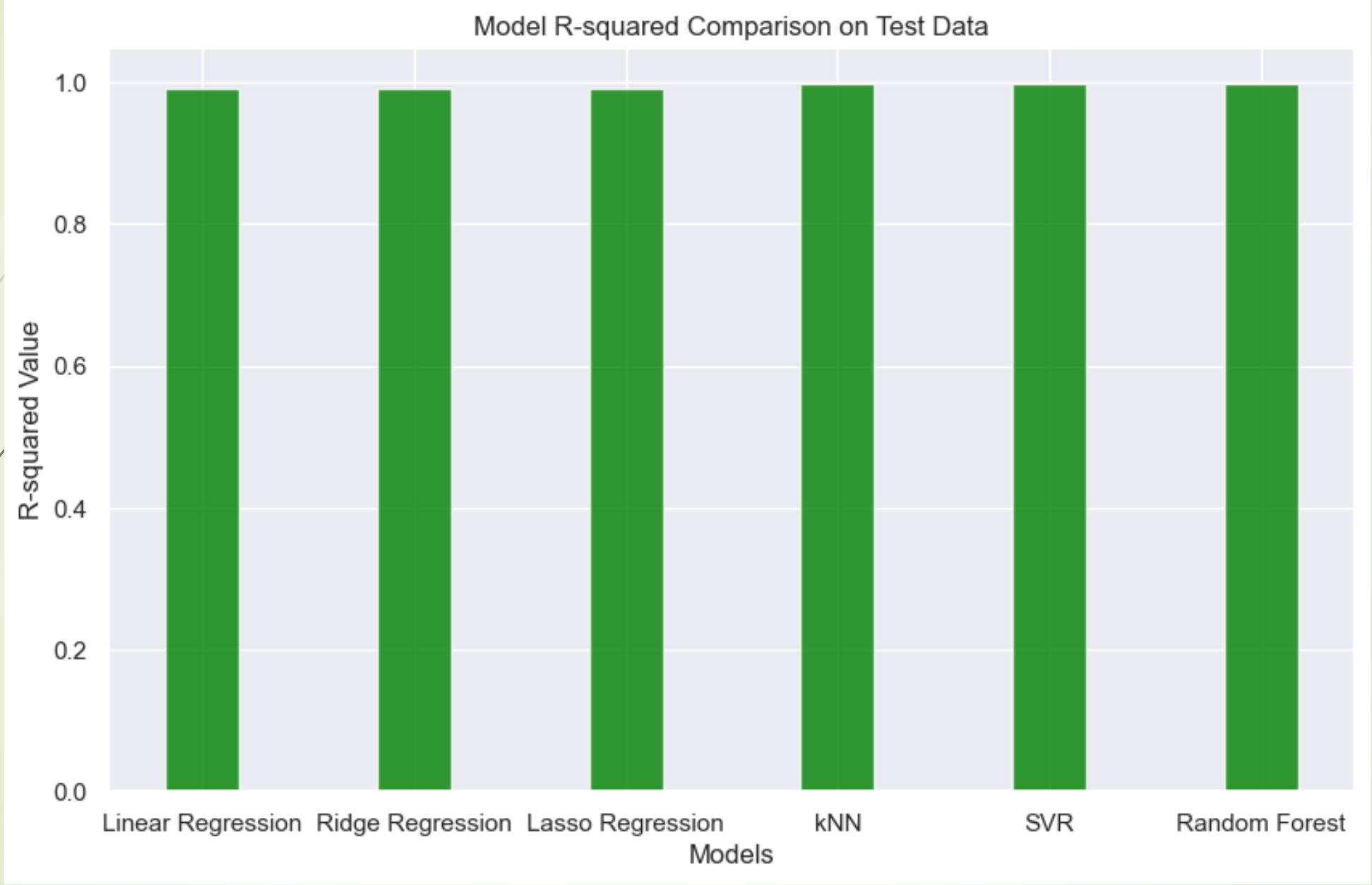
Modeling

- Models performed:
  - Linear Regression
  - Ridge Regression
  - Lasso Regression
  - kNN
  - SVR
  - Random Forest

Modeling

- Median CO_2 emissions: 268 g/km
- Mean CO_2 emissions: 276 g/km




Model R-squared Comparison on Test Data
R-squared Value
1.0
0.8
0.6
0.4
0.2
0.0
Linear Regression
Ridge Regression
Lasso Regression
kNN
SVR
Random Forest
Models

Conclusion and next steps

- All models performed well
- Car features that impact CO_2 emissions:
  - Fuel consumption (L/100 km)
  - Engine size (L)
  - Fuel type
  - Number of cylinders


Thank you!