Prediction of Used Car Prices using Regression Models

Data science approach

[Abdulwahid] - [30/10/2022]

Agenda

1. Problem Definition
2. CRISP Methodology
3. Findings and Insights
4. Recommendations

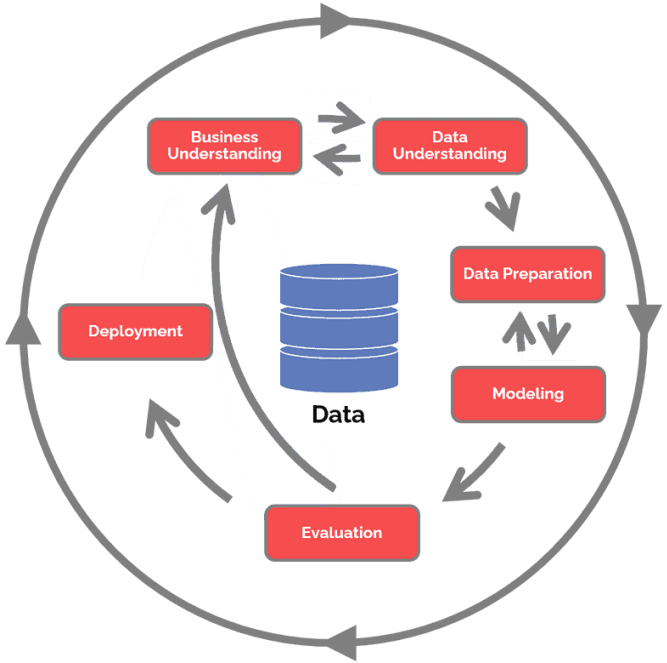
Problem Definition

Determining the worthiness of cars based on their characteristics

- What features impact the price?
- What are the best prices for used cars?

CRISP Methodology

The main stages for a successful data science project



(Data Science Process Alliance, 2022)

Business Understanding

Business Tasks

- Improving a company's advertising approach (used car selling company)

- Predicting the best prices to sell their recent used cars

Data Understanding

- Data was obtained from GitHub as a part of a data science challenge
- The dataset has 16 features with target variable price

- Conducted a descriptive and exploratory data analysis
- To find trends and insights
- To determine the best price predictors

Data Preparation

Data cleaning

- ✓ Handling missing values for training and testing set
- ✓ Checking feature data types
- ✓ Checking for inconsistent data

Data Transformation

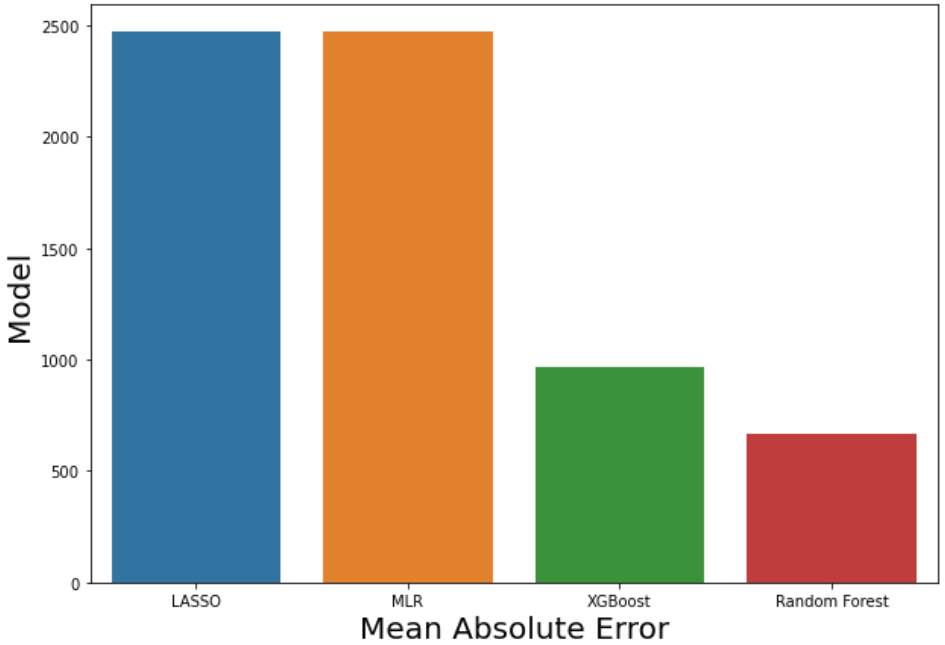
- ✓ Label encoding (from categorical to numerical)
- ✓ Feature scaling (range of 0 to 1)
- ✓ Dropping unwanted features

Model Development

- Training and testing are provided
- Split data features from target variable
- Models are built by fitting training set
- Model testing using testing set

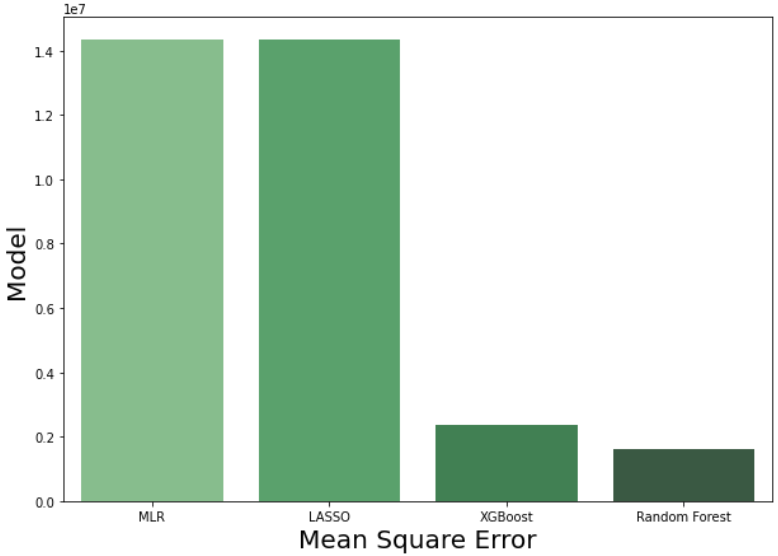
Model Evaluation

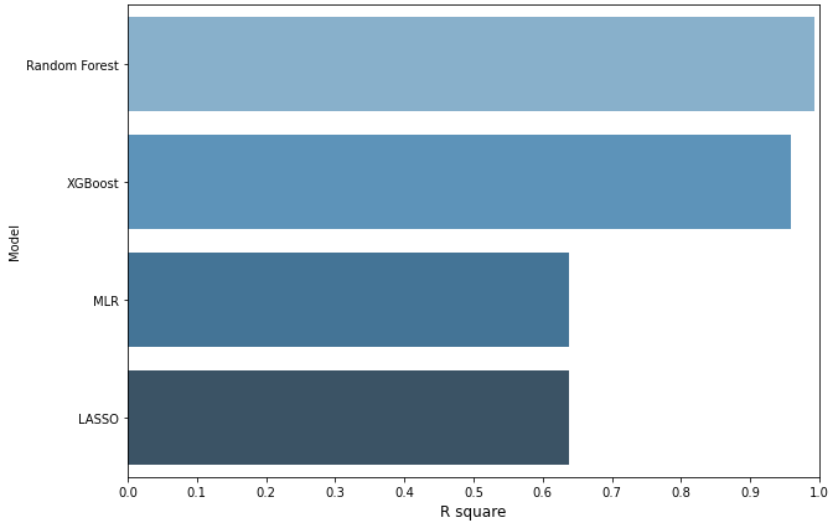
Model evaluation matrix (Mean Absolute Error)



Model Evaluation

Model evaluation matrix (Mean Square Error, R square)

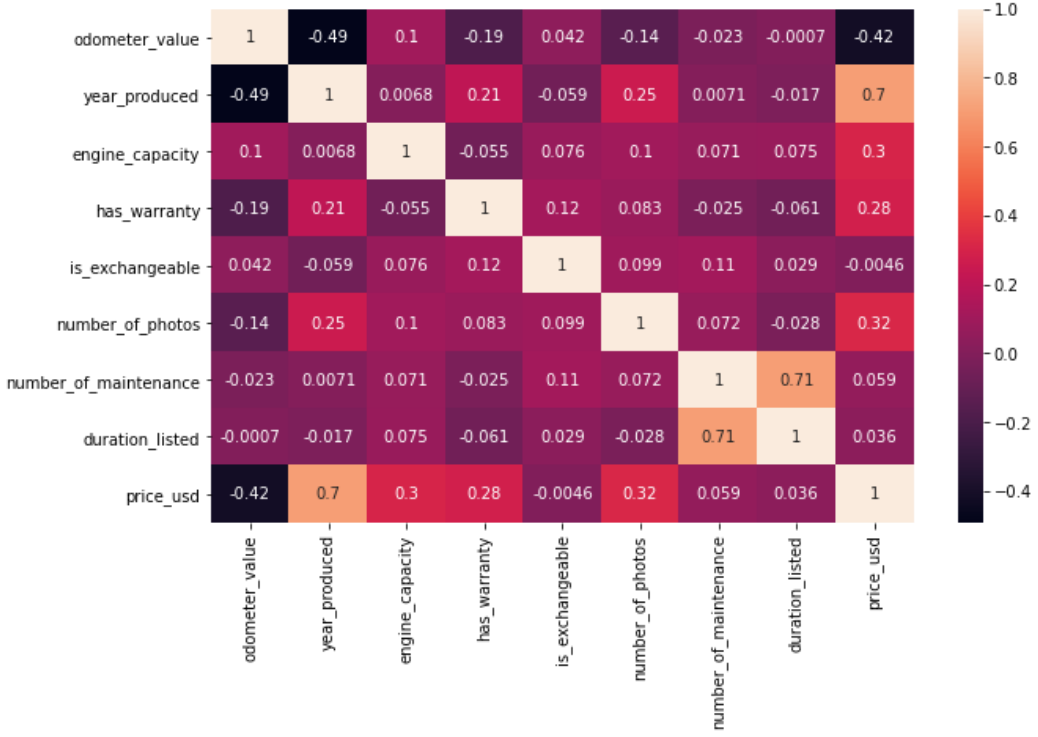




Deployment (Insights and Findings)

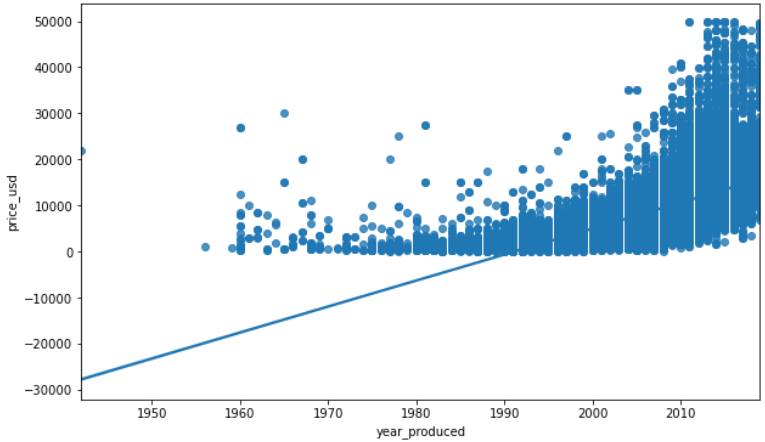
Pearson Correlation (Heatmap)

- Year produced has the highest correlation with price
- Exchangeable has the lowest correlation to the price



Deployment (Insights and Findings)

Regression Plots



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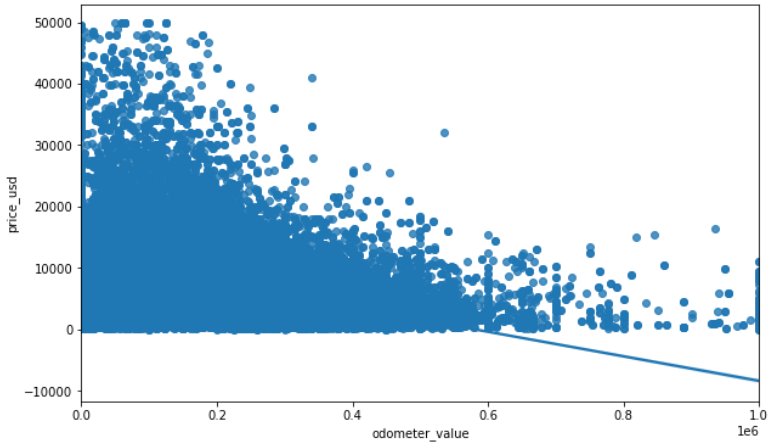

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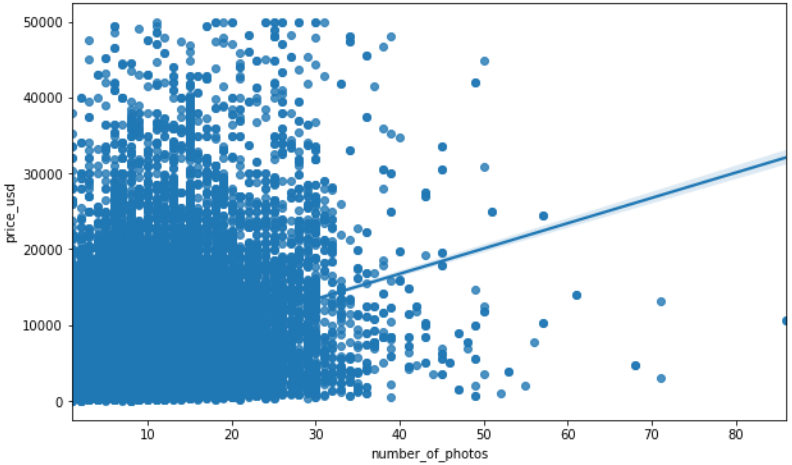
Deployment (Insights and Findings)

Regression Plots



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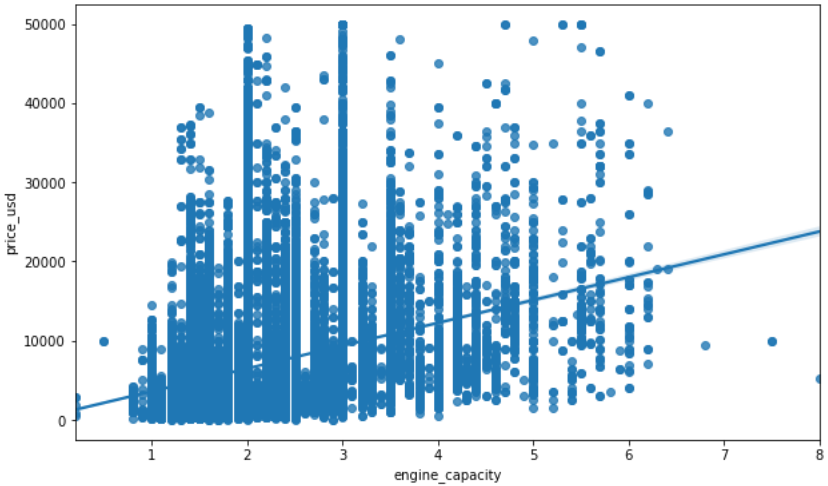

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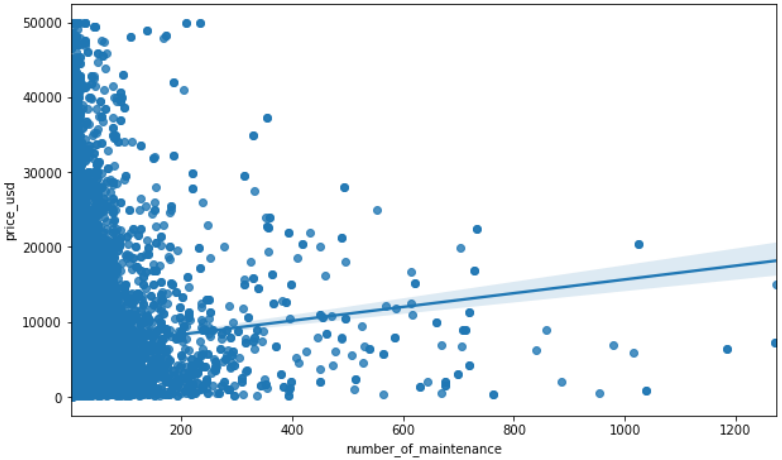
Deployment (Insights and Findings)

Regression Plots



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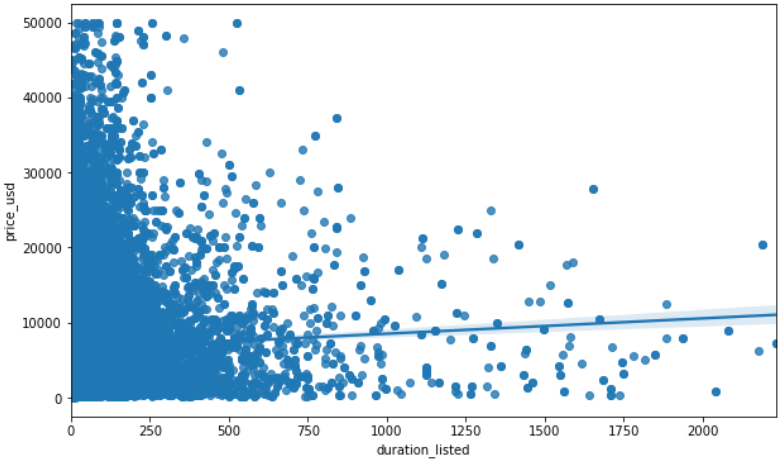

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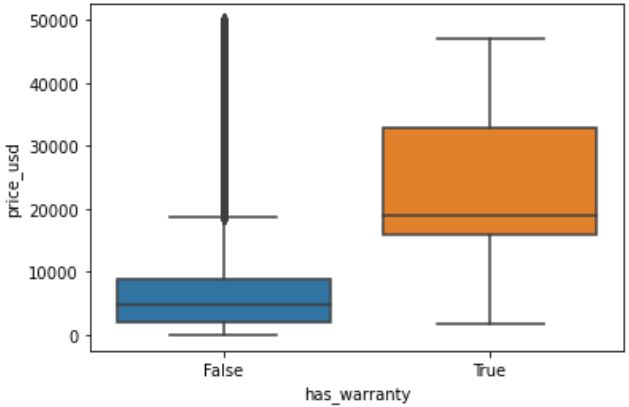
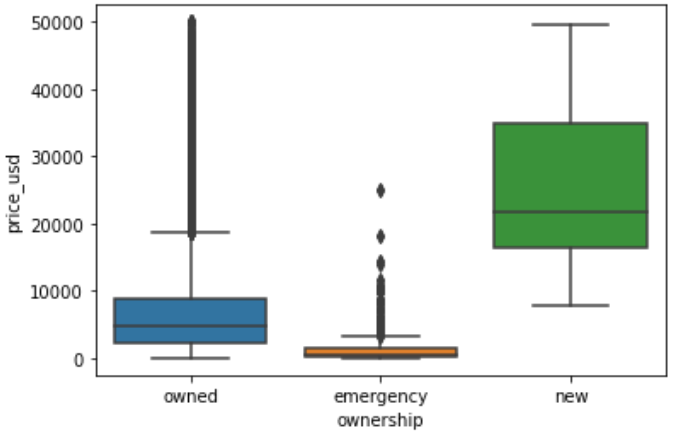
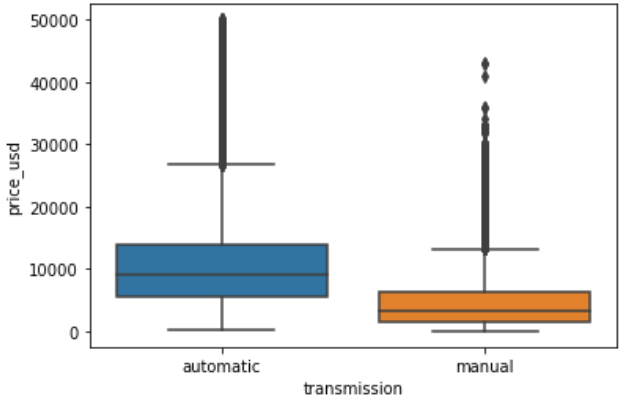
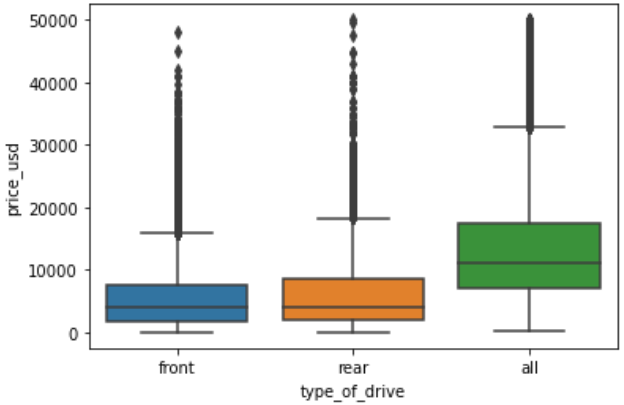


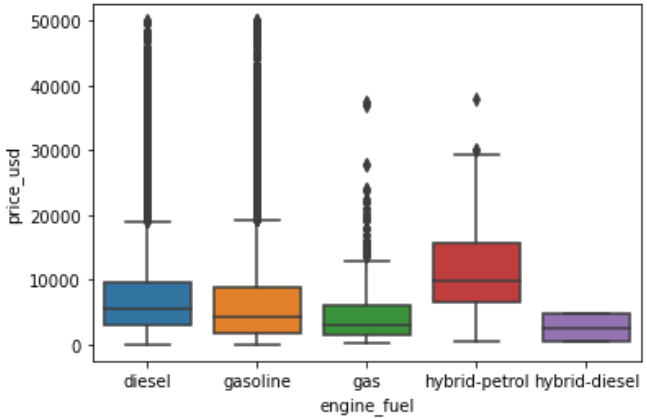


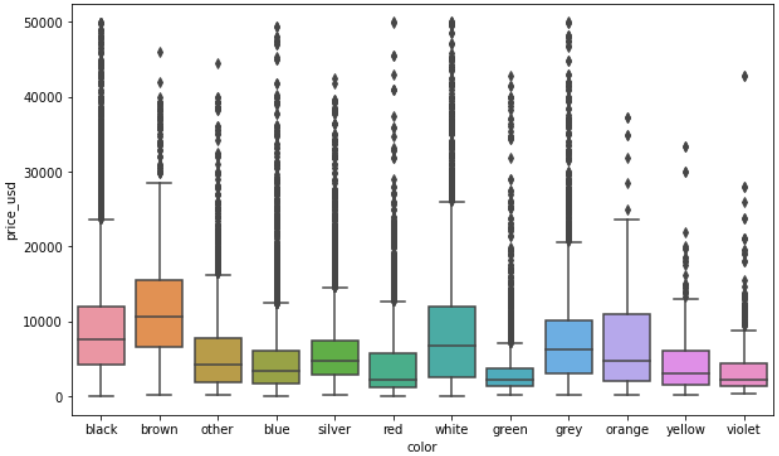


Box Plots

Deployment (Insights and Findings)







Box Plots

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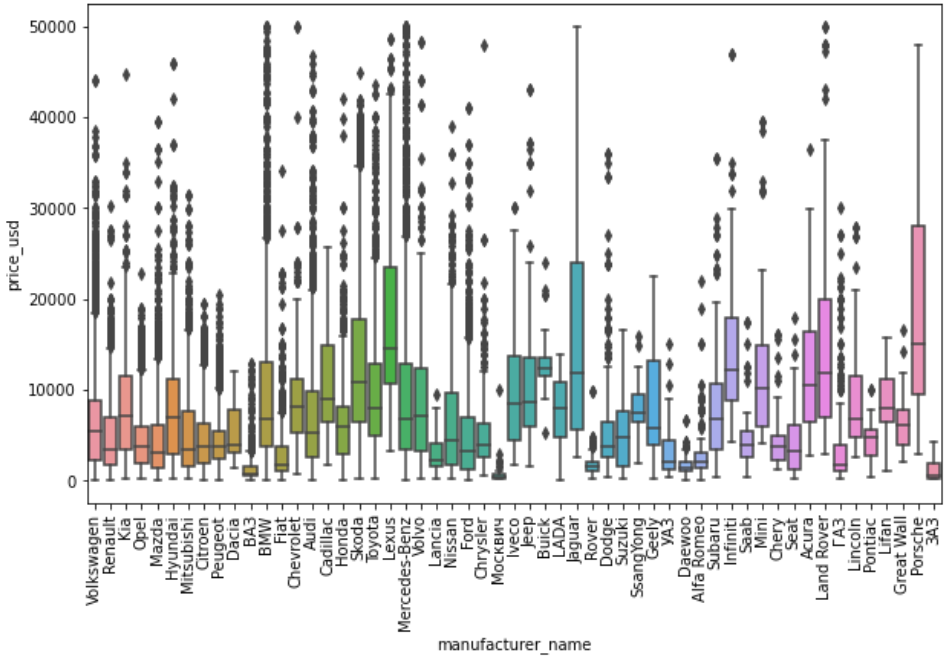

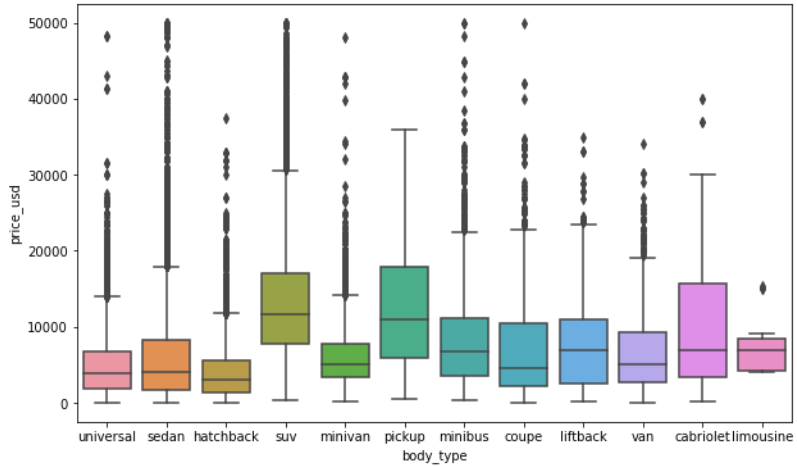

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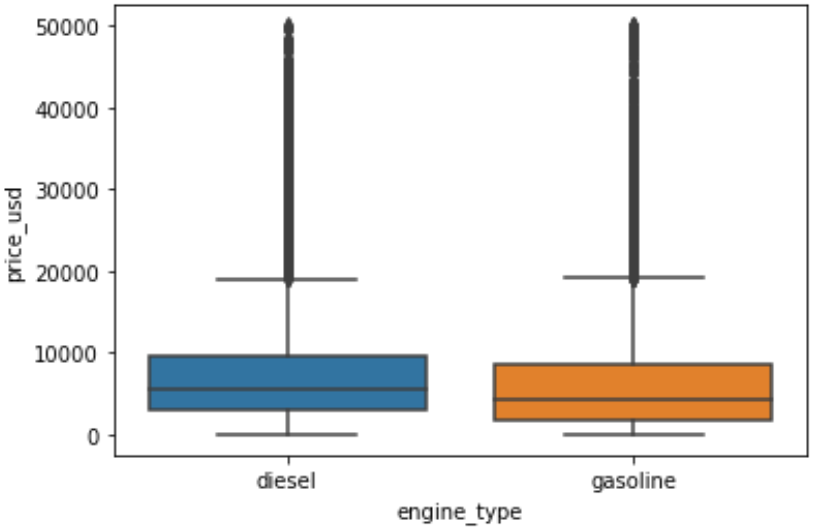
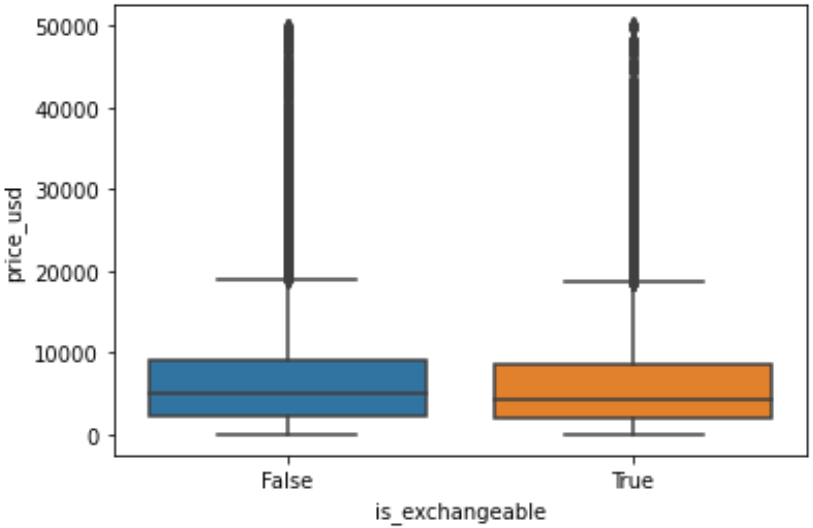




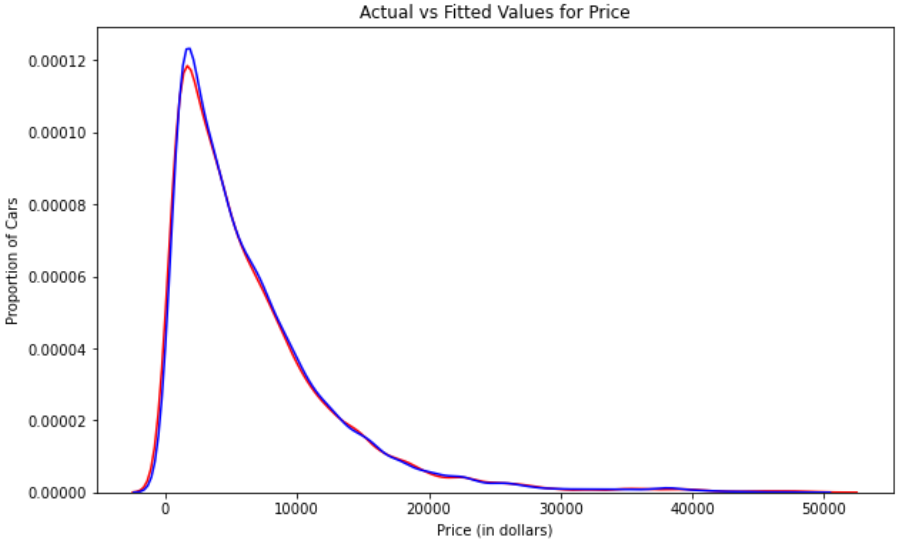
Box Plots

Recommendations

Features that can be utilized to improve the advertising approach.

- ✓ Manufacturer name
- ✓ transmission
- ✓ color
- ✓ Odometer value
- ✓ Year produced
- ✓ Engine fuel
- ✓ Engine capacity
- ✓ Body type
- ✓ Has warranty
- ✓ ownership
- ✓ Type of drive
- ✓ Number of photos

Random Forest's Plot



Reference

1. CRISP-DM - Data Science Process Alliance. (2022). Data Science Process Alliance. https://www.datascience-pm.com/crisp-dm-2/

Thank You