Project report - Bike Prediction

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Aim

The objective of this Case is to predict daily bike rental count based on the environmental and seasonal settings.

The Dataset

Structure of the given dataset:

- ID variables :
  - “instant” : Numeric (unique record instance)
  - “dteday” : Date (Calendar date corresponding to each day)

The Dataset

Structure of the given dataset:

- Independent features
  - “Season” : Categorical (4 levels - Spring, Summer, Fall, Winter)
  - “yr” : Categorical (2 levels - 2011, 2012)
  - “mnth” : Categorical (12 levels - January to December)
  - “holiday” : Categorical (2 levels - Holiday/Non-Holiday)
  - “weekday” : Categorical (7 levels - Sunday - Saturday)
  - “workingday” : Categorical (2 levels - Weekday/Weekend)
  - “weathersit” : Categorical (4 levels - Clear, Mist/Fog/Cloud, Light Rain/Snow, Heavy Rain/Snow)
  - “temp” : Numeric (temperature in celcius)
  - “atemp” : Numeric (temperature as it “feels like”)
  - “hum” : Numeric (humidity)
  - “windspeed” : Numeric (windspeed)

The Dataset

Structure of the given dataset:

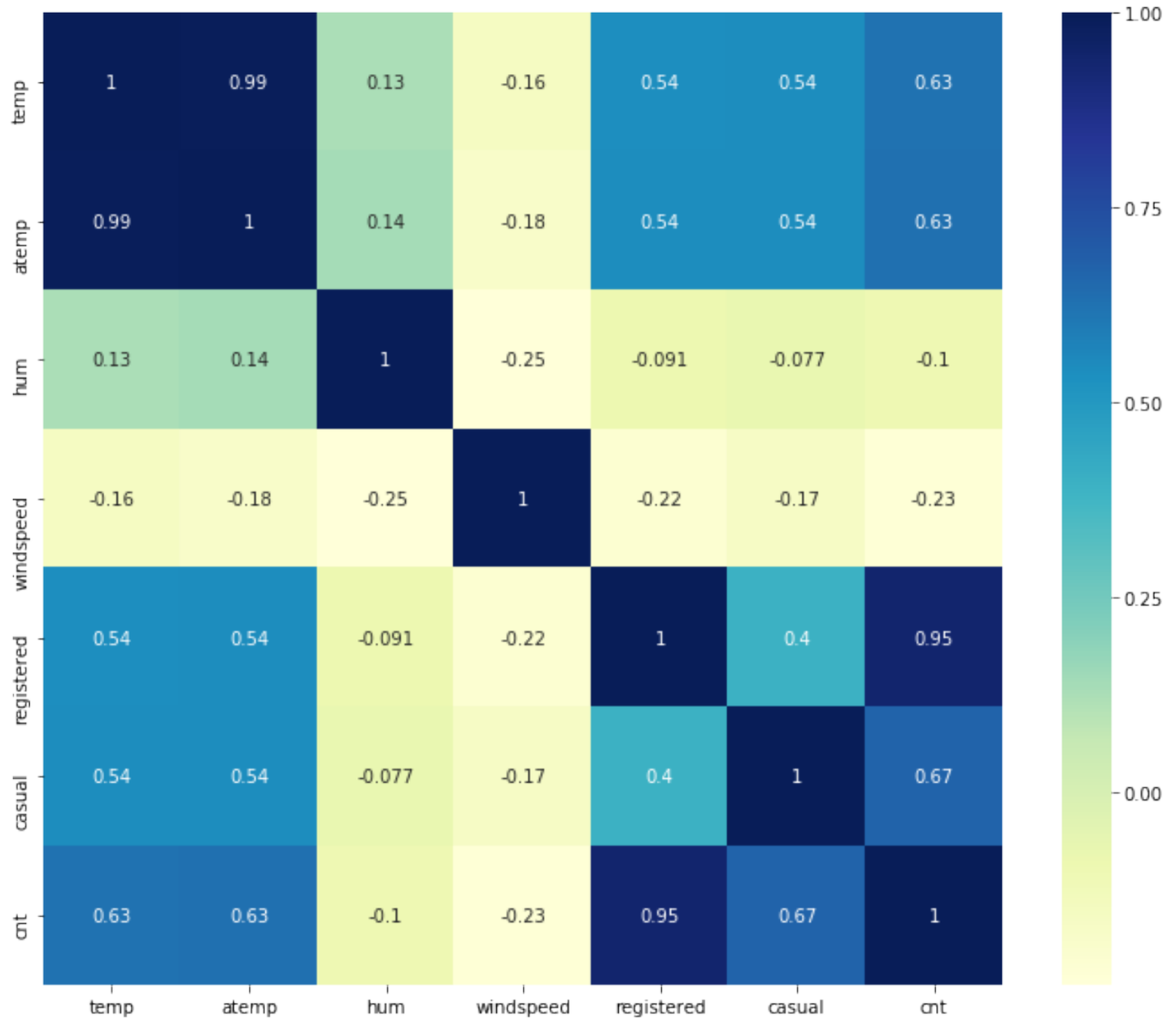
- Dependent features
  - “casual” : Numeric (Count of casual users)
  - “registered” : Numeric (Count of registered users)
  - “cnt” : Numeric (total count of users “casual + registered”)

Overview of the data

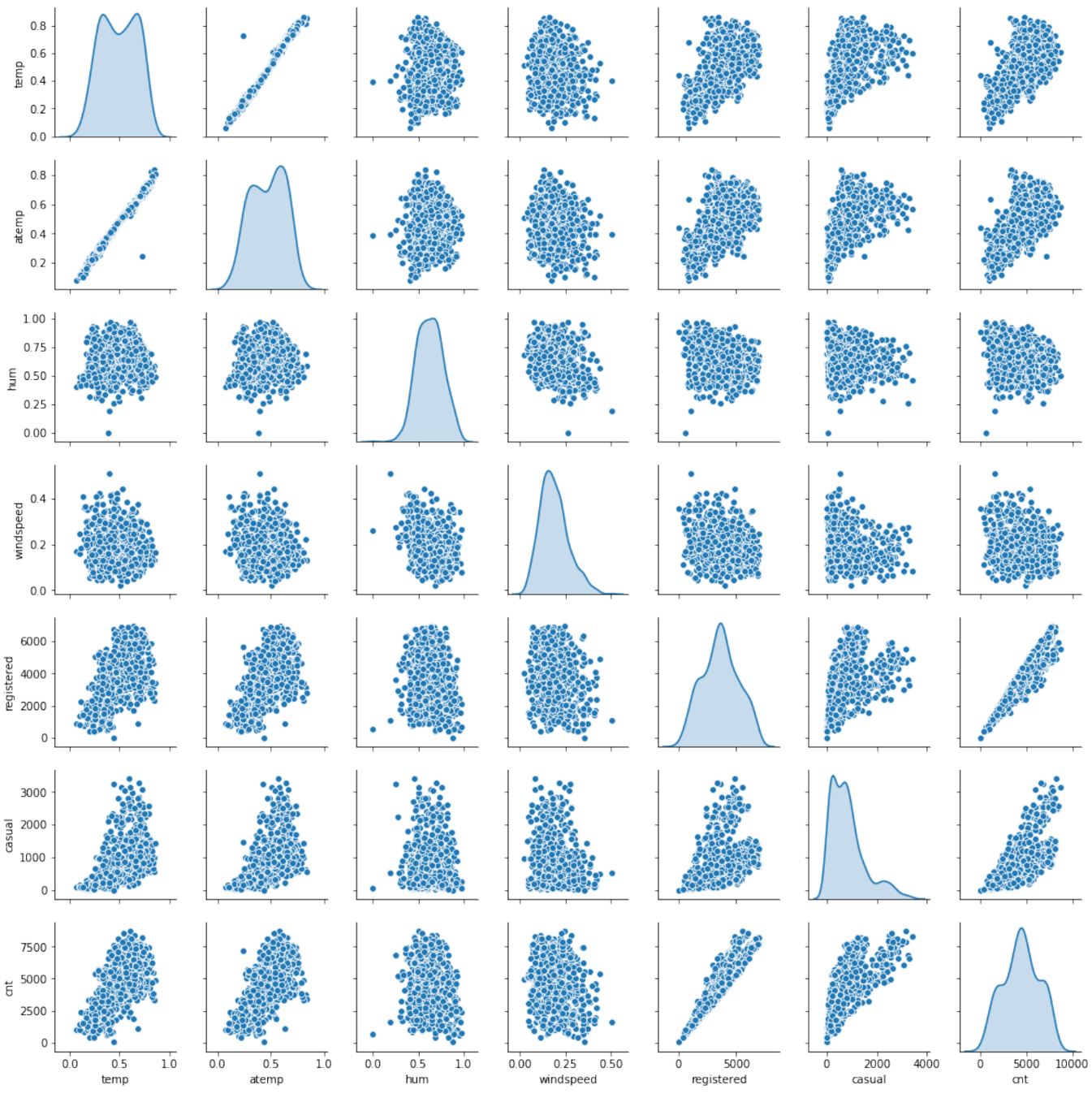
We'll see the following:

- Correlation heat map of the continuous features of the dataset
- Pair plots of continuous features for distribution
- Bar plots of categorical features for classification
- Box plots of continuous variables for outlier analysis

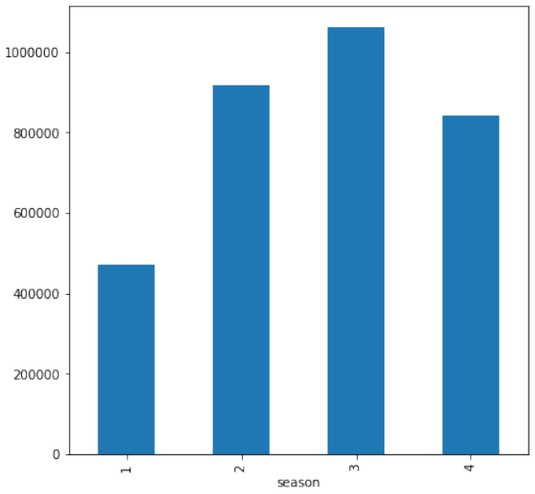
Heat map of continuous features

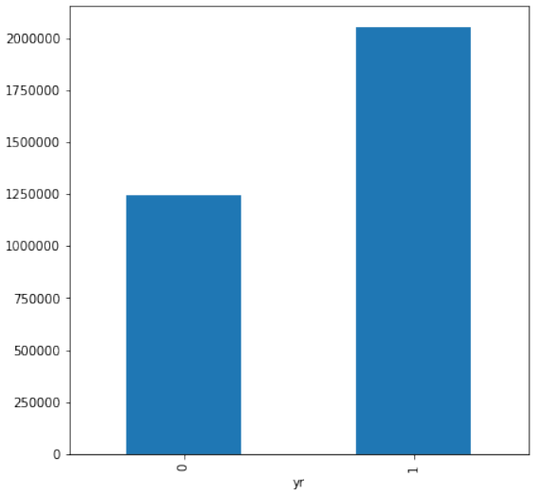


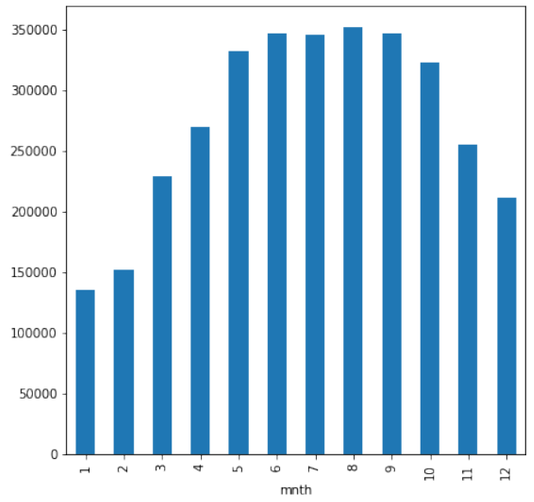
Pair plots of continuous features

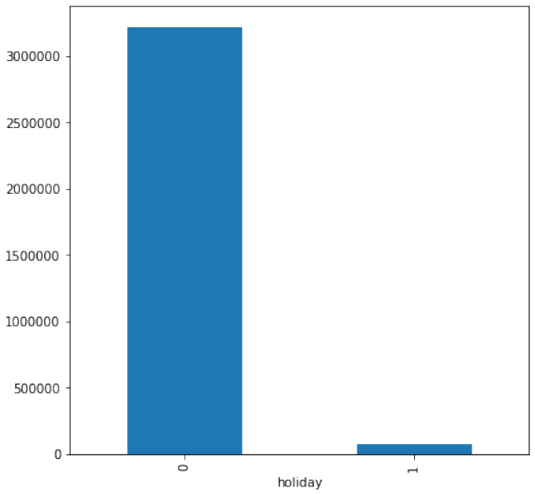


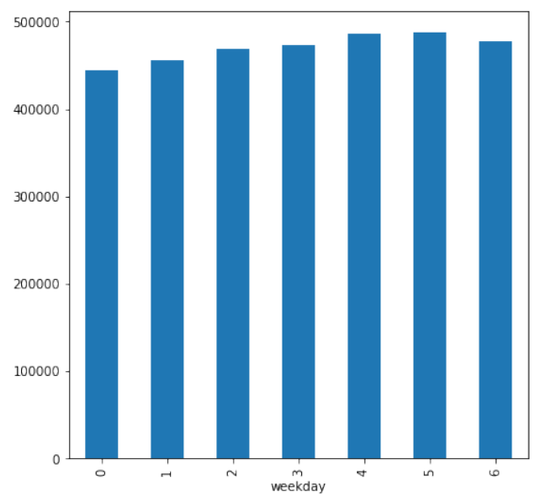
Bar plots of categorical features

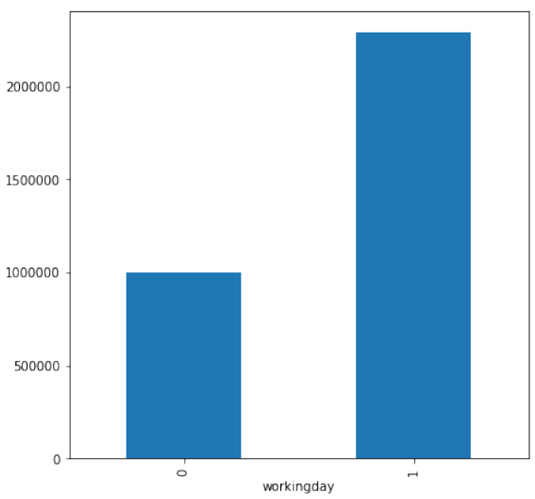


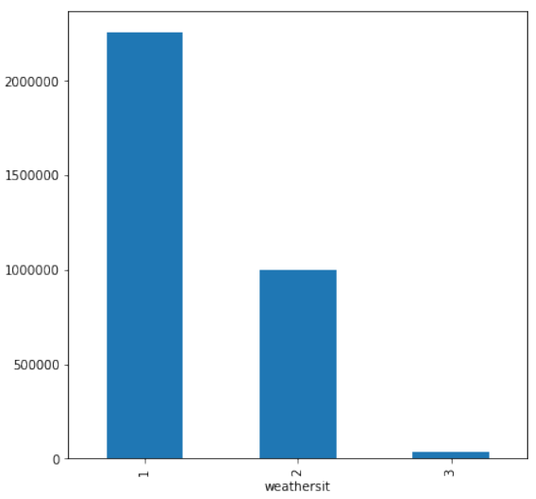




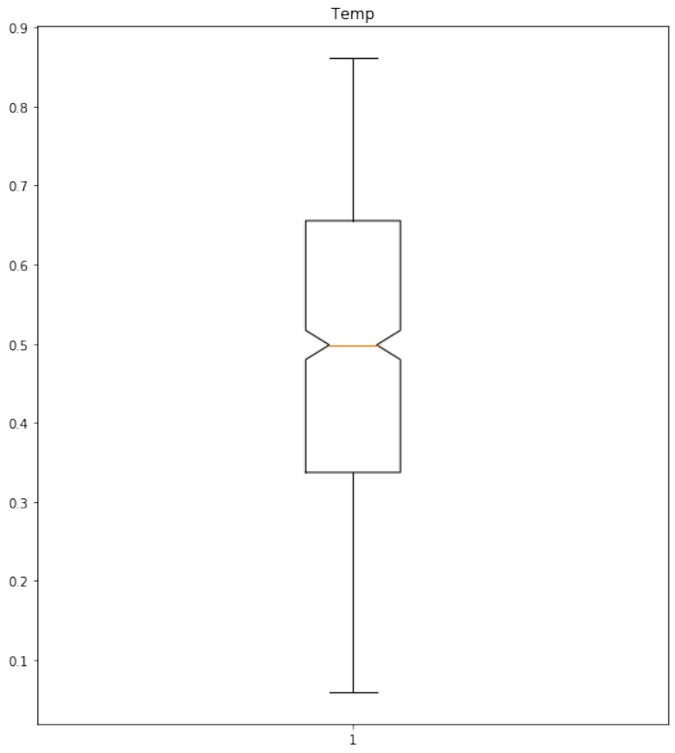


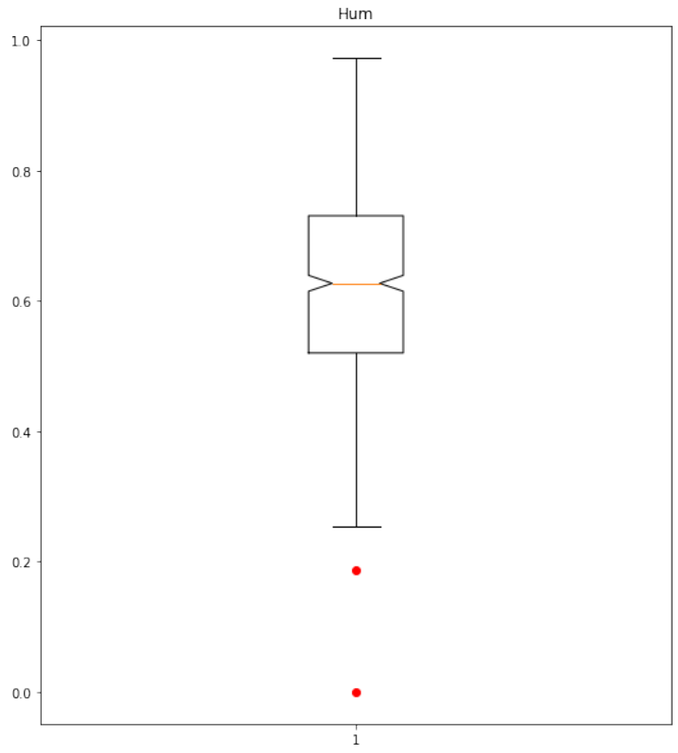


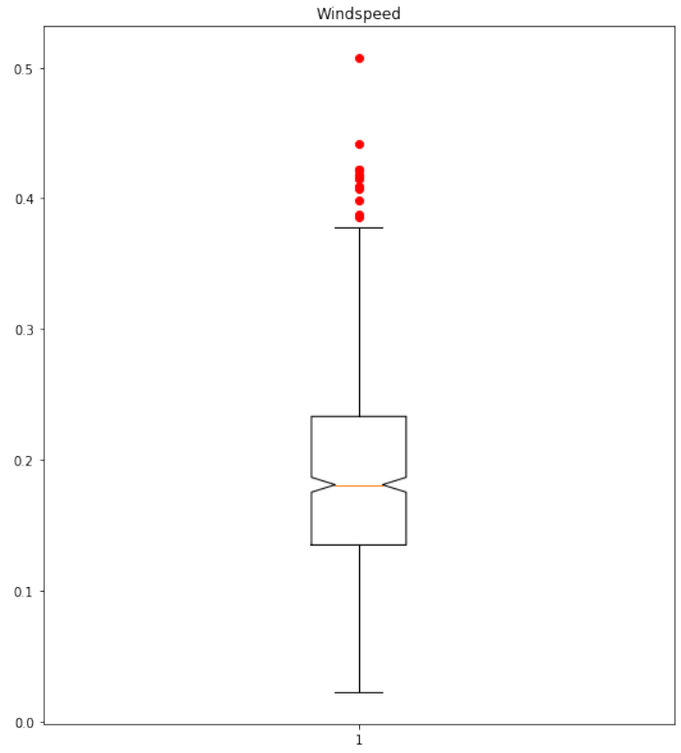




Box plots of continuous features







Observations & Preprocessing

- From the study of the various plots of the features in the data, we can made the following inferences:

  - ‘atemp’ is highly positively correlated to ‘temp’ and can be omitted from the model

  - ‘casual’ and ‘registered’ are highly correlated to ‘cnt’ (since cnt is the total) and so we can focus on predicting count alone as that is the aim of the project

  - Outliers in windspeed and humidity features need to be handled before constructing a model

Building models - R

The following algorithms are selected for the trials with R

- Decision Tree
- RandomForest
- Multivariate adaptive regression splines

Building models - R

Using MAPE as the primary evaluation metric

Decision Tree	RandomForest	MARS
MAPE : 18.65%	MAPE : 12.02%	MAPE : 15.51%

Building models - R

RandomForest model provides the least MAPE and the highest accuracy score

Decision Tree	RandomForest	MARS
MAPE : 18.65%	MAPE : 12.02%	MAPE : 15.51%

Building models - Python

The following algorithms are selected for the trials with Python

- Decision Tree
- RandomForest
- Multivariate adaptive regression splines

Building models - Python

Using MAPE as the primary evaluation metric

Decision Tree	RandomForest	Linear Regression
MAPE : 18.65%	MAPE : 12.02%	MAPE : 15.51%

Building models - Python

RandomForest model provides the least MAPE and the highest accuracy score

Decision Tree	RandomForest	Linear Regression
MAPE : 18.66%	MAPE : 15.54%	MAPE : 18.67%