Bike sharing demand

Abstract

The goal of this project was to use a multiple linear regression model for the prediction of demand for shared bikes.

Business Goal : Model the demand for shared bikes with the available independent variables. It will be used by the management to understand how exactly the demands vary with different features. They can accordingly manipulate the business strategy to meet the demand levels and meet the customer's expectations. Further, the model will be a good way for management to understand the demand dynamics of a new market.

Design

The project originates from the Data Science Bootcamp T5 the data is provided by UCI Machine Learning Repository We would be interested in prediction the rentals on various factors including season , temperature , weather and building a model that can successfully predict the number of rentals on relevant factors .

Data

This dataset contains the seasonal and weekly count of rental bikes between years 2011 and 2012 in Capital bikeshare system with the corresponding temperature and humidity information. Bike sharing systems are a new way of traditional bike rentals. The whole process to from membership to rental and return back has become automatic. Given below is the description of the data which is a (17379,17) shaped data, The variables are:

The table represent the features used in the training and analysis:

Features	Description
rec_id	Daily customer index
datetime	The date index for both years
season	Season type (1-winter, 2-spring, 3- summer, 4-fall)
year	The year (0-2011, 1-2012)
month	The months (1-12)
ls_holiday	0 – not holiday, 1-holiday
weekday	Weekdays 0(Monday) – 6(Sunday)
ls_workingday	0- not a working day, 1- workingday
weather	Weather type(1-Clear, 2- Cloudy, 3- Rian, 4-Storm
temp	Normalized value of temperatures at every rec_id
atemp	Normalized value of the absolute temperature
humidity	Contains the normalized value for the humidity
windspeed	Contains the normalized value for the windspeed
casual	Has the number of unregistered users at a given day
registered	Has the number of registered users
Total_count	Total rentals with both casual and registered users

Algorithms

-Feature Engineering

- **Analyze data**
- **Data Visualiztion**

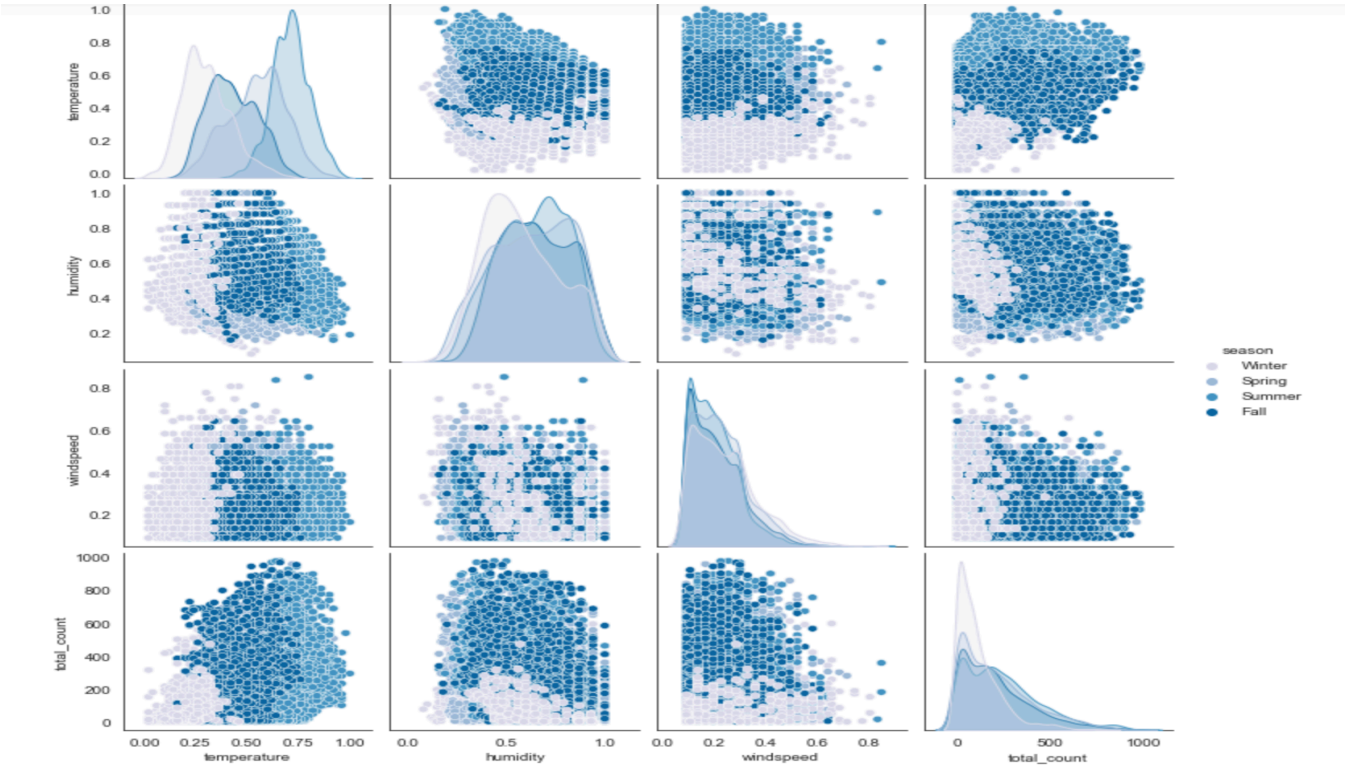
-Models

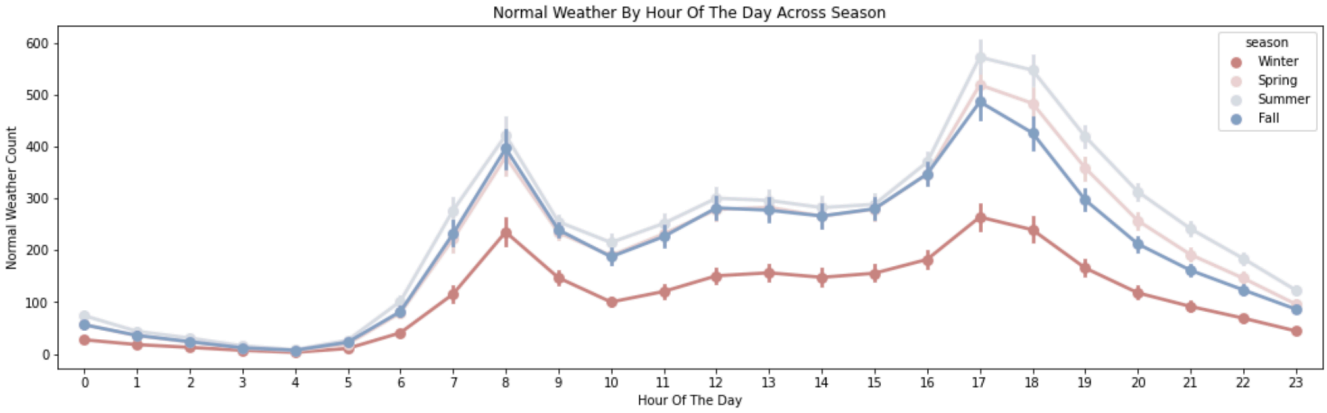
- **Linear regression**
- **Polynomial**
- **Ridge regression**
- **Lasso regression**

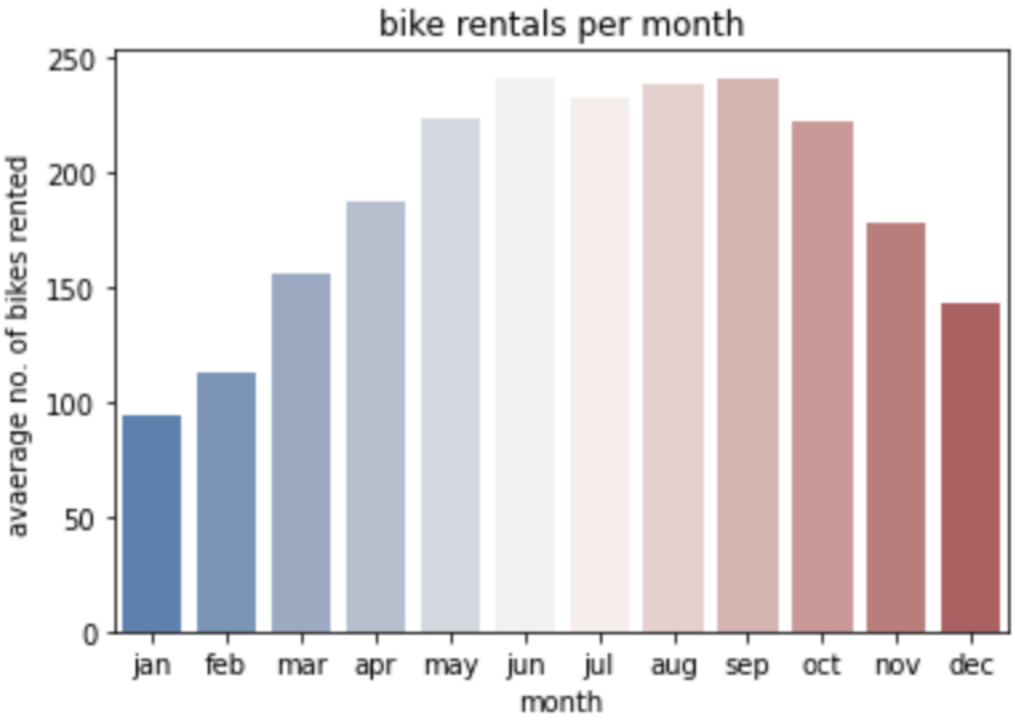
Tools

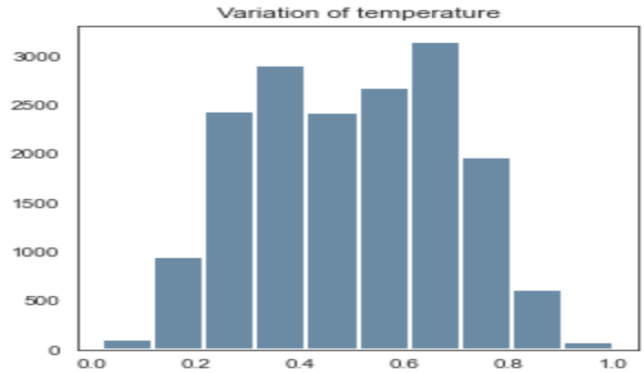
- Numpay and pandas for data manipulation
- Scikit-learn for modeling
- Matplotlib and seaborn for plotting

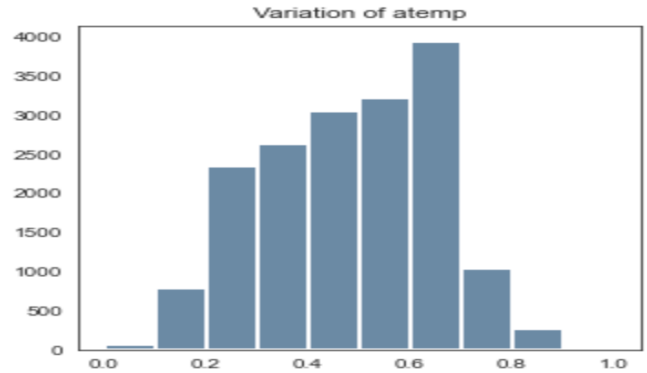
Communication

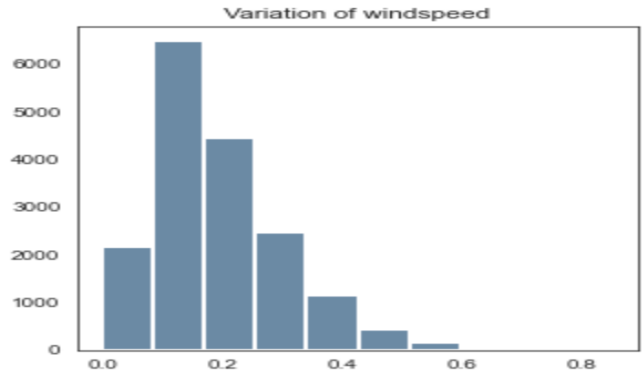


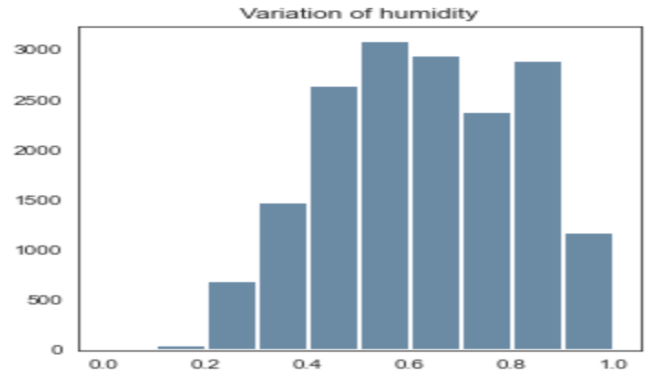


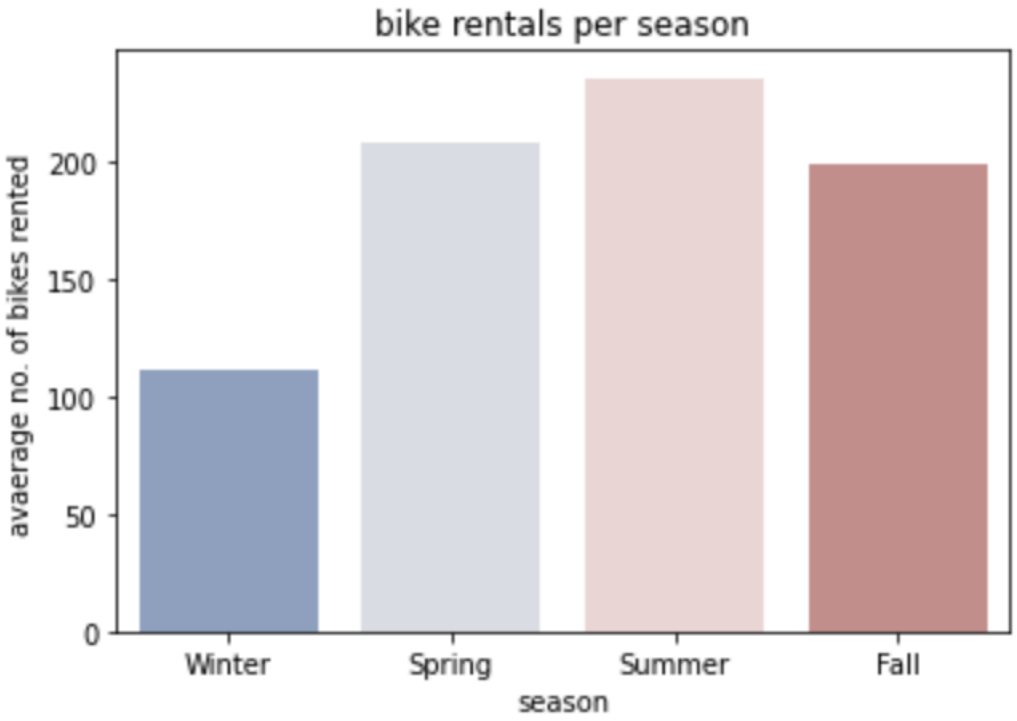

bike rentals per month
avaerage no. of bikes rented
250
200
150
100
50
0
jan
feb
mar
apr
may
jun
jul
aug
sep
oct
nov
dec
month

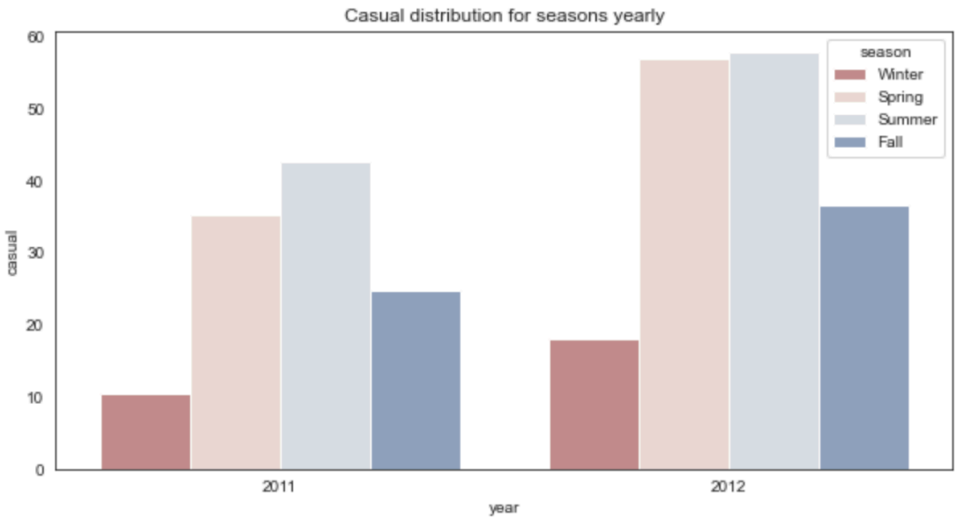

Variation of temperature
3000
2500
2000
1500
1000
500
0
0.0
0.2
0.4
0.6
0.8
1.0

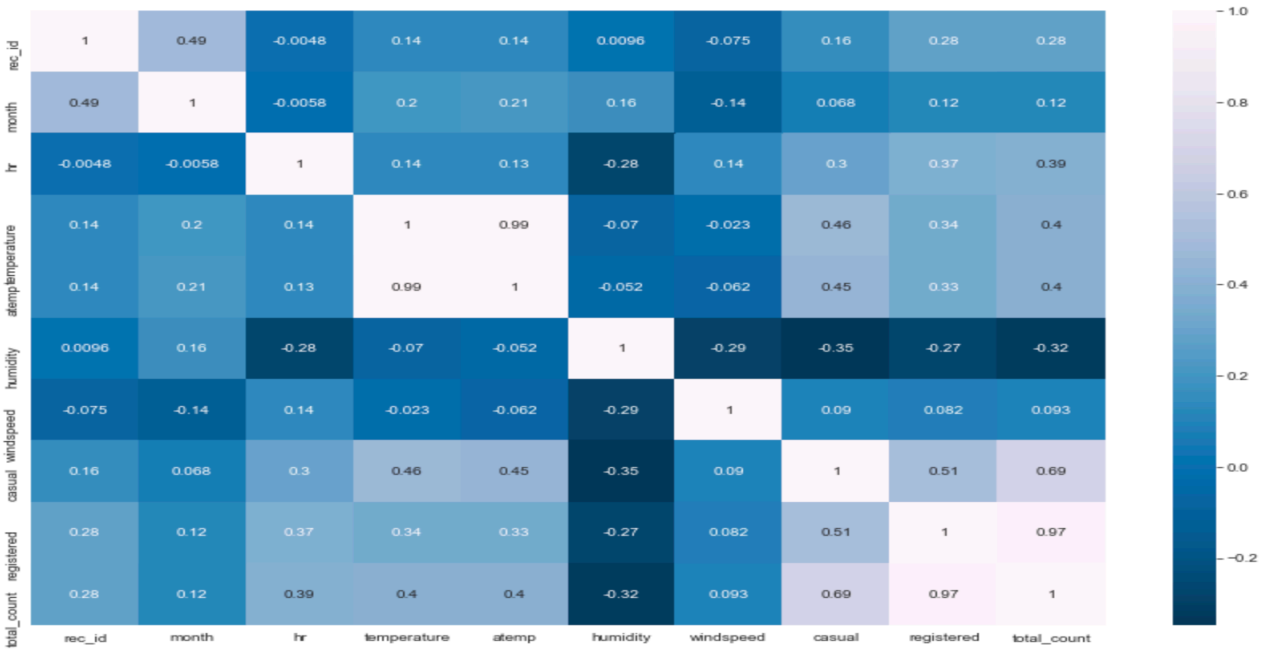

Variation of atemp
4000
3500
3000
2500
2000
1500
1000
500
0
0.0
0.2
0.4
0.6
0.8
1.0

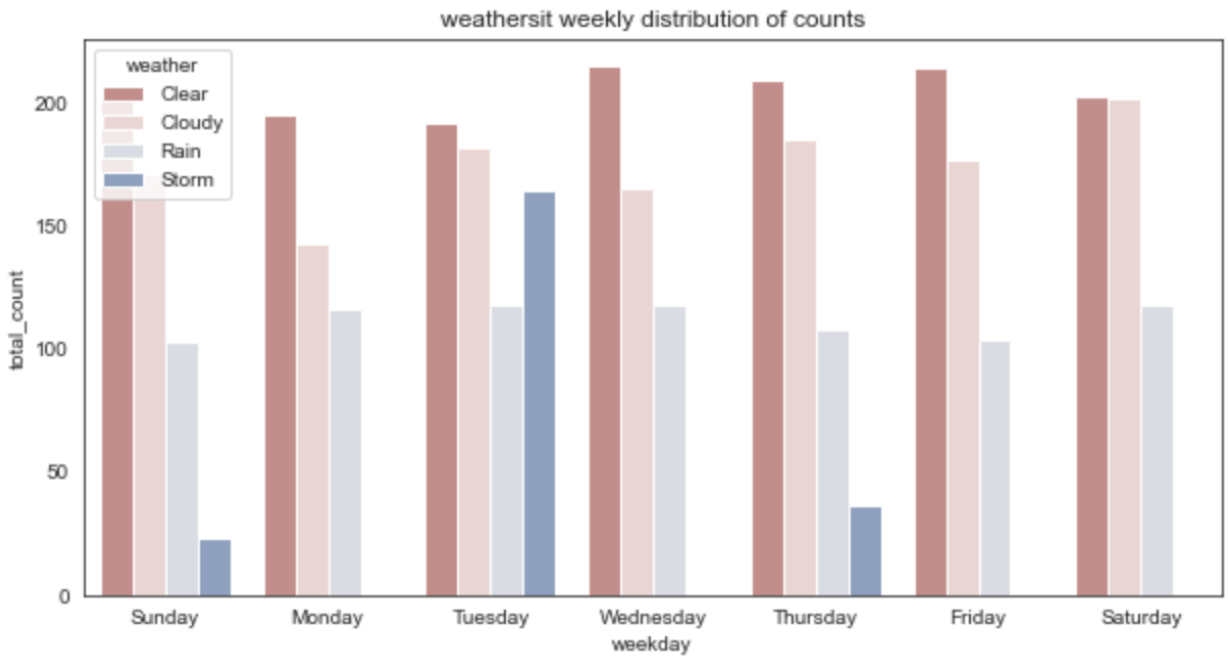

Variation of windspeed
6000
5000
4000
3000
2000
1000
0
0.0
0.2
0.4
0.6
0.8


Variation of humidity
3000
2500
2000
1500
1000
500
0
0.0
0.2
0.4
0.6
0.8
1.0


bike rentals per season
avaerage no. of bikes rented
0
50
100
150
200
Winter
Spring
Summer
Fall
season


Casual distribution for seasons yearly
casual
0
10
20
30
40
50
60
2011
2012
year
season
Winter
Spring
Summer
Fall


rec_id
month
hr
temperature
atemp
humidity
windspeed
casual
registered
total_count
1 0.49 -0.0048 0.14 0.14 0.0096 -0.075 0.16 0.28 0.28
0.49 1 -0.0058 0.2 0.21 0.16 -0.14 0.068 0.12 0.12
-0.0048 -0.0058 1 0.14 0.13 -0.28 0.14 0.3 0.37 0.39
0.14 0.2 0.14 1 0.99 -0.07 -0.023 0.46 0.34 0.4
0.14 0.21 0.13 0.99 1 -0.052 -0.062 0.45 0.33 0.4
0.0096 0.16 -0.28 -0.07 -0.052 1 -0.29 -0.35 -0.27 -0.32
-0.075 -0.14 0.14 -0.023 -0.062 -0.29 1 0.09 0.082 0.093
0.16 0.068 0.3 0.46 0.45 -0.35 0.09 1 0.51 0.69
0.28 0.12 0.37 0.34 0.33 -0.27 0.082 0.51 1 0.97
0.28 0.12 0.39 0.4 0.4 -0.32 0.093 0.69 0.97 1
rec_id
month
hr
temperature
atemp
humidity
windspeed
casual
registered
total_count
1.0
0.8
0.6
0.4
0.2
0.0
−0.2


weathersit weekly distribution of counts
weather
Clear
Cloudy
Rain
Storm
total_count
200
150
100
50
0
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
weekday