Bike Sharing Demand

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Introduction

- The bike-sharing system is a way to rent bikes through a city-wide network of kiosk locations, automatically gaining membership, renting and returning bikes.People can rent a bike from one place and return it to another as needed.
- Historical car records combine date, weather, temperature, humidity and other factors to predict the bike-sharing program needs in Washington.

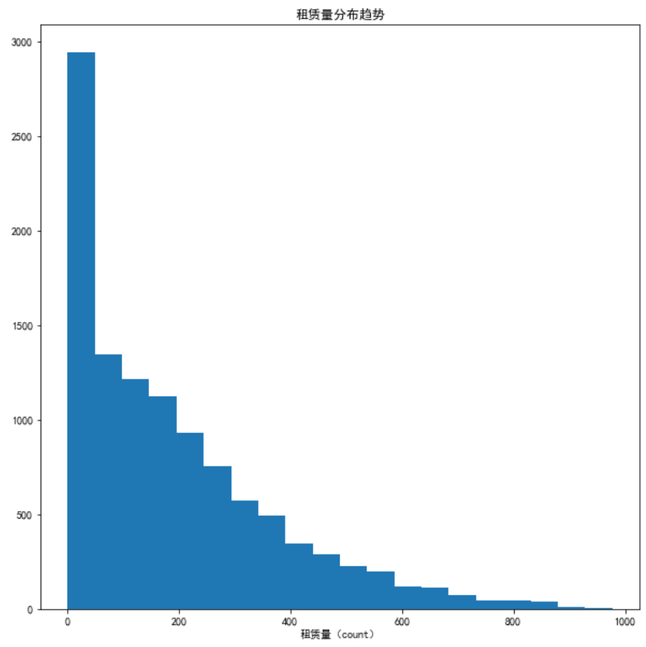
Data Description

- Descriptive statistics of the data

	season	holiday	workingday	weather	temp	atemp	humidity	windspeed	casual	registered	coun
count	10886.000000	10886.000000	10886.000000	10886.000000	10886.00000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.00000
mean	2.506614	0.028569	0.680875	1.418427	20.23086	23.655084	61.886460	12.799395	36.021955	155.552177	191.57413
std	1.116174	0.166599	0.466159	0.633839	7.79159	8.474601	19.245033	8.164537	49.960477	151.039033	181.14445
min	1.000000	0.000000	0.000000	1.000000	0.82000	0.760000	0.000000	0.000000	0.000000	0.000000	1.00000
25%	2.000000	0.000000	0.000000	1.000000	13.94000	16.665000	47.000000	7.001500	4.000000	36.000000	42.00000
50%	3.000000	0.000000	1.000000	1.000000	20.50000	24.240000	62.000000	12.998000	17.000000	118.000000	145.00000
75%	4.000000	0.000000	1.000000	2.000000	26.24000	31.060000	77.000000	16.997900	49.000000	222.000000	284.00000
max	4.000000	1.000000	1.000000	4.000000	41.00000	45.455000	100.000000	56.996900	367.000000	886.000000	977.00000

Data Visualization

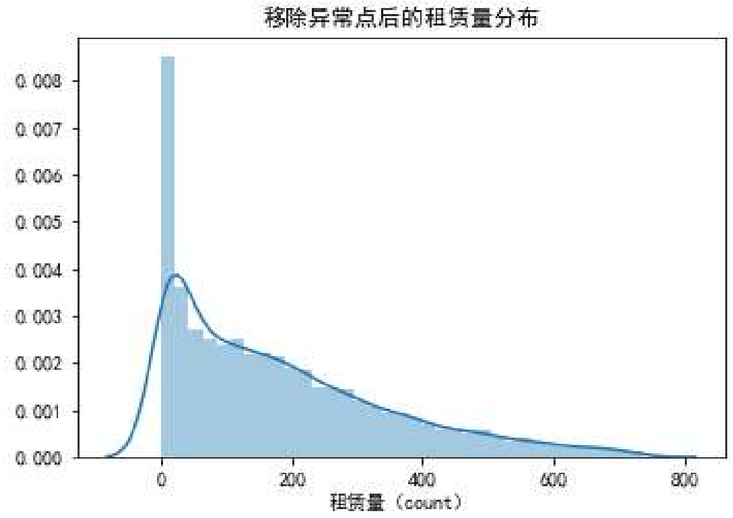
- The standard deviation of the number of leases you have to predict at the end is very large.So let’s look at the distribution by drawing it.

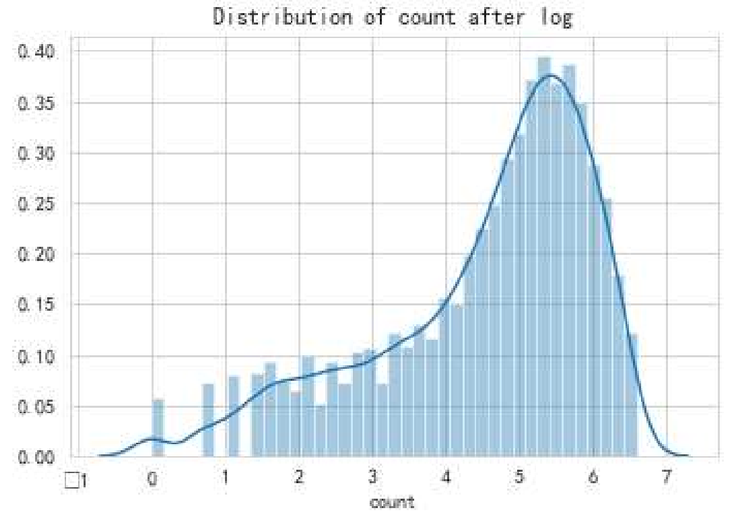


Data Visualization

- Exclude data other than three standards,log of count

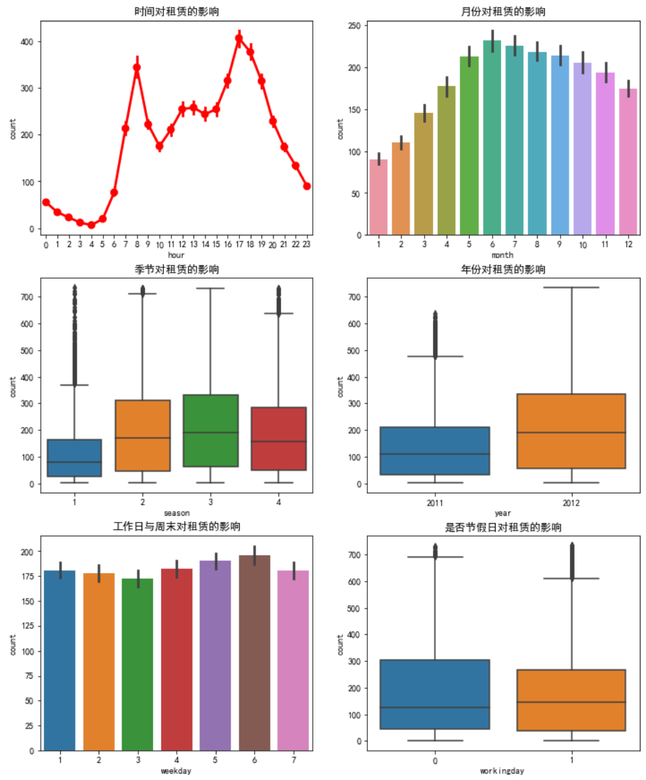
	season	holiday	workingday	weather	temp	atemp	humidity	windspeed	casual	registered	cour
ount	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.00000
nean	2.499294	0.029104	0.676180	1.421871	20.073588	23.490210	62.138363	12.779423	34.301309	142.816144	177.11745
std	1.121325	0.168107	0.467954	0.636097	7.779602	8.466483	19.238023	8.175715	47.716238	128.456579	158.26198
min	1.000000	0.000000	0.000000	1.000000	0.820000	0.760000	0.000000	0.000000	0.000000	0.000000	1.00000
25%	1.000000	0.000000	0.000000	1.000000	13.940000	16.665000	47.000000	7.001500	4.000000	34.000000	40.00000
50%	2.000000	0.000000	1.000000	1.000000	20.500000	24.240000	62.000000	12.998000	16.000000	114.000000	139.00000
75%	4.000000	0.000000	1.000000	2.000000	26.240000	31.060000	78.000000	16.997900	46.000000	212.000000	271.00000
max	4.000000	1.000000	1.000000	4.000000	41.000000	45.455000	100.000000	56.996900	355.000000	652.000000	663.00000





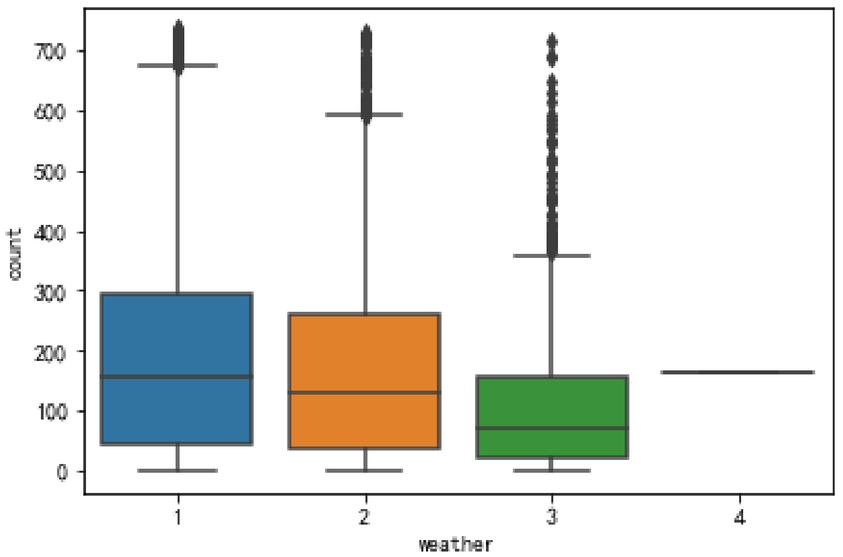
Data Visualization

- The impact of hour,month,season,year,weekday,workingday



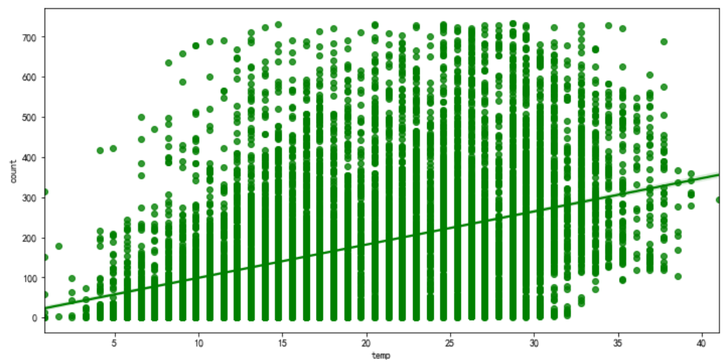
Data Visualization

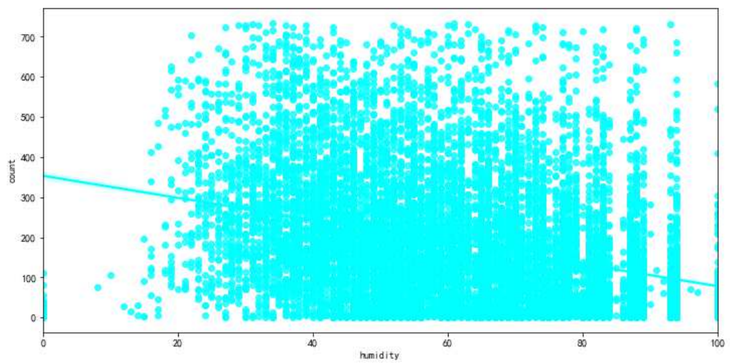
- The impact of weather

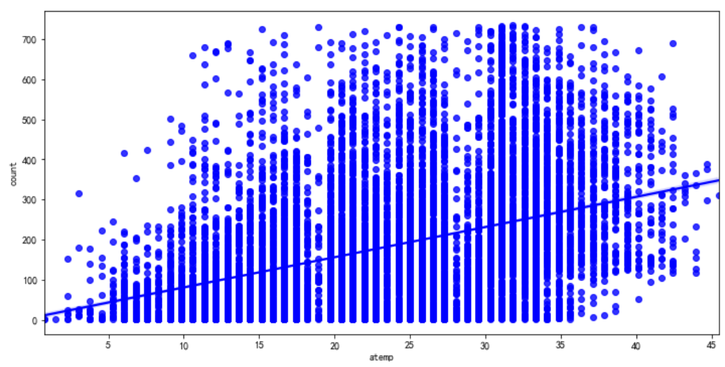


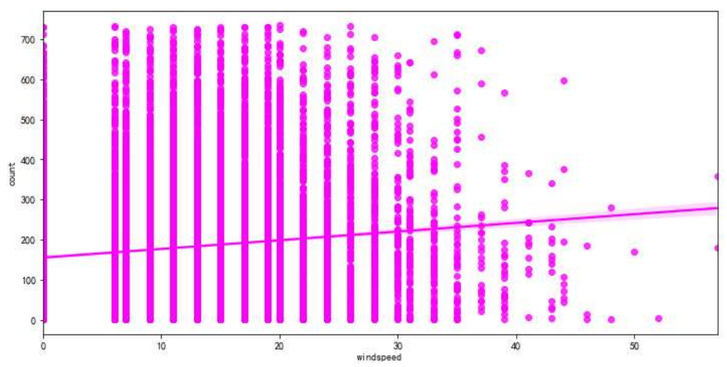
Data Visualization

- The impact of temp,atemp,humidity,windspeed





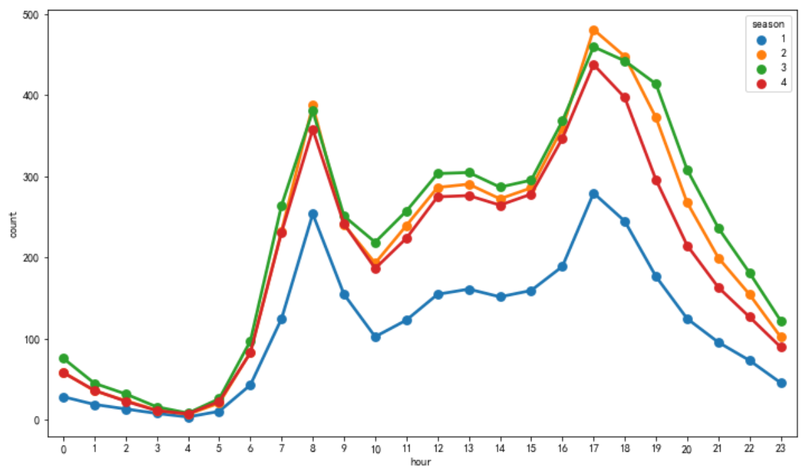




Data Visualization

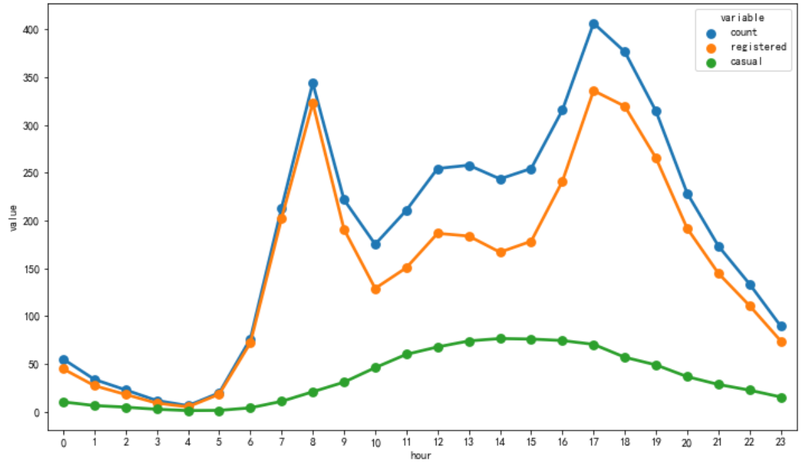
- Impact of season,week,registered and non-registered users on cycling usage trends

- For different times of the day, there is a clear trend in the use of Shared bikes, with two distinct peaks, in line with people's understanding of morning peak and evening peak.The trends were the same for all four seasons, except that usage in spring was slightly lower than in the other three.



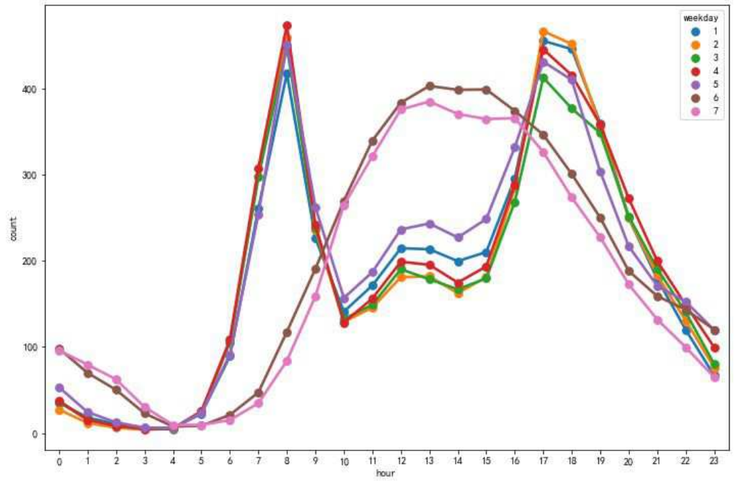
Data Visualization

- The usage of registered users accounts for the majority of the total usage, and the trend is consistent with the total usage trend, rather than that of registered users. The usage at different times of the day does not change much, and the trend is similar to the usage trend at weekends.



Data Visualization

- From Monday to Friday, there are two peak usage periods, while on weekends, the usage trend is completely different from that on weekdays. The usage trend changes from bimodal to flat unimodal, and the peak usage period is concentrated at 11-17 o ’clock.



Data Visualization

- Draw the thermal diagram of the correlation coefficient

- After all kinds of analysis, we will consider the time periods, temp, humidity, year, month, season, weather grade, windspeed, day of the week, whether there is a workingday or not and whether there is a holiday as characteristic values here.

Build Model

- 1.Separate the training set and test set.
  2.Cross validation is used to determine the optimal parameters.
  3.View the selected optimal parameters:'max_depth': 20, 'n_estimators': 150
  4.Apply the optimal parameters to the model, it can be obtained
  Accuracy on test set: 0.694599627560521 4