

# BOX OFFICE FORECAST

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ABSTRACT. Bike-sharing refers to the bicycle([bike](#)) sharing services provided by enterprises in ~~campuses, subway stations,~~ bus stations, residential areas, business districts and public service areas. It is a time-sharing model and a new green and environment-friendly sharing economy. In essence, bike-sharing is a new type of transportation rental business – bicycle rental business, which mainly relies on the carrier of (bicycle) bicycles. Can make full use of the city due to rapid economic development caused by the sluggish bicycle travel; Maximize the public road pass rate. The purpose of this project is to predict the demand for bike rental in the D.c. D.C. bike-sharing program by combining historical weather data on bike-sharing usage patterns.

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1991 *Mathematics Subject Classification.* Forecast use of a city bikeshare system.

## 1. INTRODUCTION

- (1) Bike-sharing is not new to us. This report mainly analyzes the data of bike-sharing in Washington, US from 2011 to 2012.
- (2) The data comes from Kaggle <https://www.kaggle.com/c/bike-sharing-demand>.
- (3) This project is mainly about the prediction of relevant data, and the description and analysis of relevant factors are presented here.
- (4) Related elements: datetime season holiday workingday weather temp atemp humidity windspeed casual registered count

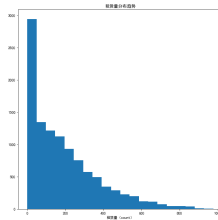
## 2. DATA ANALYSIS

First of all, our work can be divided into the following steps:

- (1) Descriptive statistics of the data

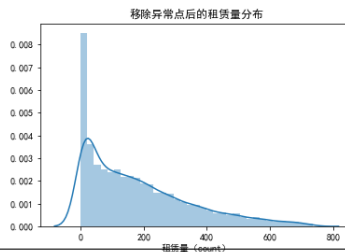
	season	holiday	workingday	weather	temp	atemp	humidity	windspeed	casual	registered	count
count	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000	10886.000000
mean	2.506614	0.028569	0.680875	1.418427	20.23086	23.650584	61.889460	12.799395	35.021955	155.552177	191.574132
std	1.116174	0.166599	0.468159	0.633839	7.78159	8.474801	19.245033	8.164537	49.960477	151.039033	181.14445
min	1.000000	0.000000	0.000000	1.000000	0.620000	0.760000	0.000000	0.000000	0.000000	0.000000	1.000000
25%	2.000000	0.000000	0.000000	1.000000	13.940000	16.665000	47.000000	7.001500	4.000000	34.000000	40.000000
50%	3.000000	0.000000	1.000000	1.000000	20.500000	24.240000	62.000000	12.998000	16.000000	114.000000	139.000000
75%	4.000000	0.000000	1.000000	2.000000	26.240000	31.060000	76.000000	16.997900	46.000000	212.000000	271.000000
max	4.000000	1.000000	1.000000	4.000000	41.000000	45.455000	100.000000	56.996900	367.000000	886.000000	977.000000

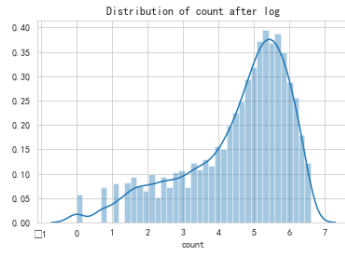
- (2) The standard deviation of the number of leases you have to predict at the end is very large. So let's look at the distribution by drawing it.



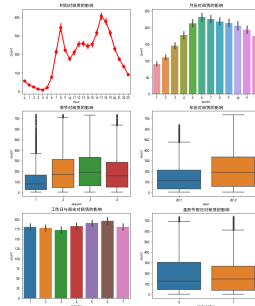
- (3) Exclude data other than three standards, log of count

	season	holiday	workingday	weather	temp	atemp	humidity	windspeed	casual	registered	count
count	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000	10617.000000
mean	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	0.467854	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	0.620000	0.760000	0.000000	0.000000	0.000000	0.000000	1.000000
25%	1.000000	0.000000	0.000000	1.000000	13.940000	16.665000	47.000000	7.001500	4.000000	34.000000	40.000000
50%	2.000000	0.000000	1.000000	1.000000	20.500000	24.240000	62.000000	12.998000	16.000000	114.000000	139.000000
75%	4.000000	0.000000	1.000000	2.000000	26.240000	31.060000	76.000000	16.997900	46.000000	212.000000	271.000000
max	4.000000	1.000000	1.000000	4.000000	41.000000	45.455000	100.000000	56.996900	355.000000	652.000000	663.000000

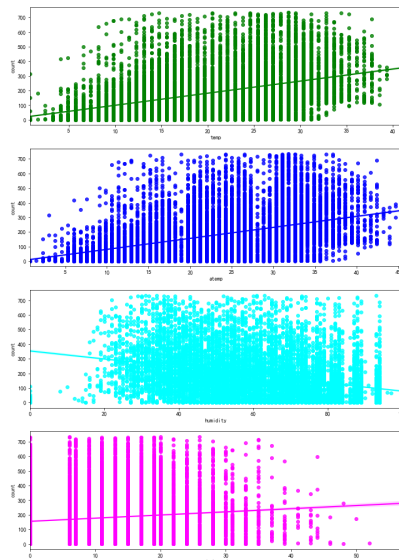




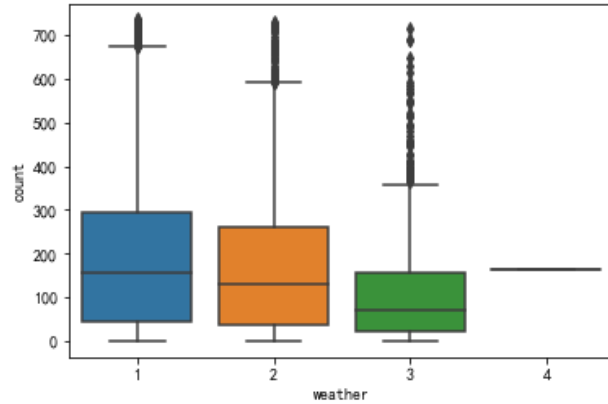
(4) The impact of hour,month,season,yar,weekday,workingday



(5) The impact of temp,atemp,humidity,windspeed

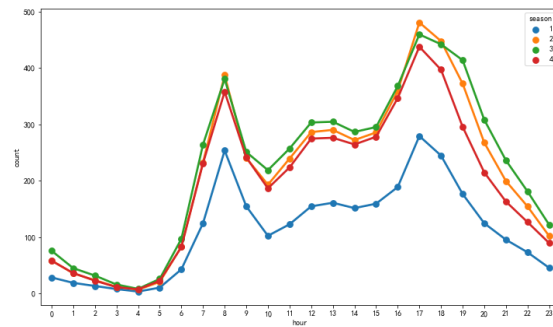


(6) The impact of weather

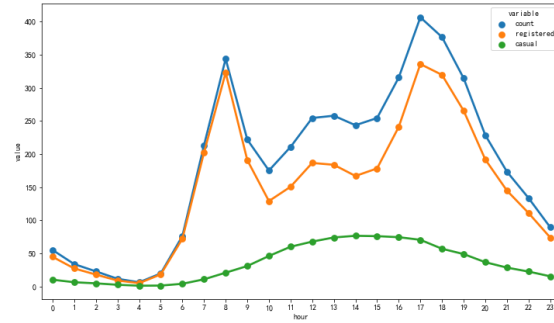


(7) Impact of season, week, registered and non-registered users on cycling usage trends

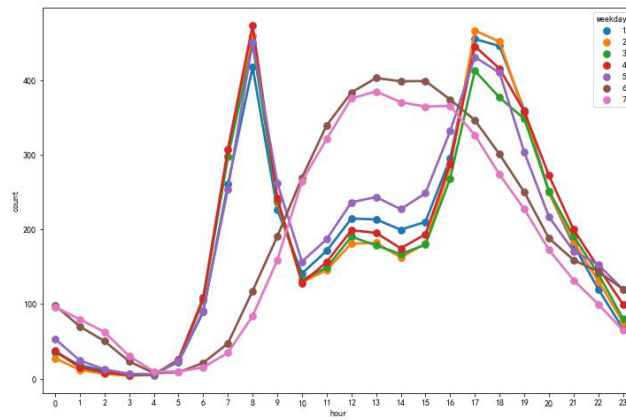
a. For different times of the day, there is a clear trend in the use of Shared bikes, with two distinct peaks, in line with people's understanding of morning peak and evening peak. The trends were the same for all four seasons, except that usage in spring was slightly lower than in the other three.



b. 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.



c. 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.



(8) Draw the thermal diagram of the correlation coefficient



cost

### 3. BUILD MODEL

1. Separate the training set and test set.
  2. Remove unwanted eigenvalues: 'casual', 'count', 'datetime', 'registered', 'date', 'atemp', 'month', 'year', 'season', 'weather'.
  3. Cross validation is used to determine the optimal parameters.
  4. View the selected optimal parameters: 'max\_depth': 20, 'n\_estimators': 150
  5. Apply the optimal parameters to the model, it can be obtained
- Accuracy on test set: 0.6945996275605214  
Recall rate on test set: 0.7379725915789399

### 4. CONCLUSIONS

Through this Kaggle project, I practiced by myself to have a deeper understanding of data visualization and to explore the structure and rules of data by means of drawing and tabulating.

LIST OF TODOS

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