Understanding the data

In [ ]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%pylab inline
import copy
from googletrans import Translator
import emoji
import re
```

In [3]:

```
#Names =
['u_id','m_id','time','forward_count','comment_count','like_count','content']
Names = ['u_id','m_id','time','content']

train_dataset= pd.read_fwf("G:\\weibo_train_data.txt",header=None,names=Names ,encodi
ng='utf-8',delimiter="\t")

# fixed width formatted lines.
```

Observing the dataset

In [3]:

```
train_dataset.head(10)
```

Out[3]:

	u_id	m_id	time
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	2015-02-23 17:41:29
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	2015-02-14 12:49:58
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	2015-03-31 13:58:06

	u_id	m_id	time
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	2015-06-11 20:39:57
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	2015-03-10 18:02:38
5	d80f3d3c5c1d658e82b837a4dd1af849	bfc0819b83ec59ce767287077f2b3507	2015-02-13 01:09:41
6	f349a67d1cd7c8683c5bbc5f8486e193	83674a60e5310195fc35d97ea8f45c46	2015-07-15 01:16:24
7	24b621c98f2594b698c0b1d60c9ae6db	2cbd3d514ed5ad3dab81aa043c8b3d0a	2015-05-19 10:24:57
8	e44d81d630e4f382f657e72aa4b685da	8a88a25f9f26ed9f79080eaacc1a8668	2015-02-11 11:03:36
9	fbe6c953632e1b3dda66cf6118b6ab12	f359a74cb4ac6150a3af8325eda04ea0	2015-03-22 00:54:34

In [4]:

```
print("Predict_Dataset has "+str(train_dataset.shape[0])+" records")
```

```
Predict_Dataset has 1229618 records
```

In [6]:

```
print("Predict_Dataset has "+str(train_dataset.shape[1])+" attributes")
```

```
Predict_Dataset has 4 attributes
```

In [6]:

```
train_content_mix=train_dataset['content']
```

In [7]:

```
train_content_split = pd.DataFrame(train_content_mix.str.split('\t',expand=True))
print(train_content_split.head(5))
```

```
   0  1  2                                                  3
0  0  0  0  丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包赢股，盈利对半分成...
1  0  0  0  #丁辰灵的红包#挣钱是一种能力，抢红包拼的是技术。我抢到了丁辰灵 和@阚洪岩 一起发出的现金...
2  0  0  0                                淘宝网这些傻逼。。。气的劳资有火没地儿发~尼玛，你们都瞎了
3  0  4  3                                  看点不能说的，你们都懂[笑cry]
4  0  0  0                                             111多张
```

In [8]:

```
#frames = [train_data,train_content_split]
#esult = pd.concat(frames)
#df['uid']=train_data['u_id']

train_dataset2 = pd.concat([train_dataset,train_content_split], axis=1)
print(train_dataset2.head(5))
```

```
                              u_id                                m_id  \
0  d38e9bed5d98110dc2489d0d1cac3c2a  7d45833d9865727a88b960b0603c19f6
1  fa13974743d3fe6ff40d21b872325e9e  8169f1d45051e08ef213bf1106b1225d
2  da534fe87e7a52777bee5c30573ed5fd  68cd0258c31c2c525f94febea2d9523b
3  e06a22b7e065e559a1f0bf7841a85c51  00b9f86b4915aedb7db943c54fd19d59
4  f9828598f9664d4e347ef2048ce17734  c7f6f66044c0c5a3330e2c5371be6824

                  time                                            content  0  \
0  2015-02-23 17:41:29  0\t0\t0\t丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包...
0
1  2015-02-14 12:49:58  0\t0\t0\t#丁辰灵的红包#挣钱是一种能力，抢红包拼的是技术。我抢到了丁辰灵和@阚洪...  0
2  2015-03-31 13:58:06            0\t0\t0\t淘宝网这些傻逼。。。气的劳资有火没地儿发~尼玛，你们都瞎了  0
3  2015-06-11 20:39:57                          0\t4\t3\t看点不能说的，你们都懂[笑cry]  0

4  2015-03-10 18:02:38                                   0\t0\t0\t111多张  0

   1  2                                                  3
0  0  0  丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包赢股，盈利对半分成...
1  0  0  #丁辰灵的红包#挣钱是一种能力，抢红包拼的是技术。我抢到了丁辰灵 和@阚洪岩 一起发出的现金...

2  0  0                                淘宝网这些傻逼。。。气的劳资有火没地儿发~尼玛，你们都瞎了
3  4  3                                  看点不能说的，你们都懂[笑cry]
4  0  0                                             111多张
```

In [9]:

```
del train_dataset2['content']
train_dataset2.rename(columns={0:'forward_count'},inplace=True)
train_dataset2.rename(columns={1:'comment_count'},inplace=True)
```

```
train_dataset2.rename(columns={2:'like_count'},inplace=True)
train_dataset2.rename(columns={3:'content'},inplace=True)
train_dataset2.head(5)
```

Out[9]:

	u_id	m_id	time	f
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	2015-02-23 17:41:29	0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	2015-02-14 12:49:58	0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	2015-03-31 13:58:06	0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	2015-06-11 20:39:57	0
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	2015-03-10 18:02:38	0

In [17]:

```
translate_dataframe = pd.DataFrame(data=train_dataset2['content'].head(10))
translator = Translator()
translate_dataframe["English_content"] = translate_dataframe['content'].map(lambda x
: translator.translate(x, src="zh-CN", dest="en").text)
```

content

```
                                                content
0  丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包赢股，盈利对半分成...
1  #丁辰灵的红包#挣钱是一种能力，抢红包拼的是技术。我抢到了丁辰灵 和@阚洪岩 一起发出的现金...
2                          淘宝网这些傻逼。。。气的劳资有火没地儿发~尼玛，你们都瞎了
3                                  看点不能说的，你们都懂[笑cry]
4                                                111多张
```

In [18]:

```
print(translate_dataframe)
```

```
                                                content  \
0  丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包赢股，盈利对半分成...
1  #丁辰灵的红包#挣钱是一种能力，抢红包拼的是技术。我抢到了丁辰灵 和@阚洪岩 一起发出的现金...
2                          淘宝网这些傻逼。。。气的劳资有火没地儿发~尼玛，你们都瞎了
3                                  看点不能说的，你们都懂[笑cry]
4                                                111多张
5  有生之年！我最喜欢的up主跟我的三体勾搭到一起了！幸福感爆棚！ @黑桐谷歌  http://...
6          论优衣库试衣间隔音效果好坏？ http://t.cn/RL5aSzp（分享自 @知乎）
7  如此平凡的日常一幕，还能够再积累多少呢。 终有一天，当我们到了看着这张照片能感受到一阵怀念的...
8  #罗永浩的红包#二十三，糖瓜儿粘，抢个红包乐翻天！我抢到了罗永浩 和@_王先森就是我 一起发...
9  有好东西分享给你！闪记笔记记事，最好用的中文待办软件，还等什么？快去下载： http://t...

                                     English_content
0  Lijiang Tourism (sz002033)#Stock##炒股##财经##理财##...
1  #丁辰灵的红包# Earning money is a kind of ability. I...
2  Taobao.com is stupid. . . The labor of the gas...
3  You can't say anything, you all know [laughing...
4                                    More than 111
5  For a lifetime! My favorite up master is with ...
6  On the effect of UNIQLO's fitting interval sou...
7  How much more can you accumulate in such an or...
8  #罗永浩的红包# Twenty-three, sugar melons sticky, gr...
9  Have something to share with you! Flash note n...
```

In [19]:

```
train_dataset2.head(30)
```

Out[19]:

	u_id	m_id	time
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	2015-02-23 17:41:29
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	2015-02-14 12:49:58
			2015-

	u_id	m_id	time
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	03-31 13:58:06
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	2015-06-11 20:39:57
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	2015-03-10 18:02:38
5	d80f3d3c5c1d658e82b837a4dd1af849	bfc0819b83ec59ce767287077f2b3507	2015-02-13 01:09:41
6	f349a67d1cd7c8683c5bbc5f8486e193	83674a60e5310195fc35d97ea8f45c46	2015-07-15 01:16:24
7	24b621c98f2594b698c0b1d60c9ae6db	2cbd3d514ed5ad3dab81aa043c8b3d0a	2015-05-19 10:24:57
8	e44d81d630e4f382f657e72aa4b685da	8a88a25f9f26ed9f79080eaacc1a8668	2015-02-11 11:03:36
9	fbe6c953632e1b3dda66cf6118b6ab12	f359a74cb4ac6150a3af8325eda04ea0	2015-03-22 00:54:34
10	f9a3ca6bc1e75d173cfc98ec4b108072	c7bc3445e8b90db8cc5e045f606dc1ee	2015-02-11 19:29:04
11	3c68bbb9da57fcc752c8a493d91bdd3a	77e14cf9d460715e84c51747c3641a9b	2015-04-28 00:14:05
12	104e8d55e98eb3cd834810088af039fe	ee0b2c9d35bfeb0fbc5b3a8677f4a18c	2015-02-14 23:42:23
13	0d15005d6397fb5ce1d45e7c834f7370	9c954d63fcfea19dca8d81a4f3b53861	2015-06-19 14:35:03
			2015-

	u_id	m_id	time
14	875a4a77b339d93f819e2c4de5bd0b57	f2cdcdbcec9ff47cbb3c6a636e4b92a3	2015-07-01 04:11:48
15	380a2219670f50dc87efce3380bea6e8	46f10244d02afa85d12346ce28e3cec5	2015-03-11 08:00:24
16	b9b88b0fc105fb08a552e782afa4342e	cb907eb1bdbc198ed0944cc3b7e24f91	2015-05-04 22:10:22
17	f18eb14365c0d7248fab1b9c464f4e70	096543bd8746869982d1a7557164dd0d	2015-02-18 21:37:17
18	0fc17bf5e2dc789dd48505df1f5b14fd	4c1e2418127811d212d0e3867a99db3e	2015-07-13 05:07:28
19	dd749a5af07c04ce7de451273a983671	419dd71d562883ef836e774bc3f4e163	2015-07-30 14:24:28
20	a984551b159fcdc0a48f9e38ecb1488f	baa0051d359555601ab61df684787f0f	2015-02-03 20:09:49
21	2e0467b73d0f6f9e5607a6174581fdd8	2fd200a7f670138c2026091c3b01532a	2015-04-15 15:49:11
22	819656f05994b00b7260daf7346586a7	95590e88cac5d8c9d1a496bc3bd42f07	2015-05-27 14:50:18
23	91ce7c63b272f2037a3e702c10163fa3	8b4e85a881afaff91f276eac7bfb6604	2015-02-13 18:48:37
24	4680e73f9e7a6b87dec62a86a7821c17	b2db095af290b3a36cf798a3e17528d8	2015-03-12 15:19:54
25	976e85e3ededdd9b2c2a3179eb7ae8ab	9540ee0cf7ccfae523020c8025e7095f	2015-03-21 22:04:55

	u_id	m_id	time
26	6623347e5f19f35f2d02ad515b96524c	9a2f48a870843d1964a03c6642b309d5	2015-07-21 01:06:53
27	cf727e70b6661387cf6aadf01d2eb32c	bff281350f035db0e84c25394865d86a	2015-02-19 06:02:06
28	de0836c1c5d40a5cae64a964a0b54894	c3345fd72cad53ca9bffd63634170ba0	2015-04-20 22:36:23
29	c8848f18da5911d0389c3ac70fe13204	fa352495e646a3f7ff979267c490fd89	2015-06-11 23:46:08

In [ ]:

```
emoji_pattern=re.compile("["
                         u"\U0001F600-\U0001F64F"
                         u"\U0001F300-\U0001F5FF"
                         u"\U0001F680-\U0001F6FF"
                         u"\U0001F1E0-\U0001F1FF"
                         "]+",flags=re.UNICODE)
train_dataset2['content']=emoji_pattern.sub(r'',str(train_dataset2['content']))
```

In [1]:

```
translate_dataframe = pd.DataFrame(data=train_dataset2['content'].head(30))
translator = Translator()
translate_dataframe["English_content"] = translate_dataframe['content'].map(lambda x
: translator.translate(x, src="zh-CN", dest="en").text)
```

In [19]:

```
train_dataset2.forward_count.describe()
```

Out[19]:

```
count     1229618
unique       1243
top             0
freq      1009457
Name: forward_count, dtype: object
```

In [14]:

```
train_dataset2.comment_count.describe()
```

Out[14]:

```
count     1229618
unique        527
top             0
freq       975602
Name: comment_count, dtype: object
```

In [15]:

```
train_dataset2.like_count.describe()
```

Out[15]:

```
count     1229618
unique       1020
top             0
freq       920818
Name: like_count, dtype: object
```

In [10]:

```
train_dataset3=pd.DataFrame(train_dataset2.time.str.split(' ',1).tolist(),columns=['date','new_time'])
```

In [9]:

```
train_dataset3.head()
```

Out[9]:

	date	new_time
0	2015-02-23	17:41:29
1	2015-02-14	12:49:58
2	2015-03-31	13:58:06
3	2015-06-11	20:39:57
4	2015-03-10	18:02:38

In [11]:

```
train_dataset4 = pd.concat([train_dataset2,train_dataset3], axis=1)
del train_dataset4['time']
del train_dataset4['content']
train_dataset4.rename(columns={0:'forward_count'},inplace=True)
train_dataset4.rename(columns={1:'comment_count'},inplace=True)
train_dataset4.rename(columns={2:'like_count'},inplace=True)
train_dataset4.rename(columns={3:'content'},inplace=True)
train_dataset4.rename(columns={'new_time':'time'},inplace=True)
train_dataset4.head(5)
```

Out[11]:

	u_id	m_id	forward_c
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	0
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	0

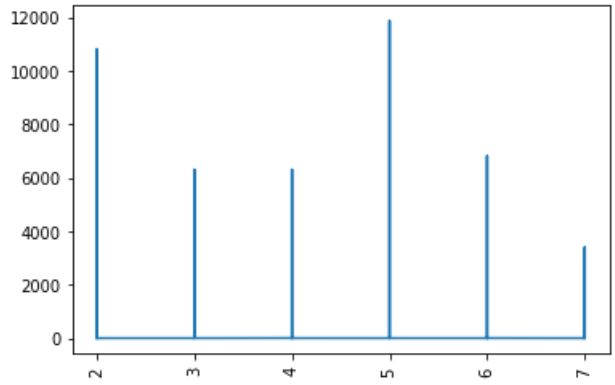
Observing trend of number of likes with respect to each month

In [15]:

```
#Month vs Like_Count
train_dataset5=train_dataset4.sort_values('date',ascending=True)
train_dataset5['like_count']=train_dataset5['like_count'].astype(float)
train_dataset5['month']=pd.DatetimeIndex(train_dataset5['date']).month
plt.plot(train_dataset5['month'],train_dataset5['like_count'])
plt.xticks(rotation='vertical')
```

Out[15]:

```
(array([1., 2., 3., 4., 5., 6., 7., 8.]),
 <a list of 8 Text xticklabel objects>)
```



Observing trend of number of forwards with respect to each month

-

In [ ]:

```
#Month vs Forward_Count
train_dataset5=train_dataset4.sort_values('date',ascending=True)
train_dataset5['forward_count']=train_dataset5['forward_count'].astype(float)
train_dataset5['month']=pd.DatetimeIndex(train_dataset5['date']).month
plt.bar(train_dataset5['month'],train_dataset5['forward_count'])
#plt.xticks(rotation='vertical')
```

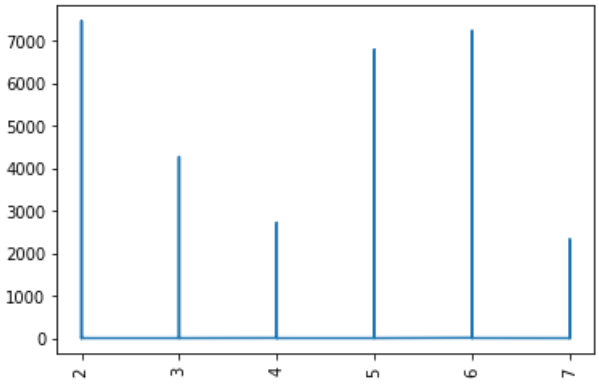
Observing trend of number of comments with respect to each month

In [52]:

```
#Month vs Comment_Count
train_dataset5=train_dataset4.sort_values('date',ascending=True)
train_dataset5['comment_count']=train_dataset5['comment_count'].astype(float)
train_dataset5['month']=pd.DatetimeIndex(train_dataset5['date']).month
plt.plot(train_dataset5['month'],train_dataset5['comment_count'])
plt.xticks(rotation='vertical')
```

Out[52]:

```
(array([1., 2., 3., 4., 5., 6., 7., 8.]),
 <a list of 8 Text xticklabel objects>)
```

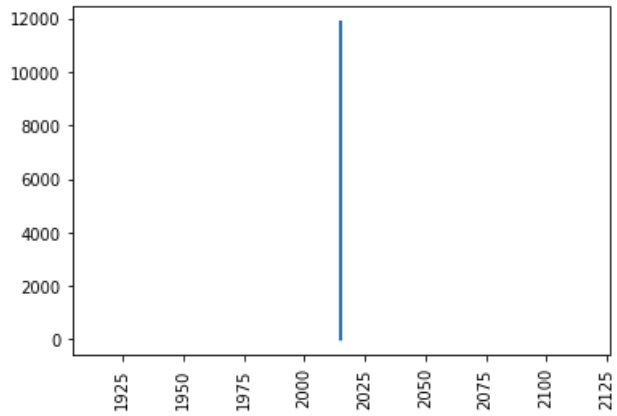


In [53]:

```
#Year vs Like_Count
train_dataset5=train_dataset4.sort_values('date',ascending=True)
train_dataset5['like_count']=train_dataset5['like_count'].astype(float)
train_dataset5['year']=pd.DatetimeIndex(train_dataset5['date']).year
plt.plot(train_dataset5['year'],train_dataset5['like_count'])
plt.xticks(rotation='vertical')
```

Out[53]:

```
(array([1900., 1925., 1950., 1975., 2000., 2025., 2050., 2075., 2100.,
        2125., 2150.]), <a list of 11 Text xticklabel objects>)
```



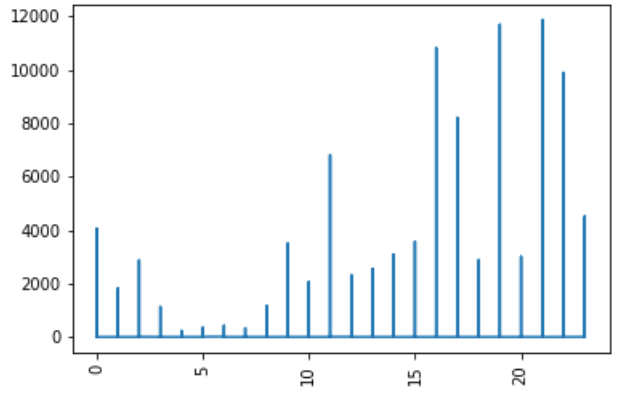
Observing trend of number of likes on hourly basis

In [16]:

```
#Hour vs Like_Count
train_dataset5=train_dataset4.sort_values('time',ascending=True)
train_dataset5['like_count']=train_dataset5['like_count'].astype(float)
train_dataset5['hour']=pd.DatetimeIndex(train_dataset5['time']).hour
plt.plot(train_dataset5['hour'],train_dataset5['like_count'])
plt.xticks(rotation='vertical')
```

Out[16]:

```
(array([-5.,  0.,  5., 10., 15., 20., 25.]),
 <a list of 7 Text xticklabel objects>)
```



In [ ]:

```
#Hour vs forward_Count
train_dataset5=train_dataset4.sort_values('time',ascending=True)
train_dataset5['forward_count']=train_dataset5['forward_count'].astype(float)
train_dataset5['hour']=pd.DatetimeIndex(train_dataset5['time']).hour
plt.bar(train_dataset5['hour'],train_dataset5['forward_count'])
plt.xticks(rotation='vertical')
```

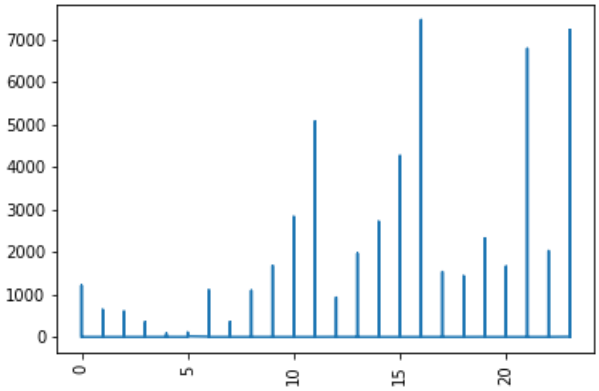
In [18]:

```
#Hour vs comment_Count
```

```
train_dataset5=train_dataset4.sort_values('time',ascending=True)
train_dataset5['comment_count']=train_dataset5['comment_count'].astype(float)
train_dataset5['hour']=pd.DatetimeIndex(train_dataset5['time']).hour
plt.plot(train_dataset5['hour'],train_dataset5['comment_count'])
plt.xticks(rotation='vertical')
```

Out[18]:

```
(array([-5.,  0.,  5., 10., 15., 20., 25.]),
 <a list of 7 Text xticklabel objects>)
```



DMA course project review 2

Preprocessing of data

1.
   - Team ID - 5A09
   - Sem - 5TH
   - Div - 'A'
   - School - KLE Technological university

1.
   - Topic ID - 5ADMACP14
   - Project Title - Sina Weibo Intereaction Prediction

1. Problem Statement - To predict the user behaviors such as forwarding, commenting and liking.

1.
   - Team Leader - Deepti Nadkarni - 01FE16BCS062 (Roll no-58)
   - Members
     - Apoorva Malemath - 01FE16BCS041 (Roll no-39)
     - Arundati Dixit - 01FE16BCS046 (Roll no-44)
     - Ashish Kar - 01FE16BCS047 (Roll no-45)

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%pylab inline
import copy
from googletrans import Translator
import pandas as pd
import numpy as np
import csv
import re
import jieba
import time
import json
from sklearn.feature_extraction.text import CountVectorizer
from sklearn import linear_model
from sklearn.externals import joblib
from nltk.corpus import stopwords as e_stopwords
from datetime import datetime, timedelta
import jieba
import sys

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
```

```
Populating the interactive namespace from numpy and matplotlib
```

DATA PREPROCESSING

- Raw data is not directly adequate for analysis.
- Training data
  - uid
  - mid
  - time
  - forward_count
  - comment_count
  - like_count
  - content
- Predicting data
  - uid
  - mid
  - time
  - content
- Previous Observations made
  - Training data has 12,296,18 tuples.
  - Predicting data has 43,845 tuples.
  - Significant occurance of the value zero.
- Translation

In [3]:

```
train1= pd.read_csv("E:\\5th Sem\\DMA Project\\DMA Project Sina Weibo\\CSV\\weibo_train1.csv")
```

In [3]:

```
train2= pd.read_csv("E:\\5th Sem\\DMA Project\\DMA Project Sina Weibo\\CSV\\weibo_train2.csv")
```

In [4]:

```
frames=[train1,train2]
train=pd.concat(frames)
```

In [5]:

```
train.shape
```

Out[5]:

```
(1229618, 11)
```

In [6]:

```
train.head(5)
```

Out[6]:

	u_id	m_id	forward_c
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	0
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	0

In [5]:

```
tc=np.array_split(train,400)
```

In [7]:

```
i=0
for i in range(400):
    ith=str(i)
    f="G:\\concatfiles\\f"+ith+".txt"
    tc[i].to_csv(f,sep=',',index=False,encoding='utf-8')
```

Translation

- u_id
- m_id
- forward_count
- comment_count
- like_count
- content
- date
- time
- content_media_count
- content_spchar
- non_emoji_content
- en_content

In [8]:

```
translated=pd.DataFrame(columns=list(['u_id', 'm_id', 'forward_count', 'comment_count
', 'like_count',
       'content', 'date', 'time', 'content_media_count', 'content_spchar',
       'non_emoji_content', 'en_content', 'Unnamed: 1']))
```

Translation has been performed on the content column seperately by considering it as a seperate file, thus the files are concatinaated

In [9]:

```
for j in range(0,218):
    filename="G:\\concatfiles\\f"+str(j)+".txt"
    transname="G:\\translated\\ts"+str(j)+".zh-CN.en.txt"
    print(filename)
    print(transname)
    f=pd.read_csv(filename)
    t= pd.read_csv(transname,sep="5A09")
    frames = [f,t]
#result = pd.concat(frames, ignore_index=False)
    #df="df"+str(j)
    df=(pd.concat(frames, join='outer', ignore_index=False,keys=None, levels=None, na
mes=None, verify_integrity=False, copy=True, axis=1))
    translated=translated.append(df)
    #translated.append(df,ignore_index=True)
```

```
G:\concatfiles\f0.txt
G:\translated\ts0.zh-CN.en.txt
G:\concatfiles\f1.txt
G:\translated\ts1.zh-CN.en.txt
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: ParserWarning: Fal
```

```
ling back to the 'python' engine because the 'c' engine does not support regex separa
tors (separators > 1 char and different from '\s+' are interpreted as regex); you can
avoid this warning by specifying engine='python'.
  import sys
```

```
G:\concatfiles\f2.txt
G:\translated\ts2.zh-CN.en.txt
G:\concatfiles\f3.txt
G:\translated\ts3.zh-CN.en.txt
G:\concatfiles\f4.txt
G:\translated\ts4.zh-CN.en.txt
G:\concatfiles\f5.txt
G:\translated\ts5.zh-CN.en.txt
G:\concatfiles\f6.txt
G:\translated\ts6.zh-CN.en.txt
G:\concatfiles\f7.txt
G:\translated\ts7.zh-CN.en.txt
G:\concatfiles\f8.txt
G:\translated\ts8.zh-CN.en.txt
G:\concatfiles\f9.txt
G:\translated\ts9.zh-CN.en.txt
G:\concatfiles\f10.txt
G:\translated\ts10.zh-CN.en.txt
G:\concatfiles\f11.txt
G:\translated\ts11.zh-CN.en.txt
G:\concatfiles\f12.txt
G:\translated\ts12.zh-CN.en.txt
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G:\translated\ts14.zh-CN.en.txt
G:\concatfiles\f15.txt
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```

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G:\concatfiles\f207.txt
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G:\concatfiles\f217.txt
G:\translated\ts217.zh-CN.en.txt
```

In [11]:

```
translated1=pd.DataFrame()
for j in range(219,339):
    filename="G:\\concatfiles\\f"+str(j)+".txt"
    transname="G:\\translated\\ts"+str(j)+".zh-CN.en.txt"
    print(filename)
    print(transname)
    f=pd.read_csv(filename)
    t= pd.read_csv(transname,sep="5A09")
    frames = [f,t]
#result = pd.concat(frames, ignore_index=False)
    #df="df"+str(j)
    df=(pd.concat(frames, join='outer', ignore_index=False,keys=None, levels=None, na
mes=None, verify_integrity=False, copy=True, axis=1))
    translated1=translated1.append(df)
    #translated.append(df,ignore_index=True)
```

```
G:\concatfiles\f219.txt
G:\translated\ts219.zh-CN.en.txt
G:\concatfiles\f220.txt
G:\translated\ts220.zh-CN.en.txt
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:8: ParserWarning: Fal
ling back to the 'python' engine because the 'c' engine does not support regex separa
tors (separators > 1 char and different from '\s+' are interpreted as regex); you can
avoid this warning by specifying engine='python'.
```

```
G:\concatfiles\f221.txt
G:\translated\ts221.zh-CN.en.txt
G:\concatfiles\f222.txt
G:\translated\ts222.zh-CN.en.txt
G:\concatfiles\f223.txt
```

G:\translated\ts223.zh-CN.en.txt
G:\concatfiles\f224.txt
G:\translated\ts224.zh-CN.en.txt
G:\concatfiles\f225.txt
G:\translated\ts225.zh-CN.en.txt
G:\concatfiles\f226.txt
G:\translated\ts226.zh-CN.en.txt
G:\concatfiles\f227.txt
G:\translated\ts227.zh-CN.en.txt
G:\concatfiles\f228.txt
G:\translated\ts228.zh-CN.en.txt
G:\concatfiles\f229.txt
G:\translated\ts229.zh-CN.en.txt
G:\concatfiles\f230.txt
G:\translated\ts230.zh-CN.en.txt
G:\concatfiles\f231.txt
G:\translated\ts231.zh-CN.en.txt
G:\concatfiles\f232.txt
G:\translated\ts232.zh-CN.en.txt
G:\concatfiles\f233.txt
G:\translated\ts233.zh-CN.en.txt
G:\concatfiles\f234.txt
G:\translated\ts234.zh-CN.en.txt
G:\concatfiles\f235.txt
G:\translated\ts235.zh-CN.en.txt
G:\concatfiles\f236.txt
G:\translated\ts236.zh-CN.en.txt
G:\concatfiles\f237.txt
G:\translated\ts237.zh-CN.en.txt
G:\concatfiles\f238.txt
G:\translated\ts238.zh-CN.en.txt
G:\concatfiles\f239.txt
G:\translated\ts239.zh-CN.en.txt
G:\concatfiles\f240.txt
G:\translated\ts240.zh-CN.en.txt
G:\concatfiles\f241.txt
G:\translated\ts241.zh-CN.en.txt
G:\concatfiles\f242.txt
G:\translated\ts242.zh-CN.en.txt
G:\concatfiles\f243.txt
G:\translated\ts243.zh-CN.en.txt
G:\concatfiles\f244.txt
G:\translated\ts244.zh-CN.en.txt
G:\concatfiles\f245.txt
G:\translated\ts245.zh-CN.en.txt
G:\concatfiles\f246.txt
G:\translated\ts246.zh-CN.en.txt
G:\concatfiles\f247.txt
G:\translated\ts247.zh-CN.en.txt
G:\concatfiles\f248.txt
G:\translated\ts248.zh-CN.en.txt
G:\concatfiles\f249.txt

G:\translated\ts249.zh-CN.en.txt
G:\concatfiles\f250.txt
G:\translated\ts250.zh-CN.en.txt
G:\concatfiles\f251.txt
G:\translated\ts251.zh-CN.en.txt
G:\concatfiles\f252.txt
G:\translated\ts252.zh-CN.en.txt
G:\concatfiles\f253.txt
G:\translated\ts253.zh-CN.en.txt
G:\concatfiles\f254.txt
G:\translated\ts254.zh-CN.en.txt
G:\concatfiles\f255.txt
G:\translated\ts255.zh-CN.en.txt
G:\concatfiles\f256.txt
G:\translated\ts256.zh-CN.en.txt
G:\concatfiles\f257.txt
G:\translated\ts257.zh-CN.en.txt
G:\concatfiles\f258.txt
G:\translated\ts258.zh-CN.en.txt
G:\concatfiles\f259.txt
G:\translated\ts259.zh-CN.en.txt
G:\concatfiles\f260.txt
G:\translated\ts260.zh-CN.en.txt
G:\concatfiles\f261.txt
G:\translated\ts261.zh-CN.en.txt
G:\concatfiles\f262.txt
G:\translated\ts262.zh-CN.en.txt
G:\concatfiles\f263.txt
G:\translated\ts263.zh-CN.en.txt
G:\concatfiles\f264.txt
G:\translated\ts264.zh-CN.en.txt
G:\concatfiles\f265.txt
G:\translated\ts265.zh-CN.en.txt
G:\concatfiles\f266.txt
G:\translated\ts266.zh-CN.en.txt
G:\concatfiles\f267.txt
G:\translated\ts267.zh-CN.en.txt
G:\concatfiles\f268.txt
G:\translated\ts268.zh-CN.en.txt
G:\concatfiles\f269.txt
G:\translated\ts269.zh-CN.en.txt
G:\concatfiles\f270.txt
G:\translated\ts270.zh-CN.en.txt
G:\concatfiles\f271.txt
G:\translated\ts271.zh-CN.en.txt
G:\concatfiles\f272.txt
G:\translated\ts272.zh-CN.en.txt
G:\concatfiles\f273.txt
G:\translated\ts273.zh-CN.en.txt
G:\concatfiles\f274.txt
G:\translated\ts274.zh-CN.en.txt
G:\concatfiles\f275.txt
G:\translated\ts275.zh-CN.en.txt

G:\translated\ts275.zh-CN.en.txt
G:\concatfiles\f276.txt
G:\translated\ts276.zh-CN.en.txt
G:\concatfiles\f277.txt
G:\translated\ts277.zh-CN.en.txt
G:\concatfiles\f278.txt
G:\translated\ts278.zh-CN.en.txt
G:\concatfiles\f279.txt
G:\translated\ts279.zh-CN.en.txt
G:\concatfiles\f280.txt
G:\translated\ts280.zh-CN.en.txt
G:\concatfiles\f281.txt
G:\translated\ts281.zh-CN.en.txt
G:\concatfiles\f282.txt
G:\translated\ts282.zh-CN.en.txt
G:\concatfiles\f283.txt
G:\translated\ts283.zh-CN.en.txt
G:\concatfiles\f284.txt
G:\translated\ts284.zh-CN.en.txt
G:\concatfiles\f285.txt
G:\translated\ts285.zh-CN.en.txt
G:\concatfiles\f286.txt
G:\translated\ts286.zh-CN.en.txt
G:\concatfiles\f287.txt
G:\translated\ts287.zh-CN.en.txt
G:\concatfiles\f288.txt
G:\translated\ts288.zh-CN.en.txt
G:\concatfiles\f289.txt
G:\translated\ts289.zh-CN.en.txt
G:\concatfiles\f290.txt
G:\translated\ts290.zh-CN.en.txt
G:\concatfiles\f291.txt
G:\translated\ts291.zh-CN.en.txt
G:\concatfiles\f292.txt
G:\translated\ts292.zh-CN.en.txt
G:\concatfiles\f293.txt
G:\translated\ts293.zh-CN.en.txt
G:\concatfiles\f294.txt
G:\translated\ts294.zh-CN.en.txt
G:\concatfiles\f295.txt
G:\translated\ts295.zh-CN.en.txt
G:\concatfiles\f296.txt
G:\translated\ts296.zh-CN.en.txt
G:\concatfiles\f297.txt
G:\translated\ts297.zh-CN.en.txt
G:\concatfiles\f298.txt
G:\translated\ts298.zh-CN.en.txt
G:\concatfiles\f299.txt
G:\translated\ts299.zh-CN.en.txt
G:\concatfiles\f300.txt
G:\translated\ts300.zh-CN.en.txt
G:\concatfiles\f301.txt
G:\translated\ts301.zh-CN.en.txt

G:\concatfiles\f302.txt
G:\translated\ts302.zh-CN.en.txt
G:\concatfiles\f303.txt
G:\translated\ts303.zh-CN.en.txt
G:\concatfiles\f304.txt
G:\translated\ts304.zh-CN.en.txt
G:\concatfiles\f305.txt
G:\translated\ts305.zh-CN.en.txt
G:\concatfiles\f306.txt
G:\translated\ts306.zh-CN.en.txt
G:\concatfiles\f307.txt
G:\translated\ts307.zh-CN.en.txt
G:\concatfiles\f308.txt
G:\translated\ts308.zh-CN.en.txt
G:\concatfiles\f309.txt
G:\translated\ts309.zh-CN.en.txt
G:\concatfiles\f310.txt
G:\translated\ts310.zh-CN.en.txt
G:\concatfiles\f311.txt
G:\translated\ts311.zh-CN.en.txt
G:\concatfiles\f312.txt
G:\translated\ts312.zh-CN.en.txt
G:\concatfiles\f313.txt
G:\translated\ts313.zh-CN.en.txt
G:\concatfiles\f314.txt
G:\translated\ts314.zh-CN.en.txt
G:\concatfiles\f315.txt
G:\translated\ts315.zh-CN.en.txt
G:\concatfiles\f316.txt
G:\translated\ts316.zh-CN.en.txt
G:\concatfiles\f317.txt
G:\translated\ts317.zh-CN.en.txt
G:\concatfiles\f318.txt
G:\translated\ts318.zh-CN.en.txt
G:\concatfiles\f319.txt
G:\translated\ts319.zh-CN.en.txt
G:\concatfiles\f320.txt
G:\translated\ts320.zh-CN.en.txt
G:\concatfiles\f321.txt
G:\translated\ts321.zh-CN.en.txt
G:\concatfiles\f322.txt
G:\translated\ts322.zh-CN.en.txt
G:\concatfiles\f323.txt
G:\translated\ts323.zh-CN.en.txt
G:\concatfiles\f324.txt
G:\translated\ts324.zh-CN.en.txt
G:\concatfiles\f325.txt
G:\translated\ts325.zh-CN.en.txt
G:\concatfiles\f326.txt
G:\translated\ts326.zh-CN.en.txt
G:\concatfiles\f327.txt
G:\translated\ts327.zh-CN.en.txt

```
G:\concatfiles\f328.txt
G:\translated\ts328.zh-CN.en.txt
G:\concatfiles\f329.txt
G:\translated\ts329.zh-CN.en.txt
G:\concatfiles\f330.txt
G:\translated\ts330.zh-CN.en.txt
G:\concatfiles\f331.txt
G:\translated\ts331.zh-CN.en.txt
G:\concatfiles\f332.txt
G:\translated\ts332.zh-CN.en.txt
G:\concatfiles\f333.txt
G:\translated\ts333.zh-CN.en.txt
G:\concatfiles\f334.txt
G:\translated\ts334.zh-CN.en.txt
G:\concatfiles\f335.txt
G:\translated\ts335.zh-CN.en.txt
G:\concatfiles\f336.txt
G:\translated\ts336.zh-CN.en.txt
G:\concatfiles\f337.txt
G:\translated\ts337.zh-CN.en.txt
G:\concatfiles\f338.txt
G:\translated\ts338.zh-CN.en.txt
```

In [12]:

```
translated2=pd.DataFrame()
for j in range(340,400):
    filename="G:\\concatfiles\\f"+str(j)+".txt"
    transname="G:\\translated\\ts"+str(j)+".zh-CN.en.txt"
    print(filename)
    print(transname)
    f=pd.read_csv(filename)
    t= pd.read_csv(transname,sep="5A09")
    frames = [f,t]
#result = pd.concat(frames, ignore_index=False)
    #df="df"+str(j)
    df=(pd.concat(frames, join='outer', ignore_index=False,keys=None, levels=None, na
mes=None, verify_integrity=False, copy=True, axis=1))
    translated2=translated2.append(df)
    #translated.append(df,ignore_index=True)
```

```
G:\concatfiles\f340.txt
G:\translated\ts340.zh-CN.en.txt
G:\concatfiles\f341.txt
G:\translated\ts341.zh-CN.en.txt
G:\concatfiles\f342.txt
G:\translated\ts342.zh-CN.en.txt
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:8: ParserWarning: Fal
ling back to the 'python' engine because the 'c' engine does not support regex separa
tors (separators > 1 char and different from '\s+' are interpreted as regex); you can
avoid this warning by specifying engine='python'.
```

G:\concatfiles\f343.txt
G:\translated\ts343.zh-CN.en.txt
G:\concatfiles\f344.txt
G:\translated\ts344.zh-CN.en.txt
G:\concatfiles\f345.txt
G:\translated\ts345.zh-CN.en.txt
G:\concatfiles\f346.txt
G:\translated\ts346.zh-CN.en.txt
G:\concatfiles\f347.txt
G:\translated\ts347.zh-CN.en.txt
G:\concatfiles\f348.txt
G:\translated\ts348.zh-CN.en.txt
G:\concatfiles\f349.txt
G:\translated\ts349.zh-CN.en.txt
G:\concatfiles\f350.txt
G:\translated\ts350.zh-CN.en.txt
G:\concatfiles\f351.txt
G:\translated\ts351.zh-CN.en.txt
G:\concatfiles\f352.txt
G:\translated\ts352.zh-CN.en.txt
G:\concatfiles\f353.txt
G:\translated\ts353.zh-CN.en.txt
G:\concatfiles\f354.txt
G:\translated\ts354.zh-CN.en.txt
G:\concatfiles\f355.txt
G:\translated\ts355.zh-CN.en.txt
G:\concatfiles\f356.txt
G:\translated\ts356.zh-CN.en.txt
G:\concatfiles\f357.txt
G:\translated\ts357.zh-CN.en.txt
G:\concatfiles\f358.txt
G:\translated\ts358.zh-CN.en.txt
G:\concatfiles\f359.txt
G:\translated\ts359.zh-CN.en.txt
G:\concatfiles\f360.txt
G:\translated\ts360.zh-CN.en.txt
G:\concatfiles\f361.txt
G:\translated\ts361.zh-CN.en.txt
G:\concatfiles\f362.txt
G:\translated\ts362.zh-CN.en.txt
G:\concatfiles\f363.txt
G:\translated\ts363.zh-CN.en.txt
G:\concatfiles\f364.txt
G:\translated\ts364.zh-CN.en.txt
G:\concatfiles\f365.txt
G:\translated\ts365.zh-CN.en.txt
G:\concatfiles\f366.txt
G:\translated\ts366.zh-CN.en.txt
G:\concatfiles\f367.txt
G:\translated\ts367.zh-CN.en.txt
G:\concatfiles\f368.txt

G:\translated\ts368.zh-CN.en.txt
G:\concatfiles\f369.txt
G:\translated\ts369.zh-CN.en.txt
G:\concatfiles\f370.txt
G:\translated\ts370.zh-CN.en.txt
G:\concatfiles\f371.txt
G:\translated\ts371.zh-CN.en.txt
G:\concatfiles\f372.txt
G:\translated\ts372.zh-CN.en.txt
G:\concatfiles\f373.txt
G:\translated\ts373.zh-CN.en.txt
G:\concatfiles\f374.txt
G:\translated\ts374.zh-CN.en.txt
G:\concatfiles\f375.txt
G:\translated\ts375.zh-CN.en.txt
G:\concatfiles\f376.txt
G:\translated\ts376.zh-CN.en.txt
G:\concatfiles\f377.txt
G:\translated\ts377.zh-CN.en.txt
G:\concatfiles\f378.txt
G:\translated\ts378.zh-CN.en.txt
G:\concatfiles\f379.txt
G:\translated\ts379.zh-CN.en.txt
G:\concatfiles\f380.txt
G:\translated\ts380.zh-CN.en.txt
G:\concatfiles\f381.txt
G:\translated\ts381.zh-CN.en.txt
G:\concatfiles\f382.txt
G:\translated\ts382.zh-CN.en.txt
G:\concatfiles\f383.txt
G:\translated\ts383.zh-CN.en.txt
G:\concatfiles\f384.txt
G:\translated\ts384.zh-CN.en.txt
G:\concatfiles\f385.txt
G:\translated\ts385.zh-CN.en.txt
G:\concatfiles\f386.txt
G:\translated\ts386.zh-CN.en.txt
G:\concatfiles\f387.txt
G:\translated\ts387.zh-CN.en.txt
G:\concatfiles\f388.txt
G:\translated\ts388.zh-CN.en.txt
G:\concatfiles\f389.txt
G:\translated\ts389.zh-CN.en.txt
G:\concatfiles\f390.txt
G:\translated\ts390.zh-CN.en.txt
G:\concatfiles\f391.txt
G:\translated\ts391.zh-CN.en.txt
G:\concatfiles\f392.txt
G:\translated\ts392.zh-CN.en.txt
G:\concatfiles\f393.txt
G:\translated\ts393.zh-CN.en.txt
G:\concatfiles\f394.txt
G:\translated\ts394.zh-CN.en.txt

G:\translated\ts394.zh-CN.en.txt
G:\concatfiles\f395.txt
G:\translated\ts395.zh-CN.en.txt
G:\concatfiles\f396.txt
G:\translated\ts396.zh-CN.en.txt
G:\concatfiles\f397.txt
G:\translated\ts397.zh-CN.en.txt
G:\concatfiles\f398.txt
G:\translated\ts398.zh-CN.en.txt
G:\concatfiles\f399.txt
G:\translated\ts399.zh-CN.en.txt

In [15]:

```
frames=[translated,translated1,translated2]
```

In [17]:

```
translated=translated.append(translated1)
```

In [18]:

```
translated=translated.append(translated2)
```

In [20]:

```
translated.head(611759).to_csv("E://DMA_PRE//Translated1.csv", sep=',',index=False,
encoding= 'utf-8')
translated.tail(611758).to_csv("E://DMA_PRE//Translated2.csv", sep=',',index=False,
encoding= 'utf-8')
```

In [10]:

```
translated.shape
```

Out[10]:

(670177, 13)

TEXT PREPROCESSING

REMOVAL OF NOISE - URL

In [11]:

```
def remurl(content):
    try:
        URLless_string = re.sub(r'\w+:\/{2}[\d\w-]+(\.[\d\w-]+)*(?:(?:\/[^\s/]*))*',
'', content)
        return URLless_string
```

```
    except Exception as e:
        print(str(e))
```

In [13]:

```
df_urlrem = pd.DataFrame(columns=['en_contenturl','url_rem'])
for i in range(50000):
    non_emo=translated['en_content'].iloc[i]
    content=translated['en_content'].iloc[i]
    new_content=remurl(content)

    df_urlrem = df_urlrem.append({'en_contenturl': non_emo,'url_rem':new_content}, ig
nore_index=True)
```

```
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
expected string or bytes-like object
```

OUTPUT

In [22]:

```
df_urlrem.head(5)
```

Out[22]:

	en_contenturl	url_rem
0	Lijiang Tourism (sz002033) # ## stock stocks F...	Lijiang Tourism (sz002033) # ## stock stocks F...
1	Chen Ling Ding # # red envelopes to make money...	Chen Ling Ding # # red envelopes to make money...
2	Taobao these sucker. . . Industrial gas fire n...	Taobao these sucker. . . Industrial gas fire n...
3	Aspect can not say, you know everything [laugh...	Aspect can not say, you know everything [laugh...
4	Over 111 Zhang	Over 111 Zhang

REMOVAL OF STOPWORDS

In [23]:

```
remStopword=pd.DataFrame()
```

In [24]:

```
def removeStopwords(data):
    stop_words = set(stopwords.words('english'))
    words = word_tokenize(data)
    wordsFiltered = []
    try:
        for w in words:
            if (w not in stop_words) :
                wordsFiltered.append(w)
        return wordsFiltered
    except Exception as e:
        print(str(e))
```

In [1]:

```
df_new = pd.DataFrame(columns=['en_contentsw','Stopwrod_removed'])
for i in range(50000):
    non_emo=df_urlrem['url_rem'].iloc[i]
    remStopword=removeStopwords(df_urlrem['url_rem'].iloc[i])
    list1=[non_emo,remStopword]

    df_new = df_new.append({'en_contentsw': non_emo, 'Stopword_removed': remStopword}
, ignore_index=True)
```

OUTPUT

In [114]:

```
df_new.drop(['Stopwrod_removed'], axis=1).head(5)
```

Out[114]:

	en_contentsw	Stopword_removed
0	Lijiang Tourism (sz002033) # ## stock stocks F...	[Lijiang, Tourism, (, sz002033,), #, #, #, st...
1	Chen Ling Ding # # red envelopes to make money...	[Chen, Ling, Ding, #, #, red, envelopes, make,...
2	Taobao these sucker. . . Industrial gas fire n...	[Taobao, sucker, ., ., ., Industrial, gas, fir...
3	Aspect can not say, you know everything [laugh	[Aspect, say, ,, know, everything, [, laughs,

	en_contentsw	Stopword_removed
4	Over 111 Zhang	[Over, 111, Zhang]

STEMMING

In [96]:

```
import nltk
from nltk.stem.porter import PorterStemmer
porter_stemmer = PorterStemmer()
```

In [97]:

```
def stemming(tokens):
    # First Word tokenization
    nltk_tokens =tokens
    stem = []
    #Next find the roots of the word
    try:
        for w in nltk_tokens:
            s=porter_stemmer.stem(w)
            stem.append(s)
        return stem
    except Exception as e:
        print(str(e))
```

In [32]:

```
df_stem = pd.DataFrame(columns=['en_contentst','Stemming'])
for i in range(50000):
    content=df_new['Stopword_removed'].iloc[i]
    stem=stemming(df_new['Stopword_removed'].iloc[i])
    list1=[content,stem]
    df_stem = df_stem.append({'en_contentst': content, 'Stemming': stem}, ignore_inde
x=True)
```

OUTPUT

In [116]:

```
df_stem.head(5)
```

Out[116]:

	en_contentst	Stemming
0	[Lijiang, Tourism, (, sz002033,), #, #, #, st...	[lijiang, tourism, (, sz002033,), #, #, #, st...

	en_contentst	Stemming
1	[Chen, Ling, Ding, #, #, red, envelopes, make,...	[chen, ling, ding, #, #, red, envelop, make, m...
2	[Taobao, sucker, ., ., ., Industrial, gas, fir...	[taobao, sucker, ., ., ., industri, ga, fire, ...
3	[Aspect, say, ,, know, everything, [, laughs, ...	[aspect, say, ,, know, everyth, [, laugh, cri,]]
4	[Over, 111, Zhang]	[over, 111, zhang]

LEMMATIZATION

Returns the base or dictionary form of the word (lemma) Ex:

- feet --> foot
- wolves --> wolf

In [34]:

```
###LEMMATIZATION
import nltk
from nltk.stem import WordNetLemmatizer
```

In [35]:

```
def lemmatization(tokens):
    wordnet_lemmatizer = WordNetLemmatizer()
    nltk_tokens =tokens
    lem = []
    #Next find the roots of the word
    try:
        for w in nltk_tokens:
            l=wordnet_lemmatizer.lemmatize(w)
            lem.append(l)
        return lem
    except Exception as e:
        print(str(e))
```

In [36]:

```
df_lem = pd.DataFrame(columns=['Stemmingle','lemmatization'])
for i in range(50000):
    content=df_stem['Stemming'].iloc[i]
    lem=stemming(df_stem['Stemming'].iloc[i])
    list1=[content,lem]
    df_lem = df_lem.append({'Stemmingle': content, 'lemmatization': lem}, ignore_inde
x=True)
```

In [117]:

```
df_lem.head(5)
```

Out[117]:

	Stemmingle	lemmatization
0	[lijiang, tourism, (, sz002033,), #, #, #, st...	[lijiang, tourism, (, sz002033,), #, #, #, st...
1	[chen, ling, ding, #, #, red, envelop, make, m...	[chen, ling, ding, #, #, red, envelop, make, m...
2	[taobao, sucker, ., ., ., industri, ga, fire, ...	[taobao, sucker, ., ., ., industri, ga, fire, ...
3	[aspect, say, ,, know, everyth, [, laugh, cri,]]	[aspect, say, ,, know, everyth, [, laugh, cri,]]
4	[over, 111, zhang]	[over, 111, zhang]

In [38]:

```
#nltk.download('wordnet')
```

Converting to lower case

In [39]:

```
def tolower(tokens):
    nltk_tokens=tokens
    x = [element.lower() for element in nltk_tokens]
    return x
```

In [40]:

```
df_lower = pd.DataFrame(columns=['lemmatizationtl','lower'])
for i in range(50000):
    content=df_lem['lemmatization'].iloc[i]
    low=tolower(df_lem['lemmatization'].iloc[i])
    list1=[content,low]
    df_lower = df_lower.append({'lemmatizationtl': content, 'lower': low}, ignore_ind
ex=True)
```

OUTPUT

In [118]:

```
df_lower.head(5)
```

Out[118]:

	lemmatizationtl	lower
0	[lijiang, tourism, (, sz002033,), #, #, #, st...	[lijiang, tourism, (, sz002033,), #, #, #, st...
1	[chen, ling, ding, #, #, red, envelop, make,	[chen, ling, ding, #, #, red, envelop, make,

	m... lemmatizationtl	m... lower
2	[taobao, sucker, ., ., ., industri, ga, fire, ...	[taobao, sucker, ., ., ., industri, ga, fire, ...
3	[aspect, say, ,, know, everyth, [, laugh, cri,]]	[aspect, say, ,, know, everyth, [, laugh, cri,]]
4	[over, 111, zhang]	[over, zhang]

Removing numbers

In [42]:

```
def rem_num(tokens):
        for item in tokens:
            if item.isdigit():
                tokens.remove(item)
        return tokens
```

In [104]:

```
df_remnum = pd.DataFrame(columns=['lowerrnum','no_num'])
for i in range(50000):
    content=df_lower['lower'].iloc[i]
    nonum=rem_num(df_lower['lower'].iloc[i])
    df_remnum = df_remnum.append({'lowerrnum': content, 'no_num': nonum}, ignore_inde
x=True)
```

REMOVE PUNTUATION

In [121]:

```
def rem_punctuation(tokens):
        input_text = ' '.join(tokens).lower()
        s = re.sub(r"[-()\"#/@;:<>{}\[\]`+=~|.!?,]", "", input_text)
        #print(input_text)
        words = word_tokenize(s)
        return words
```

In [122]:

```
df_rempunc = pd.DataFrame(columns=['no_numrp','no_punc'])
for i in range(50000):
    content=df_remnum['no_num'].iloc[i]
    nopun=rem_punctuation(df_remnum['no_num'].iloc[i])
    list1=[content,nopun]
    df_rempunc = df_rempunc.append({'no_numrp': content, 'no_punc': nopun}, ignore_in
dex=True)
```

OUTPUT

In [186]:

```
T=translated.head(50000)
```

In [192]:

```
frames=[T,df_urlrem, df_new, df_stem, df_lem, df_lower, df_remnum, df_rempunc]
```

In [190]:

```
T = T.reset_index(drop=True)
```

In [193]:

```
Train=(pd.concat(frames, join='outer', ignore_index=False,keys=None, levels=None, nam
es=None, verify_integrity=False, copy=True, axis=1))
```

In [196]:

```
Train=Train.drop(['content_spchar',
'non_emoji_content','content','en_content','Unnamed: 1', 'en_contenturl',
       'url_rem', 'en_contentsw', 'Stopwrod_removed', 'Stopword_removed',
       'en_contentst', 'Stemming', 'Stemmingle', 'lemmatization',
       'lemmatizationtl', 'lower', 'lowerrnum', 'no_num', 'no_numrp'], axis=1)
```

In [197]:

```
Train = Train.rename(columns={'no_punc': 'content'})
```

In [198]:

```
Train.shape
```

Out[198]:

```
(10000, 10)
```

In [210]:

```
Train=Train.drop(['index'],axis=1)
```

In [211]:

```
Train.to_csv("E:\\DMA_PRE\\PREPROCESSED.csv", sep=',',index=False, encoding= 'utf-8')
```

In [214]:

```
Train.columns
```

Out[214]:

```
Index(['u_id', 'm_id', 'forward_count', 'comment_count', 'like_count', 'date',
       'time', 'content_media_count', 'content'],
```

```
      dtype='object')
```

In [212]:

```
Train
```

Out[212]:

	u_id	m_id	forwa
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	0
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	0
5	d80f3d3c5c1d658e82b837a4dd1af849	bfc0819b83ec59ce767287077f2b3507	0
6	f349a67d1cd7c8683c5bbc5f8486e193	83674a60e5310195fc35d97ea8f45c46	0
7	24b621c98f2594b698c0b1d60c9ae6db	2cbd3d514ed5ad3dab81aa043c8b3d0a	0
8	e44d81d630e4f382f657e72aa4b685da	8a88a25f9f26ed9f79080eaacc1a8668	0
9	fbe6c953632e1b3dda66cf6118b6ab12	f359a74cb4ac6150a3af8325eda04ea0	0
10	f9a3ca6bc1e75d173cfc98ec4b108072	c7bc3445e8b90db8cc5e045f606dc1ee	21
11	3c68bbb9da57fcc752c8a493d91bdd3a	77e14cf9d460715e84c51747c3641a9b	0
12	104e8d55e98eb3cd834810088af039fe	ee0b2c9d35bfeb0fbc5b3a8677f4a18c	9
13	0d15005d6397fb5ce1d45e7c834f7370	9c954d63fcfea19dca8d81a4f3b53861	0
14	875a4a77b339d93f819e2c4de5bd0b57	f2cdcdbcec9ff47cbb3c6a636e4b92a3	0
15	380a2219670f50dc87efce3380bea6e8	46f10244d02afa85d12346ce28e3cec5	0

	u_id	m_id	forwa
16	b9b88b0fc105fb08a552e782afa4342e	cb907eb1bdbc198ed0944cc3b7e24f91	0
17	f18eb14365c0d7248fab1b9c464f4e70	096543bd8746869982d1a7557164dd0d	0
18	0fc17bf5e2dc789dd48505df1f5b14fd	4c1e2418127811d212d0e3867a99db3e	0
19	dd749a5af07c04ce7de451273a983671	419dd71d562883ef836e774bc3f4e163	0
20	a984551b159fcdc0a48f9e38ecb1488f	baa0051d359555601ab61df684787f0f	0
21	2e0467b73d0f6f9e5607a6174581fdd8	2fd200a7f670138c2026091c3b01532a	0
22	819656f05994b00b7260daf7346586a7	95590e88cac5d8c9d1a496bc3bd42f07	6
23	91ce7c63b272f2037a3e702c10163fa3	8b4e85a881afaff91f276eac7bfb6604	0
24	4680e73f9e7a6b87dec62a86a7821c17	b2db095af290b3a36cf798a3e17528d8	0
25	976e85e3ededdd9b2c2a3179eb7ae8ab	9540ee0cf7ccfae523020c8025e7095f	0
26	6623347e5f19f35f2d02ad515b96524c	9a2f48a870843d1964a03c6642b309d5	0
27	cf727e70b6661387cf6aadf01d2eb32c	bff281350f035db0e84c25394865d86a	0
28	de0836c1c5d40a5cae64a964a0b54894	c3345fd72cad53ca9bffd63634170ba0	0
29	c8848f18da5911d0389c3ac70fe13204	fa352495e646a3f7ff979267c490fd89	0
...	...	...	...
9970	5ae3749e4e089c3c76843debbff80283	ee9da01dfefe7e7f0bf571e8136aad20	2
9971	5587f41cfaf471df0f37b74a298295a7	8547fbb068298fbe75eeb18afec247cb	0
9972	93cc443d5df3c53a1fd0d8e12286eb1b	123bf93f7de888ee43f57e70b39ed72b	0
9973	c4b747dca344890718884e10805be401	247ae6b3c354a33cdd80472b95012d59	6

	u_id	m_id	forwa
9974	b4e7bc5d347de90c0629fe2227d96484	6603b30d73b5e23f9fe7c8ac1f39b6d8	34
9975	7564bab83ea84e4c0985b023aac58c7d	0924b77fad659942de9955042d9795fe	0
9976	6c62c5eee1ad56b97e00e34c6eeddf83	87c3f916a2c129a3443daaf564452b31	0
9977	875a4a77b339d93f819e2c4de5bd0b57	30e19c5b0642f61d89d29bf18bb0987e	0
9978	d592754c20ee397a6932e9dcc5323a49	ee85cb92cc924761a4546bfeed373cb5	0
9979	717fcfb02acdd129954856331cbeb70f	cc8d59d3006f70566119f124bf3be0bc	0
9980	c4b747dca344890718884e10805be401	82344020ee957d6b66544191ef914c51	3
9981	f41f1ffcafafd818c3cdaab632f51c0f	2889c9f8c306edee7e46124142fb692b	0
9982	c60533fdb5278412b14379f693f77dd5	c18182c9b3a2c0786f6e61fd601eebcd	1
9983	dd171c22e4560775c6b474d2e76ff6df	03658e9964e036191ccd1ccb3c4a3030	0
9984	3b0e32348721c39b3a8ad0259f6d6671	62e854ca6b734c6128dabc288b3837e3	0
9985	ba8fa60737fd5ccde031861384b7c70b	487808510c03c57547a1d869002f9b6b	0
9986	0f24ca3980734abb64119b0c47f63872	e7f75a763842a8a7a80da9a7dcf259fc	1
9987	6e7d0f59a83e1639fe5dbe90d58924bd	a8aac705174dbfa882169a8b91f0a555	0
9988	9e44aadf543ea2cfa063add522f61791	d1a57fde410538993c2c34d23d0f1c7b	61
9989	eacb9ef7d9f8b48fe0e815231cd7e9a7	6e656816c63ed6193f7c11abc7c08636	0
9990	b7a40e686113044148b88872b5cc3a3c	f57414659c4ae247b653445d08f8002a	1
9991	fb5acde8c0d7bb225b3dae767d6cdff3	4d81c630fafd742250af37213fed2cb6	1
9992	25ca1cea6595c04a5f009a11dd0e676b	cd42a5f05c3cd93ae1733ad1f07a7b18	0

	u_id	m_id	forwa
9993	1155b6265c1f6c648a622ef87a5d40a2	0002403c7426903f9e9983761aae5d06	0
9994	2fb80ade87859a21c10b98391df7d23c	efd2e25f97bca46f356b41d07f21f556	0
9995	f965a0cebbb0ecdd9ab3e1df7029d679	febab0099a7fdd541fbc541a85f00578	0
9996	ec0f81cdfb9895775f2071853bf75e75	7dff0cc3150ae91a7f8df06ccdccbf51	0
9997	586d67e2d15faeb2cb6db6f7a44312f1	4a1fd3c45f0514021acacc830ce17f44	0
9998	7634e89faee952e49bfb983de1a6518c	323cac43f508302afee6875402338ffd	0
9999	ba58044ec2e74ab69e4a5e2fe1b732e8	396772cb616a0ed336dc9bcc0e73acfb	1

10000 rows × 9 columns

TEXT

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%pylab inline
import copy
from googletrans import Translator
import pandas as pd
import numpy as np
import csv
import re
import jieba
import time
import json
from sklearn.feature_extraction.text import CountVectorizer
from sklearn import linear_model
from sklearn.externals import joblib
from nltk.corpus import stopwords as e_stopwords
from datetime import datetime, timedelta
import jieba
import sys

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
```

```
Populating the interactive namespace from numpy and matplotlib
```

In [2]:

```
train1= pd.read_csv("G:\\preprocessed_1.csv")
```

In [4]:

```
train2= pd.read_csv("G:\\preprocessed_2.csv")
```

In [7]:

```
frames=[train1,train2]
train=pd.concat(frames)
```

In [8]:

```
train.shape[0]
```

Out[8]:

```
1223517
```

In [69]:

```
translated=train
```

TEXT PREPROCESSING

REMOVAL OF NOISE - URL

In [70]:

```
def remurl(content):
    try:
        URLless_string = re.sub(r'\w+:\/{2}[\d\w-]+(\.[\d\w-]+)*(?:(?:\/[^\s/]*))*', '', content)
        return URLless_string
    except Exception as e:
        print(str(e))
        return content
```

Removal of numbers

In [71]:

```
def rem_num(tokens):
        try:
            for item in tokens:
                if item.isdigit():
                    tokens.remove(item)
            return tokens
        except Exception as e:
            print(str(e))
            return tokens
```

REMOVAL OF STOPWORDS

In [72]:

```
remStopword=pd.DataFrame()
```

In [73]:

```
def removeStopwords(data):
    stopw="STOPWORDS.txt"
    stop_words = set(stopwords.words('english'))
    words = word_tokenize(data)
    wordsFiltered = []
    try:
        for w in words:
            if (w not in stopw or w not in stop_words) :
                wordsFiltered.append(w)
        return wordsFiltered
    except Exception as e:
        print(str(e))
        return data
```

STEMMING

In [74]:

```
import nltk
from nltk.stem.porter import PorterStemmer
porter_stemmer = PorterStemmer()
```

In [75]:

```
def stemming(tokens):
    # First Word tokenization
    nltk_tokens =tokens
    stem = []
    #Next find the roots of the word
    try:
        for w in nltk_tokens:
            s=porter_stemmer.stem(w)
            stem.append(s)
        return stem
    except Exception as e:
```

```
        print(str(e))
        return tokens
```

LEMMATIZATION

In [76]:

```
###LEMMATIZATION
import nltk
from nltk.stem import WordNetLemmatizer
```

In [77]:

```
def lemmatization(tokens):
    wordnet_lemmatizer = WordNetLemmatizer()
    nltk_tokens =tokens
    lem = []
    #Next find the roots of the word
    try:
        for w in nltk_tokens:
            l=wordnet_lemmatizer.lemmatize(w)
            lem.append(l)
        return lem
    except Exception as e:
        print(str(e))
        return tokens
```

In [78]:

```
#nltk.download('wordnet')
```

Converting to lower case

In [79]:

```
def tolower(tokens):
    try:
        nltk_tokens=tokens
        x = [element.lower() for element in nltk_tokens]
        return x
    except Exception as e:
        print(str(e))
        return tokens
```

In [80]:

```
 def rem_punctuation(tokens):
        try:
            input_text = ' '.join(tokens).lower()
            s = re.sub(r"[-()\"#/@;:<>{}`+=~|.!?,]", "", input_text)
            #print(input_text)
            words = word_tokenize(s)
            return words
        except Exception as e:
            print(str(e))
            return tokens
```

In [81]:

```
## REMOVE PUNTUATION
```

In [105]:

```
df_urlrem = pd.DataFrame(columns=['en_contenturl','url_rem'])
for i in range(10):
    non_emo=translated['en_content'].iloc[i]
```

```
    content=translated['en_content'].iloc[i]
    new_content=remurl(content)

    df_urlrem = df_urlrem.append({'en_contenturl': non_emo,'url_rem':new_content},
ignore_index=True)
print("done1")
df_remnum = pd.DataFrame(columns=['url_rem',])
for i in range(10):
    content=df_urlrem['url_rem'].iloc[i]
    nonum=rem_num(df_urlrem['url_rem'].iloc[i])
    list1=[content,nonum]
    df_remnum = df_remnum.append({'url_rem': content, 'no_num': nonum}, ignore_index=True)
print("done2")
df_new = pd.DataFrame(columns=['no_num','Stopwrod_removed'])
for i in range(10):
    non_emo=df_remnum['no_num'].iloc[i]
    letters_only = re.sub("[^a-zA-Z]"," ",str(df_remnum['no_num'].iloc[i]))
    remStopword=removeStopwords(letters_only)
    list1=[non_emo,remStopword]
    df_new = df_new.append({'no_num': non_emo, 'Stopword_removed': remStopword}, ignore_index=True)

print("done3")
df_stem = pd.DataFrame(columns=['en_contentst','Stemming'])
for i in range(10):
    content=df_new['Stopword_removed'].iloc[i]
    stem=stemming(df_new['Stopword_removed'].iloc[i])
    list1=[content,stem]
    df_stem = df_stem.append({'en_contentst': content, 'Stemming': stem}, ignore_index=True)
print("done4")
df_lem = pd.DataFrame(columns=['Stemmingle','lemmatization'])
for i in range(10):
    content=df_stem['Stemming'].iloc[i]
    lem=stemming(df_stem['Stemming'].iloc[i])
    list1=[content,lem]
    df_lem = df_lem.append({'Stemmingle': content, 'lemmatization': lem}, ignore_index=True)
print("done5")
df_lower = pd.DataFrame(columns=['lemmatizationtl','lower'])
for i in range(10):
    content=df_lem['lemmatization'].iloc[i]
    low=tolower(df_lem['lemmatization'].iloc[i])
    list1=[content,low]
    df_lower = df_lower.append({'lemmatizationtl': content, 'lower': low}, ignore_index=True)
print("done6")
df_rempunc = pd.DataFrame(columns=['lemmatizationtlp','no_punc'])
for i in range(10):
    content=df_lower['lemmatizationtl'].iloc[i]
    nopun=rem_punctuation(df_lower['lemmatizationtl'].iloc[i])
    list1=[content,nopun]
    df_rempunc = df_rempunc.append({'lemmatizationtlp': content, 'no_punc': nopun}, ignore_index=Tr
ue)
print("done7")
df_rempunc.to_csv("G://preprocessed_FULL.csv", sep=',',index=False, encoding= 'utf-8')
```

```
done1
'str' object has no attribute 'remove'
'str' object has no attribute 'remove'
'str' object has no attribute 'remove'
'str' object has no attribute 'remove'
done2
done3
done4
done5
done6
done7
```

In [89]:

```
frames=[translated,df_urlrem, df_new, df_stem, df_lem, df_lower, df_remnum, df_rempunc]
```

In [93]:

```
Train=Train.reset_index(inplace=True, drop=True)
```

In [104]:

In [104]:

```
df_rempunc
```

Out[104]:

	lemmatizationtlp	no_punc
0	[lijiang, tourism, sz, stock, stock, financ, i...	[lijiang, tourism, sz, stock, stock, financ, i...
1	[chen, ling, ding, red, envelop, to, make, mon...	[chen, ling, ding, red, envelop, to, make, mon...
2	[taobao, these, sucker, industri, ga, fire, no...	[taobao, these, sucker, industri, ga, fire, no...
3	[aspect, can, not, say, you, know, everyth, la...	[aspect, can, not, say, you, know, everyth, la...
4	[over, zhang]	[over, zhang]
5	[lifetim, My, favorit, up, with, the, main, bo...	[lifetim, my, favorit, up, with, the, main, bo...
6	[On, uniqlo, dress, room, sound, insul, is, go...	[on, uniqlo, dress, room, sound, insul, is, go...
7	[So, ordinari, everyday, scene, but, also, how...	[so, ordinari, everyday, scene, but, also, how...
8	[overh, of, red, xxiii, tanggua, children, sti...	[overh, of, red, xxiii, tanggua, children, sti...
9	[there, are, good, thing, to, share, with, you...	[there, are, good, thing, to, share, with, you...

In [102]:

```
Train
```

In [30]:

```
Train.to_csv("G://preprocessed2L.csv", sep=',',index=False, encoding= 'utf-8')
```

In [106]:

```
df=pd.read_csv("G://preprocessed_FULL.csv")
```

In [107]:

```
df
```

Out[107]:

	lemmatizationtlp	no_punc
0	['lijiang', 'tourism', 'sz', 'stock', 'stock',...	['lijiang', 'tourism', 'sz', 'stock', 'stock',...
1	['chen', 'ling', 'ding', 'red', 'envelop', 'to...	['chen', 'ling', 'ding', 'red', 'envelop', 'to...
2	['taobao', 'these', 'sucker', 'industri', 'ga'...	['taobao', 'these', 'sucker', 'industri', 'ga'...
3	['aspect', 'can', 'not', 'say', 'you', 'know',...	['aspect', 'can', 'not', 'say', 'you', 'know',...
4	['over', 'zhang']	['over', 'zhang']
5	['lifetim', 'My', 'favorit', 'up', 'with', 'th...	['lifetim', 'my', 'favorit', 'up', 'with', 'th...
6	['On', 'uniqlo', 'dress', 'room', 'sound', 'in...	['on', 'uniqlo', 'dress', 'room', 'sound', 'in...
7	['So', 'ordinari', 'everyday', 'scene', 'but',...	['so', 'ordinari', 'everyday', 'scene', 'but',...
8	['overh', 'of', 'red', 'xxiii', 'tanggua', 'ch...	['overh', 'of', 'red', 'xxiii', 'tanggua', 'ch...
9	['there', 'are', 'good', 'thing', 'to', 'share...	['there', 'are', 'good', 'thing', 'to', 'share...

Team 5A09 DMA Course: Project Sina Weibo Interaction Prediction Challenge

Determining Statistical Factors

Authors: Apoorva Malemath, Arundati Dixit, Ashish Kar, Deepti Nadkarni

In [1]:

```
import import_ipynb
import pandas as pd
from genUidStat import loadData,genUidStat
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from genUidStat.ipynb
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

Information on Loaded Modules

genUidStat.ipynb

Loads train and predict dataset as well as generated UID stats with statistical measures for further analysis

evaluation.ipynb

evaluation function accoding to official rule:
http://tianchi.aliyun.com/competition/information.htm?spm=5176.100067.5678.2.Grh4pl&raceId=5

runTime.ipynb

A basic run time function for run time calculation

Prerequisites

1. Generate UID Stats with statistical measures for FCL

We will find Mean, Median, Max and Min of Forward, Comment and Likes for every unique UID in train dataset for our further statistical analysis

In [1]:

```
df=pd.read_csv("train_uid_stat.csv")
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
<ipython-input-1-e05e2296a0b5> in <module>()
----> 1 df=pd.read_csv("train_uid_stat.csv")

NameError: name 'pd' is not defined
```

Example For UID stats

Say in train dataset, For UID x there are two MID(ie two posts):

Train Dataset:

UID Stats:

Now Consider that same user has 4 mids in predict dataset, so prediction of FCL by factor "mean" will be as follows:

Predict Dataset

Similary by factor "max" :

Predict Dataset

In [10]:

```
df.head(50)
```

Out[10]:

	u_id	forward_min	forward_max	forward_median	fo
0	000127c6126e2b0019f255ed21ac1cb7	0	1	0	0
1	0001565a5edece1669577e2ace9a6a3d	0	0	0	0

	uc_id	forward_min	forward_max	forward_median	fo
2	00033a6513b86b2705de9ffa9d37ffb6	0	0	0	0
3	0004fe2742507420eaa73e119dc83ac5	0	6	0	0
4	000c663a24a2f91f4ba156fcd4f8b9f2	0	1	0	0
5	000ce19d2fccb1f22421bec50bf25b08	0	0	0	0
6	000d7bf7406392b2212dfb4fe907d946	0	0	0	0
7	0012edb614365800e901c7f2b47e9129	0	0	0	0
8	001349a053bdecf1a71960f29288ced1	0	0	0	0
9	0015c42ec93854687a258a7f170c6acf	0	0	0	0
10	0018b27ecc1370e4208b6b2f175e6651	0	0	0	0
11	001d259734bccab73fdc373803c1fcd3	0	8	0	1
12	001d458a43e7fd1d9f8e2eba54d5d2fe	0	0	0	0
13	001e00fddab72bf7e6be3455e199904a	0	1	0	0
14	001fe802d7b8a3f5782b25acf0410440	0	0	0	0
15	00203b1aa005f8e374c1e681f5c2ba20	0	0	0	0
16	00212e7163d4aa64f2d7956a35027aa3	0	0	0	0
17	00218f81fb7713a915d74a1d44f95b0b	0	0	0	0
18	00235ea45eb587598e730a01e0c95435	0	0	0	0
19	0024afeb386597432b7fe0d0a4bd9520	0	0	0	0
20	0025fdc5741eb5afeeda3c90b8b35450	0	0	0	0
21	0026416dd4943c8b119896c1e824227b	0	0	0	0
22	0026bf3bb797997289aa4bd80d2965f6	0	0	0	0
23	002c120b0b15d1f749c8d07d54ea6420	0	0	0	0
24	002d3fc1ec528dcc11e7bab8ddc12ffd	0	0	0	0
25	002fffb6806ef6a0d9507d6038e11fce	0	0	0	0
26	0030024edee05cfcfd490fecb30ce8f8	0	0	0	0
27	0030649a18ba85357aa55953cd22c366	0	4	0	1
28	003242bfec263f03e8c7e8df606d961b	0	0	0	0
29	00366f1ae39b881bdb2ba8687a4c912a	0	0	0	0
30	0036be364a3cc98d55ebf494f675b719	0	0	0	0
31	0037104157ee5dd0987be03d750f0fd3	0	5	0	0
32	003ad9ea4f54e3e0a026ebdc5e62a8a6	0	0	0	0
33	003c25fdfbca4e966b10ce51f9ba03f7	0	0	0	0
34	003dcd8f6f3e00e39ee62e9736d1f5b2	0	0	0	0
35	003e42ef93574546b6e1726e1e0217f8	0	0	0	0

	u_id	forward_min	forward_max	forward_median	fo
35	005e42cf955745460b6c1726e1e021f8	0	0	0	0
36	00406a0f0da6c5c6129fcb9a34c25fb9	0	1	0	0
37	0042372f4af23d7f58847774c2b890ef	0	0	0	0
38	00424c292ede415019a992a18b95d0c1	0	0	0	0
39	00442eeb3443714e759190887f121b3a	0	0	0	0
40	00453c524df35f85fe30088fab42211c	0	1	0	0
41	0048c95badfc4e78939ee6dbaf846e83	0	0	0	0
42	0049ace5cf556923a4d2fae28df69412	0	2	0	0
43	004b28c230de2e046213fb7d66357240	0	0	0	0
44	004ded7ec093ef68e3b8c5de725e5963	0	1	0	0
45	004fd2e20d20a88a9ea09bafd8ea1365	0	0	0	0
46	005401d2c80b0df8622baf3863f6ebd1	0	5	0	0
47	00572eb39291a2c26c6fdb3efae9c595	0	2	0	0
48	005956e5440af20d49160cc6b4c3f7c8	0	2	0	0
49	005989ae18cab8d7896bc1ab84dcfe88	0	0	0	0

2. Use Offical Formula to dertermine accuracy for statistical factors

Predict with fixed Value

1. Default Values

About 80% of the training data are: 0 0 0 (forward_count,comment_count,like_count) and also, 96% of uid in predict dataset is present in train dataset, for remaining 4% which are new, we need some default values. inspired by this, we try some fixed value for all uid:

Function to take Fixed FCL Values, Give Accuracy and Generate Predicted FCL

In [2]:

```
@runTime
def predict_with_fixed_value(forward,comment,like,submission=True):
 # type check
```

```
 if isinstance(forward,int) and isinstance(forward,int) and isinstance(forward,int):
  pass
 else:
  raise TypeError("forward,comment,like should be type 'int' ")

 traindata,testdata = loadData()

 #score on the training set
 train_real_pred = traindata[['forward_count','comment_count','like_count']]
 train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,
like
 print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values
)*100))

 #predict on the test data with fixed value, generate submission file
 if submission:
  test_pred = testdata[['u_id','m_id']]
  test_pred['fp'],test_pred['cp'],test_pred['lp'] = forward,comment,like

  result = []
  filename = "weibo_predict_{}_{}_{}.txt".format(forward,comment,like)
  for _,row in test_pred.iterrows():
   result.append("{0}\t{1}\t{2},{3},{4}\n".format(row[0],row[1],row[2],row[3],row[4])
)
  f = open(filename,'w')
  f.writelines(result)
  f.close()
  print ('generate submission file "{}"'.format(filename))
```

2. UID Statistics (Mean, Max, Min, Median)

Another wise solution is to predict respectively with uid's statistics(E.g mean,median) , their score on the training data:

Function to take Statistical Factor, Give Accuracy and Generate Predicted FCL

In [3]:

```
@runTime
def predict_with_stat(stat="median",submission=True):
 """
 stat:
  string
  min,max,mean,median
 """
 stat_dic = genUidStat()
 traindata,testdata = loadData()
```

```
 #get stat for each uid
 forward,comment,like = [],[],[]
 for uid in traindata['u_id']:
  if uid in stat_dic:
   forward.append(int(stat_dic[uid]["forward_"+stat]))
   comment.append(int(stat_dic[uid]["comment_"+stat]))
   like.append(int(stat_dic[uid]["like_"+stat]))
  else:
   forward.append(0)
   comment.append(0)
   like.append(0)
 #score on the training set
 train_real_pred = traindata[['forward_count','comment_count','like_count']]
 train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,
like
 print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values
)*100))

 #predict on the test data with fixed value, generate submission file
 if submission:
  test_pred = testdata[['u_id','m_id']]
  forward,comment,like = [],[],[]
  for uid in testdata['u_id']:
   if uid in stat_dic:
    forward.append(int(stat_dic[uid]["forward_"+stat]))
    comment.append(int(stat_dic[uid]["comment_"+stat]))
    like.append(int(stat_dic[uid]["like_"+stat]))
   else:
    forward.append(0)
    comment.append(0)
    like.append(0)


  test_pred['fp'],test_pred['cp'],test_pred['lp'] = forward,comment,like

  result = []
  filename = "weibo_predict_{}.txt".format(stat)
  for _,row in test_pred.iterrows():
   result.append("{0}\t{1}\t{2},{3},{4}\n".format(row[0],row[1],row[2],row[3],row[4])
)
  f = open(filename,'w')
  f.writelines(result)
  f.close()
  print ('generate submission file "{}"'.format(filename))
```

Ready to check accuracy of various statistical factors.....

In [27]:

```
if __name__ == "__main__":
```

```
if __name__ == "__main__":
  predict_with_stat(stat="median",submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:24: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
Score on the training set:32.73%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:42: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_median.txt"
predict_with_stat run time: 135.31s
```

In [29]:

```
if __name__ == "__main__":
  predict_with_fixed_value(0,1,1,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:26.43%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_0_1_1.txt"
predict_with_fixed_value run time: 68.95s
```

In [4]:

```
if __name__ == "__main__":
  predict_with_stat(stat="mean",submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:24: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
Score on the training set:30.17%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:42: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_mean.txt"
predict_with_stat run time: 132.35s
```

In [5]:

```
if __name__ == "__main__":
  predict_with_stat(stat="max",submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:24: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
Score on the training set:7.13%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:42: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_max.txt"
predict_with_stat run time: 132.56s
```

In [6]:

```
if __name__ == "__main__":
  predict_with_stat(stat="min",submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:24: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
```

```
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
Score on the training set:26.07%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:42: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_min.txt"
predict_with_stat run time: 131.45s
```

In [7]:

```
if __name__ == "__main__":
  predict_with_fixed_value(0,0,0,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:25.98%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_0_0_0.txt"
predict_with_fixed_value run time: 72.05s
```

In [4]:

```
if __name__ == "__main__":
  predict_with_fixed_value(0,0,1,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
```

```
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:26.11%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_0_0_1.txt"
predict_with_fixed_value run time: 66.76s
```

In [5]:

```
if __name__ == "__main__":
  predict_with_fixed_value(0,1,0,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:25.95%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_0_1_0.txt"
predict_with_fixed_value run time: 68.40s
```

In [6]:

```
if __name__ == "__main__":
  predict_with_fixed_value(1,0,0,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:22.22%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_1_0_0.txt"
predict_with_fixed_value run time: 67.65s
```

In [7]:

```
if __name__ == "__main__":
  predict_with_fixed_value(1,0,1,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:23.44%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_1_0_1.txt"
predict_with_fixed_value run time: 69.00s
```

In [8]:

```
if __name__ == "__main__":
  predict_with_fixed_value(1,1,0,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:21.28%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead
```

```
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_1_1_0.txt"
predict_with_fixed_value run time: 71.24s
```

In [9]:

```
if __name__ == "__main__":
  predict_with_fixed_value(1,1,1,submission=True)
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:13: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  del sys.path[0]
```

```
Score on the training set:10.18%
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:19: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
```

```
generate submission file "weibo_predict_1_1_1.txt"
predict_with_fixed_value run time: 69.53s
```

Overall Results

Current Weibo Sina Interation Prediction Leaderboard by Aliyun.com

References

https://github.com/wepe/AliTianChi/tree/master (A Statistical Analysis on Weibo Sina Interaction Prediction 2014 Challenge)

3.BAG OF WORDS

We convert text to a numerical representation called a feature vector. A feature vector can be as simple as a list of numbers.

The bag-of-words model is one of the feature extraction algorithms for text.

1.The first step in this model is defining the vocabulary

2.The second step is to convert sentences into a frequency vector based on the vocabulary.

In [11]:

```
#Reading data from document
import pandas as pd
df_pre=pd.read_csv("E:\\DMA_PRE\\PREPROCESSED.csv")
df=pd.read_csv("E:\\DMA_PRE\\PREPROCESSED.csv")
```

In [12]:

```
from sklearn import linear_model
```

In [13]:

```
#Adjustments to be done for the data
df['content']=df['content'].str.replace(",", "")
```

In [14]:

```
df['content']=df['content'].str.replace("'","")
```

In [15]:

```
#creating a list for all content
l=[]
for i in range(0,10000):
    l.append(df['content'].iloc[i])
l
```

Out[15]:

```
['[lijiang tourism sz002033 stock stock financ invest bank recommend baoy share divid
half earn princip group]',
 '[chen ling ding red envelop make money abil grab red envelop fight technolog i grab
red envelop cash issu chen ding ling kan hongyan burst happi valentin "s" day fan
togeth around red envelop â•® â¯ 3â¯ â•\\xadhttp tcnrzdivjf]',
 '[taobao sucker industri ga fire send children nima blind]',
 '[aspect say know everyth laugh cri]',
 '[over zhang]',
 '[lifetim my favorit main bodi hook three togeth burst happi black tong googl]',
 '[on uniqlo dress room sound insul good bad share know almost]',
 '[so ordinari everyday scene also much longer accumul one day get look pictur i feel
```

[so ordinari everyday scene also much longer accumul one day got look pictur i feel burst nostalgia age rememb pain accompani]',
 '[overh red xxiii tanggua children stick grab red envelop win i grab littl _ big red overh wang xiansen issu year goat yet come good luck come red envelop tri luck http t cnrzggwg6]',
 '[there good thing share flash note note todo best chine softwar go download]',
 '[microsoft azur machin learn exampl machin learn analysi network intru log practic hand big data `` secur field began hot public report data storag data transfer data r etriev data visual map attack even compon also limit similar data analysi topn descri pt statist]',
 '[life string life mani trial let us pain grow pain like heart like world music also pain like soul sail morn open water lili monday "s" bless hope bring posit energi wee k good night rose]',
 '[readi test first cluster data]',
 '[cream chee cake butter milk mix beaten egg yolk milk sugar flour mix 31 mix lemon juic protein pass 5 preheat rice cooker ladl half protein rest protein mix mix turn 6 help spread butter rice cooker inner wall semiwet towel cover outlet began cook stew 10min 5min stew 20min]',
 '[it wuhan drug drive car driver detain secur xinhua wuhan june report feng guodong report learn wuhan public secur bureau inspect law enforc recent driver check car tak e driver ma fruit]',
 '[thi year matter line look articl share new]',
 '[i share inspir small articl]',
 '[anni "s" red envelop make money abil grab red envelop fight technolog i grab red e nvelop cash issu anni alipay wallet good luck year goat open you tri luck â•® â¯ 3â¯ â•\\xadhttp tcnrzkxypd]',
 '[haneda airport]',
 '[share singl kutluk song `` piano play soul netea cloud music]',
 '[share album netea cloud music]',
 '[read issu clear recent realli protect mode tri help block silli trivial process `` state ah i wonder i open custom pattern compani respond outstand colleg student rebel li if employ compani regress point outrag mean one thing share know almost]',
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'[2015esri develop confer six highlight earli exposur sourc china network day broke microsoft develop confer black & hololen holograph glass pocket everyon "s" eye if tactil feel hardwar product bring excit immedi innov softwar product let see possibl realiz well possibl brought http tcnrarvequ]',
'[most earli ventur compani "s" employ poor nobodi believ compani top player join startup compani gener follow one two peopl good startup compani rubbish]',
'[run 2006km time hour minut minut second pace 156532 kcal behind basic three kilomet go tire p]',
'[snail i fli shoe yo jump small seedl shoe auiset ss sisi user plea visit http tcnr adtmtk check gift]',
'[is art extrem control]',

 '[and calm think]',
 '[grab grab vote vote browser i use grab vote wang finger move bit ticket hand like ben & poor "s" larg nationwid celebr wang grab vote browser power everyth take home]',
 '[new carat lover video site rank tudou & letv no1 mighti mighti jesu jesu qq no you ku no zhejiang tv lover carat carat anhui tv lover rainjihoon rain rain carat lover]',
 '[it expert tip the phone grab red envelop identifi phish site xinhua beij februari report sun bo liu yan guo xiao tong spring festiv xinhua interview `` invit wellknown secur expert china "s" public secur univ professor wang dawei phd nation inform technolog center secur studi senior pank feng guest column togeth major user]',
 '[hua hua dish go campu card]',
 '[game control evolut sword `` feel histori evolut rpg littl bit surpri move star]',
 '[deep learn statist incomplet theorem interact markov random process nononsen lot good content mathemat know may ``]',
 '[come experi innov softwar wifi univ free access tool wifi artifact `` watch movi brush microblog play game traffic]',
 '[as long benefit enjoy liter level turn tyrant depend think littl excit happi children small partner speed crowd collect rank microblog exclu courtesi http tcnzoljzti]',
 '[ddd]',
 '[new year child draw atmosph spring festiv chine new year greet card pda know small paint partner bless draw ju matrix grew â€¢ ã…, â€¢ ùˆâœ§ draw need turn]',
 '[hand]',
 '[for 20yearold man learn balanc import no longer depend escap personnel face balanc relationship aspect life particularli import the socal balanc take care aspect must first find suitabl pivot point order heart weigh compon sort thing a matur person live sen balanc peopl]',
 '[there object move ing]',
 '[é ’ é ’ æ²³è¾¹è‰ winking_face_with_tongu via twitter]',
 '[html5 applic classic cool html5 jqueri anim applic exampl sourc code ad html5 jqueri make famili color use html5 creat brilliant dynam anim special effect thi articl share classic cool html5 jqueri anim applic like friend share collect]',
 '[ration born feynman stop mr feynman ``]',
 '[predict interv random forest predict interv random forest `` pdf http tcnr2xn4wa]',
 '[wish]',
 '[share track netea cloud music]',
 '[like person i happi togeth love person happi i think togeth]',
 '[go ioe mysql victori postgresql open sourc chine commun amazon "s" custom aurora mysql basi alleg perform mysql time 57 aw "s" wareh use postgresql good relat databa see scenario]',
 '[befor complain beat headphon mainten event twist turn final appl new machin end the result quit satisfactori seal affix]',
 '[german industri 40 huawei "s" full join medit `` whether "s" full join huawei propo german industri 40 even ibm made wisdom earth desir build connect i believ collabor across ecosystem innov ict system becom intellig world read download lofter client]',
 '[one bian fun tai css face question 20150302 aninterestingcssinterview pocket]',
 '[a cover ruin mood day also direct respon person joke no day alon ask class moren take cover return mood good simpli ignor smile came said group come collect cover nobodi said noth oh i "m" sorri ah night see contact ignor just person charg wool pull way smile]',

```
 '[broken line kite]',
 '[parti male taro sago good eat up point now ah ah ah ah ah \\\\ â‰§ â-½ â‰¦ burst]
',
 '[but van gogh iron open new station enabl old station shutter and pay high ticket m
oney need run longer distanc save littl journey bring thrill highsp rail]',
 '[phone taobao evolut architectur practic]',
 '[hungri what good user experi o2o era realli want]',
 '[innov safeti evalu system improv network secur tax risk manag]',
 '[* onlin boot camp modern php legaci applic php class * previou 20yearsofphpand1 au
thor paulmjonespostedon 20150701categori ev http tcnrlhl7cc]',
 '[your first graphql server]',
 '[new xiaogan council "s" work strengthen five step `` network inform secur manag]',
 '[laugh sell invoic fought south yeah]',
 '[archci implement support github gitlab webhook configur hook long code submit gtih
ub intern gitlab trigger continu integr docker mean refer implement code commit]',
 '[odp simpli lump fece modifi field type data type chang rebuild tabl abandon field
name key tmd author go along tabl id rebuild tabl tabl id chang origin user right los
t requir user reappli permiss tabl]',
 '[illog art student gener emot doge]',
 '[consequ feel origin thing constant retreat forget must go back two month]',
 '[good bad way]',
 '[farewel campu life pinnacl shanghai campu graduat arm video]',
 '[starbuck china realli drunk organ star label card waiter said send packet via i as
k she said latest activ heart chuckl look care home pit father soon expir]',
 '[spring time run correct run postur share headlin today]',
 '[do eat spici red pepper kindli plug]',
 '[yunnan societi sister beaten strip nude photo femal student expo yunnan societi si
ster beat student student strip nude photo hair qq space `` today morn net post publi
sh number forum yunnan wenshan post bar net post said wenshan prefectur fune counti h
igh school girl led student school suspect place]',
 '[translat literatur larg screen cool doge]',
 '[yesterday 25th state council execut meet focu develop nextgen inform technolog hig
hend cnc machin tool robot aerospac equip marin engin equip hightech ship rail transp
ort equip advanc energysav new energi vehicl power equip new materi biomedicin highpe
rform medic equip agricultur machineri equip sector]',
 '[zhengzhou univ colleg water resourc environ youth leagu school environ water resou
rc zhengzhou univ student union i "m" sorri view microblog user could find press f5 r
efresh tri see microblog]',
 '[live temperatur â „ ƒ humid % % north publish 0315 comfort recommend longsleev tsh
irt pant cloth singl shirt frail elderli advi forward knit longsleev shirt vest pant]
',
 '[seen jurass world `` my rate â˜…â˜…â˜…â˜… chong year chuangzei rebellion spread th
roughout countri fall empir sangui liaodong command led troop alreadi surrend lead
qingbingruguan put bring disast great qing dynasti douban app]',
 '[guangdong b 5f1m7 catch illeg juli 171758 shenzhen nanshan district nanhai road fo
rc chang lane compet drunk chang lane affect normal run vehicl video http tcnrlmfblt
traffic polic guard shenzhen shenzhen traffic polic mobil train battalion shenzhen na
nshan polic]',
 '[it seem take boo ok timemachin]',
 '[new institut remot sen digit earth global open recruit director]',
 '[cinis_ci red envelop finger gentli move cinis_ci red envelop togeth what pure love
hot]',
```

```
 '[i attend chine new year red envelop send car raffl chanc win million worth bride p
rice you also particip togeth link http tcnrwgaxoi]',
 '[zookeep work system architectur it technolog blog big learn learn total progress]'
,
 '[write good]',
 '[i share articl xun yu night]',
 '[to sinafood like one just littl feedback veget phone provid solut]',
 '[map point thing land resourc communiqu issu accord land resourc issu china land re
sourc communiqu `` number map geograph inform industri enterpri increa 34 % gdp growt
h 121 % still varieti lawless total time carri law enforc inspect]',
 '[microblog recruit peopl play thing confirm venu road recruit new colleagu think st
ori share microblog recruit peopl play see http tcnzjgy8nq]',
 '[i "m" asian song list rainjihoon highest chart song good music need action support
come favorit song]',
 '[realli fail]',
 '[in hot cat owner see articl girlfriend nude man pass internet let world know i gir
lfriend `` order prove girlfriend man still pretti fight laugh cri slag man girlfrien
d see articl singl doge face where "s" detail http tcnrwgytbz]',
 '[red envelop fertil mario mario fertil i gave red envelop stuf $ ta send lucki red
envelop togeth hope meet luck good togeth heart]',
 '[i find microdisk fabul file `` python for data analysi pdf `` i download see]',
 '[tang yan red envelop wow realli rich i abl get cash issu red envelop alipay tang y
an wallet everi day draw red envelop one day becom tyrant you tri luck http tcnrze0sx
r]',
 '[i rainjihoon present flower two valu â€‹â€‹of love feel meng meng da rice circl pr
o come send flower aid]',
 '[rain carat lover februari year cctv movi channel program guid februari 2015 2157 p
remier annual emot suspen drama dew root `` rain man show charm enjoy visual feast go
od like good like good like terrif terrif terrif electr electr electr]',
 '[quick taxi voucher carpool happi green counterpart whether spring wind rain small
quickli stuck intim taxi voucher readi i receiv stamp http tcnrwfcldj]',
 '[l_hudson14 hudson let "s" get championship next round]',
 '[quick taxi shake happi do think next taxi subsid quickli upgrad latest version fas
t taxi app new year "s" eve day seventh day 1200 1900 kidney million voucher imp
upon dip festiv deft receiv coupon http tcnrwi45el]',
 '[costa rica open water aquarium biolog male]',
 '[trump card agent agent colleg `` my rate â˜…â˜…â˜…â˜…â˜… excel watercress app]',
 ...]
```

In [16]:

```
#code for bag of words model
import numpy as np
import re

#for building vocabulary
def tokenize_sentences(sentences):
    words = []
    for sentence in sentences:
        w = extract_words(sentence)
        words.extend(w)

    words = sorted(list(set(words)))
```

```
    return words

def extract_words(sentence):
    ignore_words = ['a','b','c','d','e','f','g','h','i','j','k','l','m','n','o','p',
'q','r','s','t','u','v','w','x','y','z','A','B','C','D','E','F','G','H','I','J','K',
'L','M','N','O','P','Q','R','S','T','U','V','W','X','Y','Z']
    words = re.sub("[^\w]", " ",  sentence).split() #nltk.word_tokenize(sentence)
    words_cleaned = [w.lower() for w in words if w not in ignore_words]
    return words_cleaned

#function which returns feature vector
def bagofwords(sentence, words):
    sentence_words = extract_words(sentence)
    # frequency word count
    bag = np.zeros(len(words),dtype=int)
    for sw in sentence_words:
        for i,word in enumerate(words):
            if word == sw:
                bag[i] += 1

    return np.array(bag)
```

In [17]:

```
#building the vocabulary for the list created
vocabulary1 = tokenize_sentences(l)
```

In [18]:

```
l1 = [x for x in vocabulary1 if not (x.isdigit() or x[1:].isdigit())]
```

In [19]:

```
b=pd.DataFrame()
```

In [20]:

```
#constructing bag of words
a=[]

for i in range(0,10000):
    #b.append(bagofwords(df['content'].iloc[i], vocabulary1),ignore_index=True)
    a.append(bagofwords(df['content'].iloc[i], vocabulary1))
```

In [21]:

```
type(a)
```

Out[21]:

```
list
```

In [22]:

```
bow=np.asarray(a)
```

In [23]:

```
df_pol=pd.read_csv("E:\\DMA_PRE\\weibo_polarity.csv")
```

In [24]:

```
type(bow)
print(bow.shape)
```

```
(10000, 16792)
```

In [25]:

```
df_pol.columns
```

Out[25]:

```
Index(['Unnamed: 0', 'u_id', 'm_id', 'forward_count', 'comment_count',
       'like_count', 'content', 'date', 'time', 'content_media_count',
       'content_#_count', 'content_@_count', 'content_?_count',
       'content_!_count', 'content_length', 'content_emoji_count', 'hour',
       'min', 'sec', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean',
       'Unnamed: 0.1', 'content_spchar', 'non_emoji_content', 'en_content',
       'Unnamed: 1', 'url_rem', 'contentwurl', 'polarity'],
      dtype='object')
```

In [26]:

```
bow1=np.insert(bow,16791,df_pol["content_media_count"],axis=1)
bow2=np.insert(bow1,16792,df_pol["forward_median"],axis=1)
bow3=np.insert(bow2,16793,df_pol["comment_median"],axis=1)
bow4=np.insert(bow3,16794,df_pol["like_median"],axis=1)
bow5=np.insert(bow4,16795,df_pol["polarity"],axis=1)
```

In [29]:

```
train_bow=bow5[0:8000]
pred_bow=bow5[8001:10000]
```

Linear Regression Model using BOW and additional factors

In [31]:

```
X_train1=train_bow
X_test1=pred_bow
Y_train1=train_df[["forward_count","like_count","comment_count"]]
Y_test1=predict_df[["forward_count"]]
```

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [32]:

```
tbow=bow5[0:8000]
```

In [33]:

```
cvbow=bow5[8001:10000]
```

In [34]:

```
type(tbow)
```

Out[34]:

```
numpy.ndarray
```

In [35]:

```
df_pre.shape
dftrain=df_pre[0:8000]
dfcv=df_pre[8001:10000]
```

In [36]:

```
Y_test1=dfcv[["forward_count","like_count","comment_count"]]
```

In [37]:

```
np.savetxt("E://DMA_PRE//weibo_predict_resultbow.csv",pred1,delimiter=',',header="for
ward_count,comment_count,like_count",comments="")
result=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow.csv")
```

In [38]:

```
train_real_pred = Y_test1
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:9.13%
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
```

```
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

In [39]:

```
result
```

Out[39]:

	forward_count	comment_count	like_count
0	5.0	0.0	0.0
1	157.0	0.0	34.0
2	0.0	0.0	0.0
3	0.0	0.0	-0.0
4	0.0	0.0	-0.0
5	0.0	0.0	0.0
6	12.0	432.0	184.0
7	68.0	43.0	27.0
8	71.0	40.0	37.0
9	19.0	7.0	10.0
10	0.0	0.0	0.0
11	36.0	4.0	0.0
12	128.0	86.0	27.0
13	0.0	2.0	0.0
14	0.0	7.0	14.0

	forward_count	comment_count	like_count
15	97.0	11.0	3.0
16	177.0	0.0	0.0
17	0.0	0.0	0.0
18	2.0	1.0	0.0
19	68.0	99.0	31.0
20	6.0	0.0	0.0
21	87.0	111.0	12.0
22	38.0	0.0	0.0
23	4.0	53.0	8.0
24	0.0	90.0	0.0
25	0.0	0.0	0.0
26	14.0	40.0	23.0
27	499.0	160.0	138.0
28	55.0	86.0	18.0
29	125.0	0.0	60.0
...	...	...	...
1969	50.0	0.0	10.0
1970	0.0	10.0	2.0
1971	56.0	54.0	35.0
1972	62.0	86.0	36.0
1973	161.0	164.0	40.0
1974	0.0	0.0	0.0
1975	0.0	106.0	0.0
1976	0.0	0.0	0.0
1977	80.0	102.0	21.0
1978	137.0	92.0	10.0
1979	0.0	0.0	2.0
1980	0.0	0.0	0.0
1981	232.0	147.0	117.0
1982	2.0	1.0	0.0
1983	106.0	0.0	66.0
1984	14.0	2.0	0.0
1985	56.0	92.0	0.0

	forward_count	comment_count	like_count
1986	0.0	77.0	0.0
1987	0.0	0.0	0.0
1988	0.0	0.0	0.0
1989	0.0	170.0	15.0
1990	0.0	72.0	100.0
1991	21.0	0.0	-0.0
1992	131.0	37.0	26.0
1993	0.0	0.0	0.0
1994	56.0	0.0	0.0
1995	0.0	0.0	0.0
1996	0.0	0.0	0.0
1997	228.0	0.0	29.0
1998	0.0	21.0	13.0

1999 rows × 3 columns

In [40]:

```
import pandas as pd
import numpy as np
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from matplotlib import pyplot as plt
import statsmodels.api as sm
```

In [41]:

```
#from evaluation import precision
```

In [42]:

```
df1=pd.read_csv("E:\\DMA_PRE\\PREPROCESSED.csv")
df_bow=pd.read_csv("E:\\DMA_PRE\\bow_df.csv")
```

In [43]:

```
#result = pd.concat([df1, df], axis=1)
```

In [44]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

BAG OF WORDS USING COUNTER VECTORIZER

In [45]:

```
df1=pd.read_csv('E:\\DMA_PRE\\pre_bow.csv')
train_df=df1[0:8000]
train_df.shape
```

Out[45]:

```
(8000, 10)
```

In [46]:

```
predict_df=df1[8001:10000]
```

In [47]:

```
train_l=[]
for i in range(0,8000):
    train_l.append(df_pre['content'].iloc[i])
len(train_l)
```

Out[47]:

```
8000
```

In [48]:

```
pred_l=[]
for i in range(8001,10000):
    pred_l.append(df_pre['content'].iloc[i])
len(pred_l)
```

Out[48]:

```
1999
```

In [49]:

```
from sklearn.feature_extraction.text import CountVectorizer
```

In [50]:

```
vect=CountVectorizer()
```

In [51]:

```
vect.fit(train_l)
```

Out[51]:

```
CountVectorizer(analyzer='word', binary=False, decode_error='strict',
        dtype=<class 'numpy.int64'>, encoding='utf-8', input='content',
```

```
        lowercase=True, max_df=1.0, max_features=None, min_df=1,
        ngram_range=(1, 1), preprocessor=None, stop_words=None,
        strip_accents=None, token_pattern='(?u)\\b\\w\\w+\\b',
        tokenizer=None, vocabulary=None)
```

In [52]:

```
x=vect.transform(train_l)
```

In [53]:

```
#vocabulary=vect.get_feature_names()
#print(vocabulary)
```

In [54]:

```
print(x[0,:])
```

```
  (0, 1593) 1
  (0, 1608) 1
  (0, 3688) 1
  (0, 3923) 1
  (0, 4535) 1
  (0, 5181) 1
  (0, 5286) 1
  (0, 6171) 1
  (0, 6991) 1
  (0, 9310) 1
  (0, 9783) 1
  (0, 10657) 1
  (0, 11334) 2
  (0, 11648) 1
  (0, 13110) 1
```

In [55]:

```
type(x)
```

Out[55]:

```
scipy.sparse.csr.csr_matrix
```

In [56]:

```
arrbow=x.toarray()
```

In [57]:

```
vect = CountVectorizer(analyzer = "word",   \
                       tokenizer = None,    \
                       preprocessor = None, \
                       stop_words = None,   \
                       max_features = 100)
```

In [58]:

```
print(vect)
```

```
CountVectorizer(analyzer='word', binary=False, decode_error='strict',
        dtype=<class 'numpy.int64'>, encoding='utf-8', input='content',
        lowercase=True, max_df=1.0, max_features=100, min_df=1,
        ngram_range=(1, 1), preprocessor=None, stop_words=None,
        strip_accents=None, token_pattern='(?u)\\b\\w\\w+\\b',
        tokenizer=None, vocabulary=None)
```

In [59]:

```
from sklearn.preprocessing import PolynomialFeatures
from sklearn import linear_model
from sklearn.metrics import precision_score
```

Model 1

In [60]:

```
off_train_data_features = vect.fit_transform(train_1)
off_train_data_features = off_train_data_features.toarray()
off_train_data_forward = train_df.forward_count

off_test_data_features = vect.fit_transform(pred_1)
off_test_data_features = off_test_data_features.toarray()
off_test_data_forward = predict_df.forward_count

X_train1=off_train_data_features
X_test1= off_test_data_features
Y_train1=dftrain[["forward_count","like_count","comment_count"]]
Y_test1=dfcv[["forward_count","like_count","comment_count"]]

lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
np.savetxt("E://DMA_PRE//weibo_predict_resultbow1.csv",pred1,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result1=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow1.csv")
result1=result1.abs()
result1=result1.astype(int)
train_real_pred = Y_test1
train_real_pred['fp']=result1['forward_count'].values
train_real_pred['cp']=result1['comment_count'].values
train_real_pred['lp']=result1['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:15.43%
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:24: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:25: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:26: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

Model 2

In [61]:

```
print(x.shape)
```

```
(8000, 14753)
```

In [62]:

```
x[1]
```

Out[62]:

```
<1x14753 sparse matrix of type '<class 'numpy.int64'>'
 with 25 stored elements in Compressed Sparse Row format>
```

In [63]:

```
x[2]
```

Out[63]:

```
<1x14753 sparse matrix of type '<class 'numpy.int64'>'
 with 9 stored elements in Compressed Sparse Row format>
```

In [64]:

```
train=df_pol[0:8000]
cv=df_pol[8001:10000]
```

In [65]:

```
off_train_data_features = vect.fit_transform(train_l)
off_train_data_features = off_train_data_features.toarray()

off_train_data_features1=np.insert(off_train_data_features,100,train["content_media_count"],axis=1)
off_train_data_features2=np.insert(off_train_data_features1,101,train["forward_median"],axis=1)
off_train_data_features3=np.insert(off_train_data_features2,102,train["comment_median"],axis=1)
off_train_data_features4=np.insert(off_train_data_features3,103,train["like_median"],axis=1)
#off_train_data_features5=np.insert(off_train_data_features4,100,train["polarity"],axis=1)
off_train_data_features6=np.insert(off_train_data_features4,104,train["content_emoji_count"],axis=1)
#off_train_data_forward = train_df.forward_count

off_test_data_features = vect.fit_transform(pred_l)
off_test_data_features = off_test_data_features.toarray()
off_test_data_features1=np.insert(off_test_data_features,100,cv["content_media_count"],axis=1)
off_test_data_features2=np.insert(off_test_data_features1,101,cv["forward_median"],axis=1)
off_test_data_features3=np.insert(off_test_data_features2,102,cv["comment_median"],axis=1)
off_test_data_features4=np.insert(off_test_data_features3,103,cv["like_median"],axis=1)
#off_test_data_features5=np.insert(off_test_data_features4,100,cv["polarity"],axis=1)

off_test_data_features6=np.insert(off_test_data_features4,104,cv["content_emoji_count"],axis=1)
#off_test_data_forward = predict_df.forward_count

X_train1=off_train_data_features6
X_test1= off_test_data_features6
Y_train1=dftrain[["forward_count","like_count","comment_count"]]
Y_test1=dfcv[["forward_count","like_count","comment_count"]]

lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow3.csv",pred1,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result3=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow3.csv")
result3=result3.abs()
```

```
result3=result3.astype(int)
train_real_pred = Y_test1
train_real_pred['fp']=result3['forward_count'].values
train_real_pred['cp']=result3['comment_count'].values
train_real_pred['lp']=result3['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:15.89%
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:38: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:39: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:40: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

Model 3

In [92]:

```
off_train_data_features = vect.fit_transform(train_1)
off_train_data_features = off_train_data_features.toarray()

off_train_data_features1=np.insert(off_train_data_features,100,train["content_media_c
ount"],axis=1)
off_train_data_features2=np.insert(off_train_data_features1,101,train["forward_median
"],axis=1)
off_train_data_features3=np.insert(off_train_data_features2,102,train["comment_median
"],axis=1)
off_train_data_features4=np.insert(off_train_data_features3,103,train["like_median"]
,axis=1)
off_train_data_features5=np.insert(off_train_data_features4,104,train["polarity"],ax
is=1)
```

```
#off_train_data_forward = train_df.forward_count

off_test_data_features = vect.fit_transform(pred_l)
off_test_data_features = off_test_data_features.toarray()
off_test_data_features1=np.insert(off_test_data_features,100,cv["content_media_count"
],axis=1)
off_test_data_features2=np.insert(off_test_data_features1,101,cv["forward_median"],ax
is=1)
off_test_data_features3=np.insert(off_test_data_features2,102,cv["comment_median"],ax
is=1)
off_test_data_features4=np.insert(off_test_data_features3,103,cv["like_median"],axis=
1)
off_test_data_features5=np.insert(off_test_data_features4,104,cv["polarity"],axis=1)

#off_test_data_forward = predict_df.forward_count

X_train1=off_train_data_features4
X_test1= off_test_data_features4
Y_train1=dftrain["forward_count"]
Y_test1=dfcv["forward_count"]

lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow4.csv",pred1,delimiter=',',header="fo
rward_count",comments="")
result4=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow4.csv")
result4=result4.abs()
result4=result4.astype(int)

train_real_pred = Y_test1
```

In [93]:

```
off_train_data_features = vect.fit_transform(train_l)
off_train_data_features = off_train_data_features.toarray()

off_train_data_features1=np.insert(off_train_data_features,100,train["content_media_c
ount"],axis=1)
off_train_data_features2=np.insert(off_train_data_features1,101,train["forward_median
"],axis=1)
off_train_data_features3=np.insert(off_train_data_features2,102,train["comment_median
"],axis=1)
off_train_data_features4=np.insert(off_train_data_features3,103,train["like_median"]
,axis=1)
off_train_data_features5=np.insert(off_train_data_features4,100,train["polarity"],ax
is=1)
#off_train_data_forward = train_df.forward_count
```

```
off_test_data_features = vect.fit_transform(pred_1)
off_test_data_features = off_test_data_features.toarray()
off_test_data_features1=np.insert(off_test_data_features,100,cv["content_media_count"
],axis=1)
off_test_data_features2=np.insert(off_test_data_features1,101,cv["forward_median"],ax
is=1)
off_test_data_features3=np.insert(off_test_data_features2,102,cv["comment_median"],ax
is=1)
off_test_data_features4=np.insert(off_test_data_features3,103,cv["like_median"],axis=
1)
off_test_data_features5=np.insert(off_test_data_features4,100,cv["polarity"],axis=1)
#off_test_data_forward = predict_df.forward_count

X_train2=off_train_data_features4
X_test2= off_test_data_features4
Y_train2=dftrain["like_count"]
Y_test2=dfcv["like_count"]

lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow5.csv",pred1,delimiter=',',header="co
mment_count",comments="")
result5=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow5.csv")
result5=result5.abs()
result5=result5.astype(int)
```

In [94]:

```
off_train_data_features = vect.fit_transform(train_1)
off_train_data_features = off_train_data_features.toarray()

off_train_data_features1=np.insert(off_train_data_features,100,train["content_media_c
ount"],axis=1)
off_train_data_features2=np.insert(off_train_data_features1,101,train["forward_median
"],axis=1)
off_train_data_features3=np.insert(off_train_data_features2,102,train["comment_median
"],axis=1)
off_train_data_features4=np.insert(off_train_data_features3,103,train["like_median"]
,axis=1)
off_train_data_features5=np.insert(off_train_data_features4,100,train["polarity"],ax
is=1)
#off_train_data_forward = train_df.forward_count

off_test_data_features = vect.fit_transform(pred_1)
off_test_data_features = off_test_data_features.toarray()
off_test_data_features1=np.insert(off_test_data_features,100,cv["content_media_count"
],axis=1)
off_test_data_features2=np.insert(off_test_data_features1,101,cv["forward_median"],ax
is=1)
```

```
off_test_data_features3=np.insert(off_test_data_features2,102,cv["comment_median"],axis=1)
off_test_data_features4=np.insert(off_test_data_features3,103,cv["like_median"],axis=1)
off_test_data_features5=np.insert(off_test_data_features4,100,cv["polarity"],axis=1)
#off_test_data_forward = predict_df.forward_count

X_train3=off_train_data_features4
X_test3= off_test_data_features4
Y_train3=dftrain["comment_count"]
Y_test3=dfcv["comment_count"]

lm=linear_model.LinearRegression()
model=lm.fit(X_train1,Y_train1)
pred1=lm.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow6.csv",pred1,delimiter=',',header="like_count",comments="")
result6=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow6.csv")
result6=result6.abs()
result6=result6.astype(int)
```

In [95]:

```
train_real_pred = pd.concat([Y_test1,Y_test2,Y_test3],axis=1)
train_real_pred['fp']=result4['forward_count'].values
train_real_pred['cp']=result5['comment_count'].values
train_real_pred['lp']=result6['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score on the training set:16.20%
```

In [96]:

```
train_real_pred
```

Out[96]:

	forward_count	like_count	comment_count	fp	cp	lp
8001	0	0	0	0	0	0
8002	3	0	0	0	0	0
8003	0	1	0	12	12	12
8004	0	0	0	4	4	4
8005	0	0	0	4	4	4
8006	0	0	0	117	117	117

	forward_count	like_count	comment_count	fp	cp	lp
8007	2	0	0	0	0	0
8008	0	0	0	3	3	3
8009	3	1	2	0	0	0
8010	0	0	0	0	0	0
8011	0	0	0	8	8	8
8012	1	0	0	5	5	5
8013	0	0	0	0	0	0
8014	0	0	0	0	0	0
8015	0	0	18	0	0	0
8016	0	0	0	1	1	1
8017	0	0	0	1	1	1
8018	0	1	0	10	10	10
8019	0	0	0	0	0	0
8020	0	0	1	0	0	0
8021	0	0	0	0	0	0
8022	0	4	1	0	0	0
8023	3	0	0	4	4	4
8024	0	1	0	0	0	0
8025	0	0	0	31	31	31
8026	1	1	0	0	0	0
8027	0	2	2	9	9	9
8028	0	0	0	1	1	1
8029	0	0	0	3	3	3
8030	0	0	0	6	6	6
...	...	...	...	...	...	...
9970	2	1	17	0	0	0
9971	0	0	1	0	0	0
9972	0	0	0	14	14	14
9973	6	1	0	23	23	23
9974	34	0	10	0	0	0
9975	0	0	0	3	3	3
9976	0	0	0	3	3	3
9977	0	0	0	1	1	1

	forward_count	like_count	comment_count	fp	cp	lp
9978	0	0	0	9	9	9
9979	0	0	0	0	0	0
9980	3	1	0	34	34	34
9981	0	0	0	1	1	1
9982	1	1	0	0	0	0
9983	0	0	0	0	0	0
9984	0	1	4	0	0	0
9985	0	0	0	0	0	0
9986	1	0	0	8	8	8
9987	0	0	0	0	0	0
9988	61	2	4	0	0	0
9989	0	0	0	1	1	1
9990	1	1	1	2	2	2
9991	1	0	0	38	38	38
9992	0	0	0	0	0	0
9993	0	0	0	0	0	0
9994	0	2	0	0	0	0
9995	0	1	0	0	0	0
9996	0	0	0	0	0	0
9997	0	0	0	0	0	0
9998	0	0	0	0	0	0
9999	1	0	0	0	0	0

1999 rows × 6 columns

In [147]:

```
from sklearn.ensemble import GradientBoostingRegressor
```

In [148]:

```
train=df_pol[0:8000]
cv=df_pol[8001:10000]
```

In [149]:

```
X_train6=train[["content_media_count","forward_median","comment_median","like_median"
]]
X_test6= cv[["content_media_count","forward_median","comment_median","like_median"]]
Y_train6=train[["forward_count"]]
Y_test6=cv[["forward_count"]]
```

In [150]:

```
gbrt=GradientBoostingRegressor(n_estimators=100)
gbrt.fit(X_train6, Y_train6)
y_pred1=gbrt.predict(X_test6)
y_pred1=y_pred1.round()
y_pred1=(np.maximum(y_pred1,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow6.csv",y_pred1,delimiter=',',header="
forward_count",comments="")
result6=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow6.csv")
result6=result6.abs()
result6=result6.astype(int)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\utils\validation.py:578: DataConver
sionWarning: A column-vector y was passed when a 1d array was expected. Please change
the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

In [151]:

```
X_train7=train[["content_media_count","forward_median","comment_median","like_median"
]]
X_test7= cv[["content_media_count","forward_median","comment_median","like_median"]]
Y_train7=train[["like_count"]]
Y_test7=cv[["like_count"]]

gbrt=GradientBoostingRegressor(n_estimators=100)
gbrt.fit(X_train7, Y_train7)
y_pred2=gbrt.predict(X_test7)
y_pred2=y_pred2.round()
y_pred2=(np.maximum(y_pred2,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow7.csv",y_pred2,delimiter=',',header="
like_count",comments="")
result7=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow7.csv")
result7=result7.abs()
result7=result7.astype(int)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\utils\validation.py:578: DataConver
sionWarning: A column-vector y was passed when a 1d array was expected. Please change
the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

In [152]:

```
X_train8=train[["content_media_count","forward_median","comment_median","like_median"
]]
X_test8= cv[["content_media_count","forward_median","comment_median","like_median"]]
Y_train8=train[["comment_count"]]
Y_test8=cv[["comment_count"]]
```

```
gbrt=GradientBoostingRegressor(n_estimators=100)
gbrt.fit(X_train8, Y_train8)
y_pred3=gbrt.predict(X_test8)
y_pred3=y_pred3.round()
y_pred3=(np.maximum(y_pred3,0.))

np.savetxt("E://DMA_PRE//weibo_predict_resultbow8.csv",y_pred3,delimiter=',',header="
comment_count",comments="")
result8=pd.read_csv("E://DMA_PRE//weibo_predict_resultbow8.csv")
result8=result8.abs()
result8=result8.astype(int)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\utils\validation.py:578: DataConver
sionWarning: A column-vector y was passed when a 1d array was expected. Please change
the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

In [157]:

```
train_real_pred = pd.concat([Y_test6,Y_test8,Y_test7],axis=1)
train_real_pred['fp']=result6['forward_count'].values
train_real_pred['cp']=result8['comment_count'].values
train_real_pred['lp']=result7['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:99.51%
```

In [156]:

```
train_real_pred
```

Out[156]:

	forward_count	comment_count	like_count	fp	cp	lp
8001	0	0	0	0	0	0
8002	0	0	0	0	0	0
8003	0	0	0	0	0	0
8004	0	0	0	0	0	0
8005	0	0	0	0	0	0
8006	0	0	0	0	0	0
8007	0	0	0	0	0	0
8008	0	0	0	0	0	0
8009	0	0	0	0	0	0
8010	0	1	0	0	0	0

	forward_count	comment_count	like_count	fp	cp	lp
8011	0	0	0	0	0	0
8012	0	0	0	0	0	0
8013	1	1	0	0	0	0
8014	0	0	0	0	0	0
8015	0	0	0	0	0	0
8016	0	0	0	0	0	0
8017	0	0	0	0	0	0
8018	0	0	0	0	0	0
8019	0	0	0	0	0	0
8020	0	0	0	0	0	0
8021	0	0	0	0	0	0
8022	0	0	0	0	0	0
8023	0	0	0	0	0	0
8024	0	0	0	0	0	0
8025	0	0	0	0	0	0
8026	0	0	0	0	0	0
8027	0	0	0	0	0	0
8028	0	0	0	0	0	0
8029	0	0	0	0	0	0
8030	0	0	0	0	0	0
...	...	...	...	...	...	...
9970	0	0	0	0	0	0
9971	0	0	0	0	0	0
9972	0	0	0	0	0	0
9973	0	0	1	0	0	0
9974	0	0	0	0	0	0
9975	0	0	0	0	0	0
9976	0	0	0	0	0	0
9977	0	0	0	0	0	0
9978	0	0	0	0	0	0
9979	0	0	0	0	0	0
9980	0	0	0	0	0	0
9981	1	0	0	0	0	0
9982	0	0	0	0	0	0

	forward_count	comment_count	like_count	fp	cp	lp
9983	0	0	0	0	0	0
9984	0	0	0	0	0	0
9985	0	0	0	0	0	0
9986	0	0	0	0	0	0
9987	0	0	0	0	0	0
9988	0	0	0	0	0	0
9989	0	0	0	0	0	0
9990	0	0	0	0	0	0
9991	0	0	0	0	0	0
9992	0	0	0	0	0	0
9993	0	0	0	0	0	0
9994	0	0	0	0	0	0
9995	0	0	0	0	0	0
9996	0	0	0	0	0	0
9997	0	0	0	0	0	0
9998	0	0	0	0	0	0
9999	0	0	0	0	0	0

1999 rows × 6 columns

In [1]:

```
import pandas as pd
import numpy as np
import re
from sklearn import linear_model
from sklearn.linear_model import Lasso
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
from matplotlib import pyplot as plt
from textblob import TextBlob
import statsmodels.api as sm
```

In [2]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

In [3]:

```
df=pd.read_csv("G://preprocessed1L.csv")
```

In [4]:

```
df
```

Out[4]:

	u_id	m_id	forw
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0.0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	0.0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	0.0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	0.0

	u_id	m_id	forw
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	0.0
5	d80f3d3c5c1d658e82b837a4dd1af849	bfc0819b83ec59ce767287077f2b3507	0.0
6	f349a67d1cd7c8683c5bbc5f8486e193	83674a60e5310195fc35d97ea8f45c46	0.0
7	24b621c98f2594b698c0b1d60c9ae6db	2cbd3d514ed5ad3dab81aa043c8b3d0a	0.0
8	e44d81d630e4f382f657e72aa4b685da	8a88a25f9f26ed9f79080eaacc1a8668	0.0
9	fbe6c953632e1b3dda66cf6118b6ab12	f359a74cb4ac6150a3af8325eda04ea0	0.0
10	f9a3ca6bc1e75d173cfc98ec4b108072	c7bc3445e8b90db8cc5e045f606dc1ee	21.0
11	3c68bbb9da57fcc752c8a493d91bdd3a	77e14cf9d460715e84c51747c3641a9b	0.0
12	104e8d55e98eb3cd834810088af039fe	ee0b2c9d35bfeb0fbc5b3a8677f4a18c	9.0
13	0d15005d6397fb5ce1d45e7c834f7370	9c954d63fcfea19dca8d81a4f3b53861	0.0
14	875a4a77b339d93f819e2c4de5bd0b57	f2cdcdbcec9ff47cbb3c6a636e4b92a3	0.0

	u_id	m_id	forw
15	380a2219670f50dc87efce3380bea6e8	46f10244d02afa85d12346ce28e3cec5	0.0
16	b9b88b0fc105fb08a552e782afa4342e	cb907eb1bdbc198ed0944cc3b7e24f91	0.0
17	f18eb14365c0d7248fab1b9c464f4e70	096543bd8746869982d1a7557164dd0d	0.0
18	0fc17bf5e2dc789dd48505df1f5b14fd	4c1e2418127811d212d0e3867a99db3e	0.0
19	dd749a5af07c04ce7de451273a983671	419dd71d562883ef836e774bc3f4e163	0.0
20	a984551b159fcdc0a48f9e38ecb1488f	baa0051d359555601ab61df684787f0f	0.0
21	2e0467b73d0f6f9e5607a6174581fdd8	2fd200a7f670138c2026091c3b01532a	0.0
22	819656f05994b00b7260daf7346586a7	95590e88cac5d8c9d1a496bc3bd42f07	6.0
23	91ce7c63b272f2037a3e702c10163fa3	8b4e85a881afaff91f276eac7bfb6604	0.0
24	4680e73f9e7a6b87dec62a86a7821c17	b2db095af290b3a36cf798a3e17528d8	0.0
25	976e85e3ededdd9b2c2a3179eb7ae8ab	9540ee0cf7ccfae523020c8025e7095f	0.0

	u_id	m_id	forw
26	6623347e5f19f35f2d02ad515b96524c	9a2f48a870843d1964a03c6642b309d5	0.0
27	cf727e70b6661387cf6aadf01d2eb32c	bff281350f035db0e84c25394865d86a	0.0
28	de0836c1c5d40a5cae64a964a0b54894	c3345fd72cad53ca9bffd63634170ba0	0.0
29	c8848f18da5911d0389c3ac70fe13204	fa352495e646a3f7ff979267c490fd89	0.0
...	...	...	...
99970	b7261d402db4a731e8ea832699333ab7	3c64d713aa3f533f2b696bb4e9a26f4f	0.0
99971	aee12f3eb0cae884ae6c470968357f0f	5a3c9abf2f272895af331b54c78b0a14	0.0
99972	8b3250e43d33021dd848c04f963a96ca	8954335080c5ee96d07c7fc9894425db	1.0
99973	875a4a77b339d93f819e2c4de5bd0b57	613062a089f25ad265c6545e6141f942	0.0
99974	fb0971d7bc981be9878e44f185b4ff70	a733f59ae091283276c40eb8dfddecd4	54.0
99975	70c198acee07ce8fb7bcad0d19761abe	197362440af5951ba4d8db88649d4ea4	0.0
99976	69a108e7167bddb6fd33d720d8ba5b0e	35f40952b56ceeffa9ea9eee953358b1	0.0

	u_id	m_id	forw
99977	b139236e024e15611377da5001f1addd	04853ce3abcd155419648b3bbf042331	29.0
99978	eeabfd5e894c191158402264553f5bb7	7449368fd0a194b43e4073edf20da3c6	0.0
99979	2aa971a0a69411b2a276eb4723eef2ed	42fc51422c74f9e0c30f5d62a63f67d6	0.0
99980	879d037b78bd5f54a062afcc22f170ad	cf5b15bca7963d8779b50572db17873e	0.0
99981	9946867fb7e729d3d7b5693ebe4274cd	afc99fac3c2dcb17fdf3753a873b53cf	8.0
99982	d11cd9eca4d042914c1dd7f682262e6a	e432f569d00115a071124db15c61a6c2	0.0
99983	e950cb6513973337917ac0bfe6546171	2080b964b7b425b4ffba4b5d4c81e121	0.0
99984	a2f4bf65ba121a22923ed6269167614d	102e1c8562303edcbf0a65ec4267cd77	0.0
99985	a91d955eb55921171386353d97f26e2c	26e48696568c7c9171691420d4274fa6	0.0
99986	aaa34d33b2cdbc230356bb944d797355	c6b10b0441814ed852eaf856b3097bf8	0.0
99987	e88330514585dc40b7cb8f48c0e0ea2a	1cdcf7dff5c60b5bf340090b2a1dd4b8	156

	u_id	m_id	forw
99988	ff6df56a5c138710f41896102ff3335c	6ef4eaeda467202214babd3a8e1b7959	0.0
99989	a74f8ea4ec2cd491e00e7112574e28d2	ef45216fb95a553755a56e96619f3f84	0.0
99990	5fdbebd81a32b63f5a9bd20e40302cc7	2c7140afac51d51ffd3ac0770cf215fe	0.0
99991	392b9ad1019a6143a55d46d6d694b39c	376a571c1977908241c861510e3da05f	0.0
99992	1f6fa8bd67f384066c3815f384641909	6b1a8189242187adaafd6d7c720c69d9	0.0
99993	0faddeeabf8b2cfd75afc6ad9c1ba2da	4ce1362d01c3c68b3f6b37ecee3e33cb	0.0
99994	2c29c907d3a5111e58f60b7997877a0e	29f21c87a34727423d41c44ab36970fc	0.0
99995	be4bb6460816182375c75128776e03a3	67ff839d6546e98db53fd730ae248209	2.0
99996	fd3acb53b6e5992b8e96d08a8e27f00d	e85246e3cb09c12e955e6586de4372f7	0.0
99997	c58f60297a4a46ea9e80c171f0c6a804	e46bb297ab952cb6ad354ce31c41922b	0.0
99998	6acc1900479dcceea56375d97916a40e	7d4b9cfe0362db61395790e2538d696e	0.0

	u_id	m_id	forw
99999	c8026e7713b9cffd6c21935ac407dfcc	b877e60aef68601c52ff55445281192c	2.0

100000 rows × 28 columns

In [5]:

```
df.shape[0]
```

Out[5]:

```
100000
```

In [13]:

```
df_new = pd.DataFrame(columns=['pol'])
for i in range(0,100000):
    try:
        a=TextBlob(df['no_punc'].iloc[i]).sentiment
        df_new=df_new.append({'pol':a[0]}, ignore_index=True)
    except Exception as e:
        print(str(e))
        df_new=df_new.append({'pol':999999}, ignore_index=True)
```

In [14]:

```
df['polarity']=df_new['pol']
```

In [15]:

```
df_new
```

Out[15]:

	pol
0	-0.166667
1	0.000000
2	-0.400000
3	0.300000
4	0.000000
5	0.000000
6	0.133333
7	0.000000
8	0.214286

	pol
9	0.850000
10	0.125000
11	0.260000
12	0.250000
13	-0.105556
14	0.000000
15	0.136364
16	-0.250000
17	0.140000
18	0.000000
19	0.000000
20	0.000000
21	-0.053125
22	0.000000
23	0.060000
24	0.000000
25	0.000000
26	0.000000
27	-0.100000
28	0.533333
29	0.100000
...	...
99970	0.500000
99971	0.000000
99972	0.000000
99973	0.227778
99974	0.300000
99975	0.000000
99976	0.500000
99977	0.214394
99978	0.550000
99979	0.000000
99980	0.100000
99981	0.200000

	pol
99982	0.285714
99983	0.000000
99984	-0.015909
99985	0.800000
99986	0.500000
99987	-0.150000
99988	-0.600000
99989	0.700000
99990	0.000000
99991	0.341667
99992	0.250000
99993	-0.800000
99994	0.187500
99995	0.285714
99996	0.000000
99997	0.000000
99998	0.407143
99999	0.301786

100000 rows × 1 columns

In [16]:

```
df.to_csv('E://DMA_PRED//polarityL1.csv')
```

In [3]:

```
import pandas as pd
import numpy as np
import re
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
from matplotlib import pyplot as plt
from textblob import TextBlob
```

In [4]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

----------Polarity as a factor----------

In [5]:

```
dfpol=pd.read_csv("E:\DMA_PRE\polarity\weibo_polarity.csv")
```

In [6]:

```
dfpol.head(10)
```

Out[6]:

	Unnamed: 0	u_id	m_ic
0	0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6
1	1	d38e9bed5d98110dc2489d0d1cac3c2a	00755196c77936bf44656ada98291c59

	Unnamed: 0	u_id	m_id
2	2	d38e9bed5d98110dc2489d0d1cac3c2a	4fedf3888b1e16592f0e0bdc8b393845
3	3	d38e9bed5d98110dc2489d0d1cac3c2a	91be0b8612265aae32725cd4fa80b222
4	4	d38e9bed5d98110dc2489d0d1cac3c2a	bd2af99ecf1298f5539f0ddfcdd3ed64
5	5	d38e9bed5d98110dc2489d0d1cac3c2a	182078c5a409834f2128b3c9c2c289c3
6	6	d38e9bed5d98110dc2489d0d1cac3c2a	2c9697e5d6f1d9d479540173c4c374cb
7	7	d38e9bed5d98110dc2489d0d1cac3c2a	0ce5d103d7712b398ee2e81f83f49751
8	8	d38e9bed5d98110dc2489d0d1cac3c2a	a651facd0523d2a85a0717b83928c6c8
9	9	d38e9bed5d98110dc2489d0d1cac3c2a	3e1895f6017e0214f7392013552ac96a

10 rows × 39 columns

In [7]:

```
dfpol.columns
```

Out[7]:

```
Index(['Unnamed: 0', 'u_id', 'm_id', 'forward_count', 'comment_count',
       'like_count', 'content', 'date', 'time', 'content_media_count',
       'content_#_count', 'content_@_count', 'content_?_count',
       'content_!_count', 'content_length', 'content_emoji_count', 'hour',
       'min', 'sec', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean',
       'Unnamed: 0.1', 'content_spchar', 'non_emoji_content', 'en_content',
       'Unnamed: 1', 'url_rem', 'contentwurl', 'polarity'],
      dtype='object')
```

In [8]:

```
dfpol['date']=pd.to_datetime(dfpol['date'],errors='coerce')
train_month=[g for n, g in dfpol.groupby(pd.Grouper(key='date',freq='M'))]
```

In [9]:

```
train_month[0]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_feb_cpts10000.csv")
train_month[1]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_march_cpts10000.csv")
train_month[2]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_april_cpts10000.csv")
train_month[3]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_may_cpts10000.csv")
train_month[4]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_june_cpts10000.csv")
train_month[5]=pd.read_csv("E:\DMA_PRE\polarity\weibo_train_july_cpts10000.csv")
```

In [10]:

```
frames1=[train_month[0],train_month[1],train_month[2],train_month[3],train_month[4]]
train=pd.concat(frames1)
predict=train_month[5]
```

Model 7: (Factors: Media, Length, Emoji, Median,Polarity)

In [11]:

```
X_train1=train[["content_media_count","content_length","forward_median","comment_medi
an","like_median","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_median","comment_med
ian","like_median","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [12]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [13]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[ -3.60345081e-01   6.74510609e-03  -9.03871388e+00  -5.69877934e+00
    1.46618263e+01  -3.00702607e-01]
 [ -4.52559256e-01   2.88854313e-04  -2.58935392e+00   3.20973326e-01
    2.56664104e+00   1.78063868e-01]
 [ -1.70607807e-01  -1.73336140e-03  -2.49319057e+00  -7.66383744e-01
    3.84877692e+00   1.34944972e-01]]
[ 0.09961692  0.27754213  0.23556883]
```

In [14]:

```
np.savetxt("E:\DMA_PRE\polarity\weibo_predict_result51.csv",pred1,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result1=pd.read_csv("E:\DMA_PRE\polarity\weibo_predict_result51.csv")
```

In [15]:

```
print(mean_squared_error(Y_test1,result1))
```

```
21.2745912995
```

In [16]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score:35.39%
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

Analysis: Result with Polarity as factor are satisfactory considering the data used for train. This might prove to be a good factor for whole dataset prediction.

In [1]:

```
import pandas as pd
import numpy as np
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from matplotlib import pyplot as plt
import statsmodels.api as sm
```

In [2]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

In [3]:

```
from evaluation2 import precision2
```

```
importing Jupyter notebook from evaluation2.ipynb
```

In [4]:

```
df1=pd.read_csv("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_train1_cp.csv")
df2=pd.read_csv("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_train2_cp.csv")
frames=[df1,df2]
train_dataset=pd.concat(frames)
predict_dataset=pd.read_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_predict_cp.csv")
```

In [5]:

```
train_dataset['date']=pd.to_datetime(train_dataset['date'],errors='coerce')
```

In [6]:

```
train_month=[g for n, g in train_dataset.groupby(pd.Grouper(key='date',freq='M'))]
```

In [7]:

```
train_dataset['time']=pd.to_datetime(train_dataset['time'],errors='coerce')
```

In [8]:

```
train_hour=[g for n, g in train_dataset.groupby(pd.Grouper(key='time',freq='H'))]
```

In [9]:

```
train_month[0].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_feb_cp.csv",sep=',',index=False,encoding='utf-8')
```

```
train_month[1].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_march_cp.csv",sep=',',index=False,encoding='utf-8')
train_month[2].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_april_cp.csv",sep=',',index=False,encoding='utf-8')
train_month[3].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_may_cp.csv",sep=',',index=False,encoding='utf-8')
train_month[4].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_june_cp.csv",sep=',',index=False,encoding='utf-8')
train_month[5].to_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_july_cp.csv",sep=',',index=False,encoding='utf-8')
```

In [13]:

```
i=0
for i in range(0,24):
    path="E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_train_hour_"+str(i)+"_cp.csv"
    train_hour[i].to_csv(path,sep=',',index=False,encoding='utf-8')
```

In [14]:

```
frames1=[train_month[0],train_month[1],train_month[2],train_month[3],train_month[4]]
train=pd.concat(frames1)
predict=train_month[5]
```

Model 1 (Factors: Media, #, @, ?, !, Length, Emoji)

In [15]:

```
X_train=train[["content_media_count","content_#_count","content_@_count","content_?_c
ount","content_!_count","content_length","content_emoji_count"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_#_count","content_@_count","content_?_
count","content_!_count","content_length","content_emoji_count"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [16]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 7) (1044681, 3)
(184937, 7) (184937, 3)
```

In [17]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [18]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [19]:

```
print(pred[0:5])
```

```
[[ 4.  1.  2.]
 [ 3.  2.  3.]
 [ 3.  1.  1.]
 [ 7.  1.  2.]
 [ 9.  2.  3.]]
```

In [20]:

```
print(model.coef_)
```

```
[[-2.13937044 -0.36595303 -0.29844433 -0.04270781 -0.20884535  0.05323583
  -0.11373958]
 [-1.46356558 -0.15223682 -0.02946097 -0.00326344 -0.04880305  0.00769467
   0.1747673 ]
 [-2.6330917  -0.13749083 -0.32811723 -0.01394959 -0.071054    0.01544652
   0.26583545]]
```

In [21]:

```
print(model.intercept_)
```

```
[ 1.31437859  1.76293348  2.98461306]
```

In [22]:

```
np.savetxt("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_predict_result2.csv",pred,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result=pd.read_csv("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_predict_result2.csv")
```

In [23]:

```
train_real_pred = Y_test
forward=result['forward_count'].values
```

```
comment=result['forward_count'].values
like=result['forward_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,like
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  """
```

```
Score on the training set:3.69%
```

Model 2 (Media, Length, Emoji)

In [27]:

```
X_train=train[["content_media_count","content_length","content_emoji_count"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [28]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 3) (1044681, 3)
(184937, 3) (184937, 3)
```

In [29]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [30]:

```
lm=linear_model.LinearRegression()
```

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [31]:

```
print(pred[0:5])
```

```
[[ 4.  1.  2.]
 [ 3.  2.  3.]
 [ 3.  1.  1.]
 [ 7.  1.  2.]
 [ 8.  1.  3.]]
```

In [32]:

```
print(model.coef_)
```

```
[[-2.19780299  0.05049652 -0.14777505]
 [-1.47377848  0.00679751  0.16018448]
 [-2.68756793  0.01390734  0.25398113]]
```

In [33]:

```
print(model.intercept_)
```

```
[ 1.23425639  1.73473692  2.94322868]
```

In [35]:

```
np.savetxt("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_predict_result3.csv",p
red,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result=pd.read_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_predict_result3.csv")
```

In [36]:

```
train_real_pred = Y_test
forward=result['forward_count'].values
comment=result['forward_count'].values
like=result['forward_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,l
ike
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
```

```
exing.html#indexing-view-versus-copy
  """
```

```
Score on the training set:3.79%
```

Model 3(Media)

In [37]:

```
X_train=train[["content_media_count"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [38]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 1) (1044681, 3)
(184937, 1) (184937, 3)
```

In [39]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCop
yWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [40]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [41]:

```
print(pred[0:5])
```

```
[[ 3.  1.  1.]
 [ 4.  2.  4.]
 [ 3.  1.  1.]
 [ 3.  1.  1.]
```

```
 [ 3.  1.  1.]]
```

In [42]:

```
print(model.coef_)
```

```
[[-0.62388914]
 [-1.26343548]
 [-2.25659216]]
```

In [43]:

```
print(model.intercept_)
```

```
[ 3.86255173  2.09158813  3.67207903]
```

In [45]:

```
np.savetxt("E:\\5th Sem\\DMA Project\\Model Evaluation\\weibo_predict_result4.csv",p
red,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result=pd.read_csv("E:\\5th Sem\\DMA Project\\Model
Evaluation\\weibo_predict_result4.csv")
```

In [33]:

```
train_real_pred = Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
  after removing the cwd from sys.path.
```

```
Score on the training set:3.59%
```

Model 4 (Time) Pre-requisite

In [34]:

```
train_dataset['hour']=pd.DatetimeIndex(train_dataset['time']).hour
print("done")
train_dataset['min']=pd.DatetimeIndex(train_dataset['time']).minute
print("done")
train_dataset['sec']=pd.DatetimeIndex(train_dataset['time']).second
print("done")
```

```
done
done
done
```

In [95]:

```
predict_dataset['hour']=pd.DatetimeIndex(predict_dataset['time']).hour
print("done")
predict_dataset['min']=pd.DatetimeIndex(predict_dataset['time']).minute
print("done")
predict_dataset['sec']=pd.DatetimeIndex(predict_dataset['time']).second
print("done")
```

```
done
done
done
```

In [98]:

```
train_dataset.head(614809).to_csv("G://DMA_PROJECT//weibo_train1_cpt.csv",sep=',',ind
ex=False,encoding='utf-8')
train_dataset.tail(614809).to_csv("G://DMA_PROJECT//weibo_train2_cpt.csv",sep=',',ind
ex=False,encoding='utf-8')
predict_dataset.to_csv("G://DMA_PROJECT//weibo_predict_cpt.csv",sep=',',index=False,
encoding='utf-8')
```

In [4]:

```
df1=pd.read_csv("G://DMA_PROJECT//weibo_train1_cpt.csv")
df2=pd.read_csv("G://DMA_PROJECT//weibo_train2_cpt.csv")
frames=[df1,df2]
train_dataset=pd.concat(frames)
predict_dataset=pd.read_csv("G://DMA_PROJECT//weibo_predict_cpt.csv")
```

In [100]:

```
train_dataset['date']=pd.to_datetime(train_dataset['date'],errors='coerce')
```

In [101]:

```
train_month=[g for n, g in train_dataset.groupby(pd.Grouper(key='date',freq='M'))]
```

In [102]:

```
train_month[0].to_csv("G://DMA_PROJECT//weibo_train_feb_cpt.csv",sep=',',index=False
,encoding='utf-8')
train_month[1].to_csv("G://DMA_PROJECT//weibo_train_march_cpt.csv",sep=',',index=Fals
e,encoding='utf-8')
train_month[2].to_csv("G://DMA_PROJECT//weibo_train_april_cpt.csv",sep=',',index=Fals
e,encoding='utf-8')
train_month[3].to_csv("G://DMA_PROJECT//weibo_train_may_cpt.csv",sep=',',index=False
,encoding='utf-8')
train_month[4].to_csv("G://DMA_PROJECT//weibo_train_june_cpt.csv",sep=',',index=False
,encoding='utf-8')
train_month[5].to_csv("G://DMA_PROJECT//weibo_train_july_cpt.csv",sep=',',index=False
,encoding='utf-8')
```

In [35]:

```
train_month[0]=pd.read_csv("G://DMA_PROJECT//weibo_train_feb_cpt.csv")
train_month[1]=pd.read_csv("G://DMA_PROJECT//weibo_train_march_cpt.csv")
train_month[2]=pd.read_csv("G://DMA_PROJECT//weibo_train_april_cpt.csv")
train_month[3]=pd.read_csv("G://DMA_PROJECT//weibo_train_may_cpt.csv")
train_month[4]=pd.read_csv("G://DMA_PROJECT//weibo_train_june_cpt.csv")
train_month[5]=pd.read_csv("G://DMA_PROJECT//weibo_train_july_cpt.csv")
```

In [36]:

```
frames1=[train_month[0],train_month[1],train_month[2],train_month[3],train_month[4]]
train=pd.concat(frames1)
predict=train_month[5]
```

Model 4 (Time: Hour, Min, Sec)

In [37]:

```
X_train=train[["hour","min","sec"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["hour","min","sec"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [38]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 3) (1044681, 3)
(184937, 3) (184937, 3)
```

In [39]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [40]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [41]:

```
print(pred[0:5])
```

```
[[ 3.  1.  2.]
 [ 2.  1.  2.]
 [ 3.  1.  2.]
 [ 1.  1.  1.]
 [ 6.  1.  3.]]
```

In [42]:

```
print(model.coef_)
```

```
[[ 0.08066778 -0.06019321 -0.0382752 ]
 [ 0.02746039 -0.00495496 -0.00478928]
 [ 0.07295777 -0.03270772 -0.01755154]]
```

In [43]:

```
print(model.intercept_)
```

```
[ 5.15832365  1.15751239  2.61598361]
```

In [44]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result5.csv",pred,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result5.csv")
```

In [45]:

```
train_real_pred = Y_test
```

```
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score on the training set:4.19%
```

Model 5 (Time: Hour)

In [46]:

```
X_train=train[["hour"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["hour"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [47]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 1) (1044681, 3)
(184937, 1) (184937, 3)
```

In [48]:

```
pd.options.mode.use_inf_as_na = True
```

```
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [49]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [50]:

```
print(pred[0:5])
```

```
[[ 3.  1.  1.]
 [ 4.  1.  2.]
 [ 3.  1.  2.]
 [ 3.  1.  2.]
 [ 3.  1.  2.]]
```

In [51]:

```
print(model.coef_)
```

```
[[ 0.07590631]
 [ 0.02704577]
 [ 0.0704154 ]]
```

In [52]:

```
print(model.intercept_)
```

```
[ 2.40776056  0.88480607  1.21309106]
```

In [53]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result6.csv",pred,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result6.csv")
```

In [54]:

```
train_real_pred = Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
```

```
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score on the training set:3.66%
```

Model 6 Time: (Hour, Min, Sec), Media, Length, Emoji

In [55]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","m
in","sec"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","
min","sec"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [56]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 6) (1044681, 3)
(184937, 6) (184937, 3)
```

In [57]:

```
pd.options.mode.use_inf_as_na = True
```

```
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [58]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [59]:

```
print(pred[0:5])
```

```
[[  4.   1.   1.]
 [  1.   2.   3.]
 [  2.   1.   1.]
 [  4.   1.   1.]
 [ 10.   2.   4.]]
```

In [60]:

```
print(model.coef_)
```

```
[[-2.16126691  0.04995623 -0.14079719  0.09097968 -0.05802816 -0.03386975]
 [-1.46714342  0.0068272   0.15966872  0.02589544 -0.00483482 -0.00418282]
 [-2.6652836   0.0137497   0.25624217  0.07054347 -0.03242168 -0.01633076]]
```

In [61]:

```
print(model.intercept_)
```

```
[ 2.62859063  1.63033587  3.36618167]
```

In [62]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result7.csv",pred,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result7.csv")
```

In [63]:

```
train_real_pred = Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
```

```
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score on the training set:6.89%
```

Model 7: Stats Pre-requisite

In [5]:

```
df1=pd.read_csv("G://DMA_PROJECT//weibo_train1_cpt.csv")
df2=pd.read_csv("G://DMA_PROJECT//weibo_train2_cpt.csv")
frames=[df1,df2]
train_dataset=pd.concat(frames)
predict_dataset=pd.read_csv("G://DMA_PROJECT//weibo_predict_cpt.csv")
```

In [6]:

```
stat=pd.read_csv("G://DMA_PROJECT//train_uid_stat.csv")
```

In [7]:

```
trainstat=pd.merge(train_dataset,stat,on=['u_id'])
predictstat=pd.merge(train_dataset,stat,on=['u_id'])
```

In [9]:

```
trainstat.head(5)
```

Out[9]:

Out[9]:

	u_id	m_id	forward_c
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0
1	d38e9bed5d98110dc2489d0d1cac3c2a	00755196c77936bf44656ada98291c59	0
2	d38e9bed5d98110dc2489d0d1cac3c2a	4fedf3888b1e16592f0e0bdc8b393845	0
3	d38e9bed5d98110dc2489d0d1cac3c2a	91be0b8612265aae32725cd4fa80b222	0
4	d38e9bed5d98110dc2489d0d1cac3c2a	bd2af99ecf1298f5539f0ddfcdd3ed64	0

5 rows × 30 columns

In [10]:

```
trainstat.head(614809).to_csv("G://DMA_PROJECT//weibo_train1_cpts.csv",sep=',',index
=False,encoding='utf-8')
trainstat.tail(614809).to_csv("G://DMA_PROJECT//weibo_train2_cpts.csv",sep=',',index
=False,encoding='utf-8')
predictstat.to_csv("G://DMA_PROJECT//weibo_predict_cpts.csv",sep=',',index=False,enc
oding='utf-8')
```

In [4]:

```
df1=pd.read_csv("G://DMA_PROJECT//weibo_train1_cpts.csv")
df2=pd.read_csv("G://DMA_PROJECT//weibo_train2_cpts.csv")
frames=[df1,df2]
train_dataset=pd.concat(frames)
predict_dataset=pd.read_csv("G://DMA_PROJECT//weibo_predict_cpts.csv")
```

In [5]:

```
train_dataset['date']=pd.to_datetime(train_dataset['date'],errors='coerce')
```

In [6]:

```
train_month=[g for n, g in train_dataset.groupby(pd.Grouper(key='date',freq='M'))]
```

In [14]:

```
train_month[0].to_csv("G://DMA_PROJECT//weibo_train_feb_cpts.csv",sep=',',index=False
,encoding='utf-8')
train_month[1].to_csv("G://DMA_PROJECT//weibo_train_march_cpts.csv",sep=',',index=Fal
se,encoding='utf-8')
train_month[2].to_csv("G://DMA_PROJECT//weibo_train_april_cpts.csv",sep=',',index=Fal
se,encoding='utf-8')
train_month[3].to_csv("G://DMA_PROJECT//weibo_train_may_cpts.csv",sep=',',index=False
,encoding='utf-8')
train_month[4].to_csv("G://DMA_PROJECT//weibo_train_june_cpts.csv",sep=',',index=Fals
e,encoding='utf-8')
train_month[5].to_csv("G://DMA_PROJECT//weibo_train_july_cpts.csv",sep=',',index=Fals
e,encoding='utf-8')
```

In [7]:

```
train_month[0]=pd.read_csv("G://DMA_PROJECT//weibo_train_feb_cpts.csv")
train_month[1]=pd.read_csv("G://DMA_PROJECT//weibo_train_march_cpts.csv")
train_month[2]=pd.read_csv("G://DMA_PROJECT//weibo_train_april_cpts.csv")
train_month[3]=pd.read_csv("G://DMA_PROJECT//weibo_train_may_cpts.csv")
train_month[4]=pd.read_csv("G://DMA_PROJECT//weibo_train_june_cpts.csv")
train_month[5]=pd.read_csv("G://DMA_PROJECT//weibo_train_july_cpts.csv")
```

In [8]:

```
frames1=[train_month[0],train_month[1],train_month[2],train_month[3],train_month[4]]
train=pd.concat(frames1)
predict=train_month[5]
```

Model 7 Median,Time: (Hour, Min, Sec), Media, Length, Emoji

Only for Forward Count

In [9]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","m
in","sec","forward_median"]]
Y_train=train[["forward_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","
min","sec","forward_median"]]
Y_test=predict[["forward_count"]]
```

In [10]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 7) (1044681, 1)
(184937, 7) (184937, 1)
```

In [11]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [12]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [13]:

```
print(pred[0:5])
```

```
[[ 1.]
 [ 1.]
 [ 1.]
 [ 8.]
 [ 1.]]
```

In [14]:

```
print(model.coef_)
```

```
[[ -7.05031752e-01   2.07778896e-02   6.62467259e-02   4.04463406e-02
    6.80481359e-04   9.98897013e-05   1.52380773e+00]]
```

In [15]:

```
print(model.intercept_)
```

```
[-0.37795983]
```

In [16]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result8.csv",pred,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result8.csv")
```

In [17]:

```
train_real_pred=Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision2(train_real_pred.values
)*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
```

```
Score on the training set:45.81%
```

Model 7 Median,Time: (Hour, Min, Sec), Media, Length, Emoji

In [39]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","m
in","sec","forward_median","comment_median","like_median"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","
min","sec","forward_median","comment_median","like_median"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
```

In [40]:

```
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
(1044681, 9) (1044681, 3)
(184937, 9) (184937, 3)
```

In [41]:

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [42]:

```
lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

In [43]:

```
print(pred[0:5])
```

```
[[  3.   4.   3.]
 [  3.   4.   3.]
 [  3.   4.   3.]
 [ 13.   7.   8.]
 [  2.   2.   2.]]
```

In [44]:

```
print(model.coef_)
```

```
[[ -2.63364425e-01   1.91174376e-02   5.54642973e-02   3.76150971e-02
    5.27858190e-04   1.68362209e-03   1.58279691e+00   1.67729136e+00
   -2.93017304e-01]
 [ -6.60961017e-01   2.55079540e-03   1.00504045e-01   1.24809468e-02
    2.35146358e-03   1.20243289e-03   7.17940397e-02   1.55348700e+00
    4.45266999e-03]
 [ -8.70474303e-01   9.23346652e-04   5.98607519e-02   2.34643687e-02
    4.45920014e-05   1.52298289e-03   1.45839466e-01   3.91354761e-01
    1.06591334e+00]]
```

In [45]:

```
print(model.intercept_)
```

```
[-1.04897282  0.36245024  0.43019058]
```

In [46]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result9.csv",pred,delimiter=',',header="fo
rward_count,comment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result9.csv")
```

In [47]:

```
train_real_pred = Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score on the training set:22.47%
```

Team 5A09 DMA Course Project :

Sina Weibo Interaction Prediction Challenge

Modelling Phase

1.
   - Team ID - 5A09
     - Sem - 5TH
     - Div - 'A'
     - School - KLE Technological university

1.
   - Topic ID - 5ADMACP14
   - Project Title - Sina Weibo Intereaction Prediction

1. Problem Statement - To predict the user behaviors such as forwarding, commenting and liking on Sina Weibo Microblogging site.

1.
   - Team Leader - Deepti Nadkarni - 01FE16BCS062 (Roll no-58)
   - Members
     - Apoorva Malemath - 01FE16BCS041 (Roll no-39)
     - Arundati Dixit - 01FE16BCS046 (Roll no-44)
     - Ashish Kar - 01FE16BCS047 (Roll no-45)

----------Pre-Processing Highlights----------

1. TRANSLATION TO ENGLISH CONTENT

In [2]:

```
import pandas as pd
import numpy as np
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from matplotlib import pyplot as plt
import statsmodels.api as sm
import import_ipynb
from evaluation import precision
```

```
importing Jupyter notebook from evaluation.ipynb
```

In [5]:

```
df1=pd.read_csv("G://DMA_PROJECT//preprocessed_1.csv")
df2=pd.read_csv("G://DMA_PROJECT//preprocessed_2.csv")
frames=[df1,df2]
traintrans=pd.concat(frames)
```

In [4]:

```
traintrans.head(5)
```

Out[4]:

	u_id	m_id	forward_count	comment_count	like_count

	u_id	m_id	forward_count	comment_count	like_count
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0.0	0.0	0.0
1	fa13974743d3fe6ff40d21b872325e9e	8169f1d45051e08ef213bf1106b1225d	0.0	0.0	0.0
2	da534fe87e7a52777bee5c30573ed5fd	68cd0258c31c2c525f94febea2d9523b	0.0	0.0	0.0
3	e06a22b7e065e559a1f0bf7841a85c51	00b9f86b4915aedb7db943c54fd19d59	0.0	4.0	3.0
4	f9828598f9664d4e347ef2048ce17734	c7f6f66044c0c5a3330e2c5371be6824	0.0	0.0	0.0

In [8]:

```
traintrans.columns
```

Out[8]:

```
Index(['u_id', 'm_id', 'forward_count', 'comment_count', 'like_count',
       'content', 'date', 'time', 'content_media_count', 'content_spchar',
       'non_emoji_content', 'en_content', 'Unnamed: 1'],
      dtype='object')
```

2. BOW as factor

Processes Involved for Text Processing:

REMOVAL OF NOISE - URL

REMOVAL OF STOPWORDS

STEMMING

LEMMATIZATION

CONVERSION TO LOWERCASE

REMOVAL OF NUMBERS

REMOVAL OF PUNCTUATION

In [60]:

```
trainpp=pd.read_csv("G://DMA_PROJECT//preprocessed.csv")
```

In [61]:

```
trainpp.head(10)
```

Out[61]:

	u_id	m_id	forward_count	comment_count	like_count
0	ef132857ae5c47ff0aa2ce251436258c	a09fd98a3fddd174f281e0b56d14c6fc	0	0	0
1	97775929a27fdb7e0da1e8c64bf796b4	c44d9db6c197a921eb2635017b733d41	0	0	0
2	875a4a77b339d93f819e2c4de5bd0b57	423c182a9ab1a2ba71f97721717607dc	0	0	0
3	935dd42bcab833225d96eb826e2fb959	119426d163f5f77fe626d3e3701289e4	0	1	0
4	c9ef6a4615183d652a777771599dcfbe	b135c8123b51ccd53c26dc76fa1d3ed4	0	0	0

	u_id	m_id	forward_count	comment_count	like_count
5	ca1010cf23e9327e9a68358f5a0f7484	a3dafc001f7e8d8a2169a2625d698cc3	0	1	0
6	b1de85c455b9a42fb1bdf8e44792a50e	d2500bae5669ad1cfbcbaaeb1384a338	0	0	0
7	63c0b7f38fbd83add57273d1ec907551	1e037545970e9983b94acae7bc9ac2c2	1	0	0
8	d38e9bed5d98110dc2489d0d1cac3c2a	abf00ba5489ed889f0ce35b7eb586941	0	0	0
9	dd20701e6bb5bd4eae4df9ef7fcd7103	cb441ee83d8c1cc005f8b4f66748c211	2	2	0

10 rows × 29 columns

In [62]:

```
trainpp.columns
```

Out[62]:

```
Index(['u_id', 'm_id', 'forward_count', 'comment_count', 'like_count',
       'content', 'date', 'time', 'content_media_count', 'content_spchar',
```

```
       'non_emoji_content', 'en_content', 'Unnamed: 1', 'en_contenturl',
       'url_rem', 'en_contentsw', 'Stopwrod_removed', 'Stopword_removed',
       'en_contentst', 'Stemming', 'Stemmingle', 'lemmatization',
       'lemmatizationtl', 'lower', 'lowerrmum', 'no_num', 'lowerrnum',
       'no_numrp', 'no_punc'],
      dtype='object')
```

3. UID Stats as factor

In [6]:

```
stat=pd.read_csv("train_uid_stat.csv")
```

In [7]:

```
stat.head(10)
```

Out[7]:

	u_id	forward_min	forward_max	forward_median	forward_mean	comment_min	comm
0	000127c6126e2b0019f255ed21ac1cb7	0	1	0	0	0	0
1	0001565a5edece1669577e2ace9a6a3d	0	0	0	0	0	1
2	00033a6513b86b2705de9ffa9d37ffb6	0	0	0	0	0	0
3	0004fe2742507420eaa73e119dc83ac5	0	6	0	0	0	1
4	000c663a24a2f91f4ba156fcd4f8b9f2	0	1	0	0	0	7
5	000ce19d2fccb1f22421bec50bf25b08	0	0	0	0	0	0
6	000d7bf7406392b2212dfb4fe907d946	0	0	0	0	0	0
7	0012edb614365800e901c7f2b47e9129	0	0	0	0	0	4
8	001349a053bdecf1a71960f29288ced1	0	0	0	0	0	1
9	0015c42ec93854687a258a7f170c6acf	0	0	0	0	0	0

In [9]:

```
stat.columns
```

Out[9]:

```
Index(['u_id', 'forward_min', 'forward_max', 'forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean'],
      dtype='object')
```

4. Initial Predictions without Model and Analysis

Putting known values of stats in predict dataset without any computation and finding accuracy

Best Statistical Factors and Default Value

Analysis

1. The Best Default Value is 0 1 1 (F C L) which can be used for new users in predict dataset or as a default value

2. The Highest Accuracy is for Median factor which is considerable as per current standings in Sina Weibo leaderbord. (Top

Accuracy: 41.73%)

3. We further wanted to add more factors from content like emoji and media, time etc. with these factors to better our accuracy

----------Factors Considered For Modelling----------

In [10]:

```
df1=pd.read_csv("G://DMA_PROJECT//weibo_train1_cptsd.csv")
df2=pd.read_csv("G://DMA_PROJECT//weibo_train2_cptsd.csv")
frames=[df1,df2]
train_dataset=pd.concat(frames)
predict_dataset=pd.read_csv("G://DMA_PROJECT//weibo_predict_cptsd.csv")
```

In [12]:

```
train_dataset.head(5)
```

Out[12]:

	u_id	m_id	forward_count	comment_count	like_count
0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0	0	0
1	d38e9bed5d98110dc2489d0d1cac3c2a	00755196c77936bf44656ada98291c59	0	0	0
2	d38e9bed5d98110dc2489d0d1cac3c2a	4fedf3888b1e16592f0e0bdc8b393845	0	0	0
3	d38e9bed5d98110dc2489d0d1cac3c2a	91be0b8612265aae32725cd4fa80b222	0	0	0
4	d38e9bed5d98110dc2489d0d1cac3c2a	bd2af99ecf1298f5539f0ddfcdd3ed64	0	0	0

5 rows × 33 columns

In [13]:

```
train_dataset.columns
```

Out[13]:

```
Index(['u_id', 'm_id', 'forward_count', 'comment_count', 'like_count',
       'content', 'date', 'time', 'content_media_count', 'content_#_count',
       'content_@_count', 'content_?_count', 'content_!_count',
       'content_length', 'content_emoji_count', 'hour', 'min', 'sec',
       'forward_min', 'forward_max', 'forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean', 'default_forward',
       'default_comment', 'default_like'],
      dtype='object')
```

1. Content Factors

1a) content_media_count

1b) content_#_count

1c) content_@_count

1d) content_?_count

1e) content_!_count

1f) content_length

1g) content_emoji_count

2. Time Factors

2a) hour

2b) min

2c) sec

3. Statistical Factors

3a) forward_min

3b) forward_max

3c) forward_median

3d) forward_mean

3e) comment_min

3f) comment_max

3g) comment_median

3h) comment_mean

3i) like_min

3j) like_max

3k) like_median

3l) like_mean

4. Default Values

4a) default_forward

4b) default_comment

4c) default_like

Total Factors: 24

----------Model Building Pre requisite----------

In [34]:

```
train_month1=pd.read_csv("G://DMA_PROJECT//weibo_train_feb_cptsd.csv")
train_month2=pd.read_csv("G://DMA_PROJECT//weibo_train_march_cptsd.csv")
train_month3=pd.read_csv("G://DMA_PROJECT//weibo_train_april_cptsd.csv")
train_month4=pd.read_csv("G://DMA_PROJECT//weibo_train_may_cptsd.csv")
train_month5=pd.read_csv("G://DMA_PROJECT//weibo_train_june_cptsd.csv")
train_month6=pd.read_csv("G://DMA_PROJECT//weibo_train_july_cptsd.csv")
```

In [35]:

```
frames1=[train_month1,train_month2,train_month3,train_month4,train_month5]
train=pd.concat(frames1)
predict=train_month6
```

Library used for modelling: sklearn (linear model)

----------Modelling----------

1. Some Models and Inferences

1a) New Factor Analysis

Model 1: (Factors: Media, #, @, ?, !, Length, Emoji)

In [17]:

```
X_train=train[["content_media_count","content_#_count","content_@_count","content_?_count","conten
t_!_count","content_length","content_emoji_count"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_#_count","content_@_count","content_?_count","conte
nt_!_count","content_length","content_emoji_count"]]
Y_test=predict[["forward_count","comment_count","like_count"]]

print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)

pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

```
(1044681, 7) (1044681, 3)
(184937, 7) (184937, 3)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [18]:

```
print(pred[0:5])
print(model.coef_)
print(model.intercept_)
```

```
[[ 4.  1.  2.]
 [ 3.  2.  3.]
 [ 3.  1.  1.]
 [ 7.  1.  2.]
 [ 9.  2.  3.]]
[[-2.13937044 -0.36595303 -0.29844433 -0.04270781 -0.20884535  0.05323583
  -0.11373958]
 [-1.46356558 -0.15223682 -0.02946097 -0.00326344 -0.04880305  0.00769467
   0.1747673 ]
 [-2.6330917  -0.13749083 -0.32811723 -0.01394959 -0.071054    0.01544652
   0.26583545]]
[ 1.31437859  1.76293348  2.98461306]
```

In [19]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result2.csv",pred,delimiter=',',header="forward_count,cc
mment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result2.csv")
```

In [20]:

```
train_real_pred = Y_test
forward=result['forward_count'].values
comment=result['forward_count'].values
like=result['forward_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,like
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  """
```

```
Score on the training set:13.69%
```

Model 2: (Factors: Media, Length, Emoji)

In [22]:

```
X_train=train[["content_media_count","content_length","content_emoji_count"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count"]]
Y_test=predict[["forward_count","comment_count","like_count"]]

print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)

pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

```
(1044681, 3) (1044681, 3)
(184937, 3) (184937, 3)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [23]:

```
print(pred[0:5])
print(model.coef_)
print(model.intercept_)
```

```
[[ 4.  1.  2.]
 [ 3.  2.  3.]
 [ 3.  1.  1.]
 [ 7.  1.  2.]
 [ 8.  1.  3.]]
[[-2.19780299  0.05049652 -0.14777505]
 [-1.47377848  0.00679751  0.16018448]
 [-2.68756793  0.01390734  0.25398113]]
[ 1.23425639  1.73473692  2.94322868]
```

In [24]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result3.csv",pred,delimiter=',',header="forward_count,cc
mment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result3.csv")
```

In [25]:

```
train_real_pred = Y_test
forward=result['forward_count'].values
comment=result['forward_count'].values
like=result['forward_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,like
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  """
```

```
Score on the training set:13.79%
```

Model 3: (Factors:Time: (Hour, Min, Sec), Media, Length, Emoji)

In [27]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","min","sec"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","min","sec"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)

pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

```
(1044681, 6) (1044681, 3)
```

```
(184937, 6) (184937, 3)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [28]:

```
print(pred[0:5])
print(model.coef_)
print(model.intercept_)
```

```
[[  4.   1.   1.]
 [  1.   2.   3.]
 [  2.   1.   1.]
 [  4.   1.   1.]
 [ 10.   2.   4.]]
[[-2.16126691  0.04995623 -0.14079719  0.09097968 -0.05802816 -0.03386975]
 [-1.46714342  0.0068272   0.15966872  0.02589544 -0.00483482 -0.00418282]
 [-2.6652836   0.0137497   0.25624217  0.07054347 -0.03242168 -0.01633076]]
[ 2.62859063  1.63033587  3.36618167]
```

In [29]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result4.csv",pred,delimiter=',',header="forward_count,cc
mment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result4.csv")
```

In [30]:

```
train_real_pred = Y_test
forward=result['forward_count'].values
comment=result['forward_count'].values
like=result['forward_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,like
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  """
```

```
Score on the training set:15.41%
```

Analysis: New Factors not yeilding very satisfactory results

1 b) Combination with old factors

Model 4: (Factors: Median,Time: (Hour, Min, Sec), Media, Length, Emoji)

In [40]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","min","sec","for
ward_median","comment_median","like_median"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","min","sec","fo
rward_median","comment_median","like_median"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred=lm.predict(X_test)
pred=pred.round()
pred=(np.maximum(pred,0.))
```

```
(1044681, 9) (1044681, 3)
(184937, 9) (184937, 3)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [41]:

```
print(pred[0:5])
print(model.coef_)
print(model.intercept_)
```

```
[[  3.   4.   3.]
 [  3.   4.   3.]
 [  3.   4.   3.]
 [ 13.   7.   8.]
 [  2.   2.   2.]]
[[ -2.63364425e-01   1.91174376e-02   5.54642973e-02   3.76150971e-02
    5.27858190e-04   1.68362209e-03   1.58279691e+00   1.67729136e+00
   -2.93017304e-01]
 [ -6.60961017e-01   2.55079540e-03   1.00504045e-01   1.24809468e-02
    2.35146358e-03   1.20243289e-03   7.17940397e-02   1.55348700e+00
    4.45266999e-03]
 [ -8.70474303e-01   9.23346652e-04   5.98607519e-02   2.34643687e-02
    4.45920014e-05   1.52298289e-03   1.45839466e-01   3.91354761e-01
    1.06591334e+00]]
[-1.04897282  0.36245024  0.43019058]
```

Analysis: Weights assigned to Statistical Factors is higher

In [42]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_result5.csv",pred,delimiter=',',header="forward_count,cc
mment_count,like_count",comments="")
result=pd.read_csv("G://DMA_PROJECT//weibo_predict_result5.csv")
```

In [44]:

```
train_real_pred = Y_test
train_real_pred['fp']=result['forward_count'].values
train_real_pred['cp']=result['comment_count'].values
train_real_pred['lp']=result['like_count'].values
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

G:\Anaconda\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
G:\Anaconda\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score on the training set:32.47%
```

Analysis:

1. Median factor boosted accuracy yet again

2. Separate predictions are necessory for F C L as in cases like Forward won't need Like Median and Comment Median. Also Each of F C L can have different best factors

1 c) Separate prediction Models for FCL and Final Model

Model 5: (Factors: Median, Min, Max, Media, Emoji)

In [45]:

```
X_train1=train[["forward_median","forward_mean","forward_min","content_media_count","content_emoji_
count"]]
Y_train1=train[["forward_count"]]
X_test1=predict[["forward_median","forward_mean","forward_min","content_media_count","content_emoji
_count"]]
Y_test1=predict[["forward_count"]]

X_train2=train[["comment_median","comment_mean","comment_min","content_media_count","content_emoji_
count"]]
Y_train2=train[["comment_count"]]
X_test2=predict[["comment_median","comment_mean","comment_min","content_media_count","content_emoji
_count"]]
Y_test2=predict[["comment_count"]]

X_train3=train[["like_median","like_mean","like_min","content_media_count","content_emoji_count"]]
Y_train3=train[["like_count"]]
X_test3=predict[["like_median","like_mean","like_min","content_media_count","content_emoji_count"]
]
Y_test3=predict[["like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
X_train2.fillna(X_train2.max(),inplace=True)
X_test2.fillna(X_test2.max(),inplace=True)
X_train3.fillna(X_train3.max(),inplace=True)
X_test3.fillna(X_test3.max(),inplace=True)

print(X_train1.shape,Y_train1.shape)
print(X_test1.shape,Y_test1.shape)

print(X_train2.shape,Y_train2.shape)
print(X_test2.shape,Y_test2.shape)

print(X_train3.shape,Y_train3.shape)
print(X_test3.shape,Y_test3.shape)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

```
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
```

In [46]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

lm2=linear_model.LinearRegression()
model2=lm2.fit(X_train2,Y_train2)
pred2=lm2.predict(X_test2)
pred2=pred2.round()
pred2=(np.maximum(pred2,0.))

lm3=linear_model.LinearRegression()
model3=lm3.fit(X_train3,Y_train3)
pred3=lm3.predict(X_test3)
pred3=pred3.round()
pred3=(np.maximum(pred3,0.))
```

In [48]:

```
print(pred1[0:5])
print(model1.coef_)
print(model1.intercept_)

print(pred2[0:5])
print(model2.coef_)
print(model2.intercept_)

print(pred3[0:5])
print(model3.coef_)
print(model3.intercept_)
```

```
[[  2.]
 [  2.]
 [  2.]
 [ 13.]
 [ 12.]]
[[ 0.44920013  0.84888874 -0.28999774  0.32885539  0.01281363]]
[-0.20643995]
[[ 4.]
 [ 4.]
 [ 4.]
 [ 4.]
 [ 3.]]
[[-0.23456946  1.16942801  0.04188341 -0.33471336  0.02751557]]
[ 0.19200623]
[[ 3.]
 [ 3.]
 [ 3.]
 [ 7.]
 [ 4.]]
[[ 0.13417819  0.93515754 -0.20071856 -0.64595136 -0.11687872]]
[ 0.47901386]
```

In [47]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_resultc1.csv",pred1,delimiter=',',header="forward_count"
,comments="")
result1=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultc1.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resultc2.csv",pred2,delimiter=',',header="comment_count"
,comments="")
```

```
,comments="")
result2=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultc2.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resultc3.csv",pred3,delimiter=',',header="like_count",c
omments="")
result3=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultc3.csv")
```

In [49]:

```
train_real_pred = pd.concat([Y_test1,Y_test2,Y_test3],axis=1)
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result2['comment_count']
train_real_pred['lp']=result3['like_count']
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.4f}%".format(precision(train_real_pred.values)*100))
```

```
Score on the training set:38.0378%
```

Analysis: This is the best accuracy we got out of all the models we tried

We got the same accuracy for another model....

Model 6: (Factors: Median, Min, Max, Media, Emoji, Default Values)

In [50]:

```
X_train1=train[["forward_median","forward_mean","forward_min","content_media_count","content_emoji_
count","default_forward"]]
Y_train1=train[["forward_count"]]
X_test1=predict[["forward_median","forward_mean","forward_min","content_media_count","content_emoji
_count","default_forward"]]
Y_test1=predict[["forward_count"]]

X_train2=train[["comment_median","comment_mean","comment_min","content_media_count","content_emoji_
count","default_comment"]]
Y_train2=train[["comment_count"]]
X_test2=predict[["comment_median","comment_mean","comment_min","content_media_count","content_emoji
_count","default_comment"]]
Y_test2=predict[["comment_count"]]

X_train3=train[["like_median","like_mean","like_min","content_media_count","content_emoji_count","
default_like"]]
Y_train3=train[["like_count"]]
X_test3=predict[["like_median","like_mean","like_min","content_media_count","content_emoji_count",
"default_like"]]
Y_test3=predict[["like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
X_train2.fillna(X_train2.max(),inplace=True)
X_test2.fillna(X_test2.max(),inplace=True)
X_train3.fillna(X_train3.max(),inplace=True)
X_test3.fillna(X_test3.max(),inplace=True)

print(X_train1.shape,Y_train1.shape)
print(X_test1.shape,Y_test1.shape)

print(X_train2.shape,Y_train2.shape)
print(X_test2.shape,Y_test2.shape)

print(X_train3.shape,Y_train3.shape)
print(X_test3.shape,Y_test3.shape)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

```
(1044681, 6) (1044681, 1)
(184937, 6) (184937, 1)
(1044681, 6) (1044681, 1)
(184937, 6) (184937, 1)
(1044681, 6) (1044681, 1)
(184937, 6) (184937, 1)
```

In [51]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))

lm2=linear_model.LinearRegression()
model2=lm2.fit(X_train2,Y_train2)
pred2=lm2.predict(X_test2)
pred2=pred2.round()
pred2=(np.maximum(pred2,0.))

lm3=linear_model.LinearRegression()
model3=lm3.fit(X_train3,Y_train3)
pred3=lm3.predict(X_test3)
pred3=pred3.round()
pred3=(np.maximum(pred3,0.))
```

In [52]:

```
print(pred1[0:5])
print(model1.coef_)
print(model1.intercept_)

print(pred2[0:5])
print(model2.coef_)
print(model2.intercept_)

print(pred3[0:5])
print(model3.coef_)
print(model3.intercept_)
```

```
[[  2.]
 [  2.]
 [  2.]
 [ 13.]
 [ 12.]]
[[ 0.44920013  0.84888874 -0.28999774  0.32885539  0.01281363  0.        ]]
[-0.20643995]
[[ 4.]
 [ 4.]
 [ 4.]
 [ 4.]
 [ 3.]]
[[-0.23456946  1.16942801  0.04188341 -0.33471336  0.02751557  0.        ]]
[ 0.19200623]
[[ 3.]
 [ 3.]
 [ 3.]
 [ 7.]
 [ 4.]]
[[ 0.13417819  0.93515754 -0.20071856 -0.64595136 -0.11687872  0.        ]]
[ 0.47901386]
```

In [53]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_resultd1.csv",pred1,delimiter=',',header="forward_count"
,comments="")
result1=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultd1.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resultd2.csv",pred2,delimiter=',',header="comment_count"
,comments="")
result2=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultd2.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resultd3.csv",pred3,delimiter=',',header="like_count",c
omments="")
```

```
result3=pd.read_csv("G://DMA_PROJECT//weibo_predict_resultd3.csv")
```

In [54]:

```
train_real_pred = pd.concat([Y_test1,Y_test2,Y_test3],axis=1)
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result2['comment_count']
train_real_pred['lp']=result3['like_count']
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.4f}%".format(precision(train_real_pred.values)*100))
```

```
Score on the training set:38.0378%
```

Analysis: Since Model with less factors is more preferred so Model 5 is the Final Model

----------Final Model Analysis----------

Factors for forward: "forward_median","forward_mean","forward_min","content_media_count","con

Factors for comment: "comment_median","comment_mean","comment_min","content_media_count"

Factors for like: "like_median","like_mean","like_min","content_media_count","content_emoji_c

Linear Equations:

forward_count = 0.44 x forward_median + 0.84 x forward_mean - 0.28 x forward_min + 0.32 x content_media_count + 0.01 x content_emoji_count - 0.2

comment_count = 0.23 x comment_median + 1.16 x comment_mean - 0.04 x comment_min - 0.33 x content_media_count + 0.02 x content_emoji_count + 0.19

like_count = 0.13 x like_median + 0.93 x like_mean - 0.2 x like_min - 0.64 x content_media_count - 0.11 x content_emoji_count + 0.47

Final Precision: 38.04%

Graphical Analysis of final Model

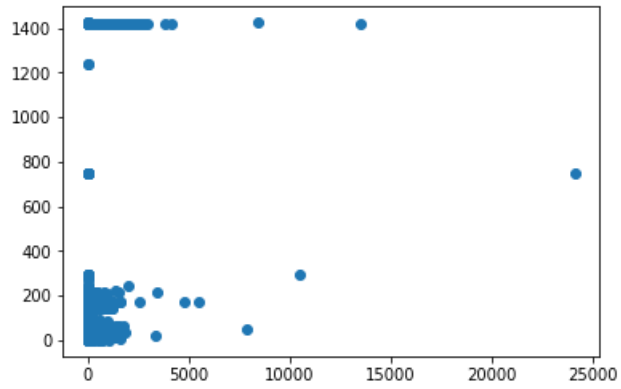
Forward Predictions

In [57]:

```
plt.scatter(Y_test1,pred1)
```

Out[57]:

```
<matplotlib.collections.PathCollection at 0x5eefb6fc18>
```



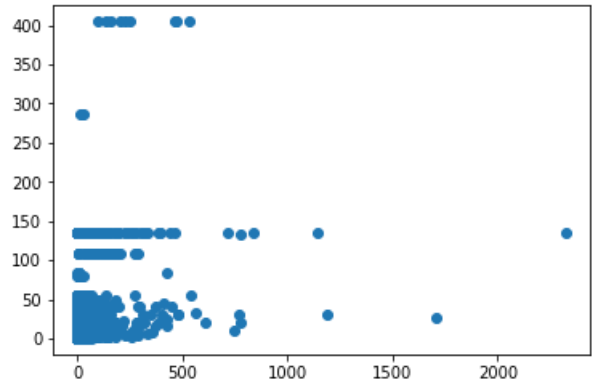
Comment Predictions

In [58]:

```
plt.scatter(Y_test2,pred2)
```

Out[58]:

```
<matplotlib.collections.PathCollection at 0x5eefae5668>
```



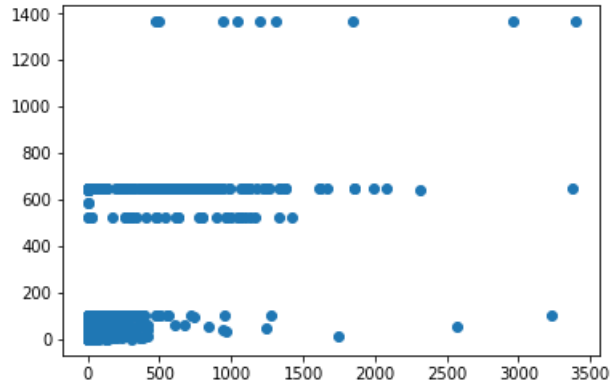
Like Predictions

In [59]:

```
plt.scatter(Y_test3,pred3)
```

Out[59]:

```
<matplotlib.collections.PathCollection at 0x5eefb960b8>
```



Analysis: Better prediction for lower F C L

Scope and Learnings

1. Though we got satisfactory results from our above factors, Sina Weibo Prediction consists of vast factors for prediction and further new factors are very much possible to find like BOW and polarity which can increase the accuracy. More In depth analysis for these microblog site factors can lead to more better results.

2. Due to some factors hard to process like BOW and Polarity for relatively large data we might not have used them for selected models used here but these can also be used for better results.

3. We have considered BOW and polarity for approx first 10K tuples and computed accuracy.This work can further be carried out.

Limitation

Prediction for higher F C L is less accurate

In [2]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%pylab inline
import copy
from googletrans import Translator
import pandas as pd
import numpy as np
import csv
import re
import jieba
import time
import json
from sklearn.feature_extraction.text import CountVectorizer
from sklearn import linear_model
from sklearn.externals import joblib
from nltk.corpus import stopwords as e_stopwords
from datetime import datetime, timedelta
import jieba
import sys

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
```

```
Populating the interactive namespace from numpy and matplotlib
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\IPython\core\magics\pylab.py:160: UserWarni
ng: pylab import has clobbered these variables: ['copy', 'datetime']
`%matplotlib` prevents importing * from pylab and numpy
  "\n`%matplotlib` prevents importing * from pylab and numpy"
```

Random Forest Regressor for Statistical Factors

In [3]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

In [4]:

```
#Reading data from document
import pandas as pd
df_pre=pd.read_csv("E:\\DMA_PRE\\PREPROCESSED.csv")
```

In [21]:

```
df_pre.shape[0]
```

Out[21]:

```
37263
```

In [17]:

```
train=df_pre[0:8000]
cv=df_pre[8001:10000]
```

In [19]:

```
df_stat=pd.read_csv("E:\\DMA_PRE\\train_uid_stat.csv")
```

In [20]:

```
df_stat.shape
```

Out[20]:

```
(37263, 13)
```

In [62]:

```
df_stat.head(5)
```

Out[62]:

	u_id	forward_min	forward_max	forward_median	for
0	000127c6126e2b0019f255ed21ac1cb7	0	1	0	0
1	0001565a5edece1669577e2ace9a6a3d	0	0	0	0
2	00033a6513b86b2705de9ffa9d37ffb6	0	0	0	0
3	0004fe2742507420eaa73e119dc83ac5	0	6	0	0
4	000c663a24a2f91f4ba156fcd4f8b9f2	0	1	0	0

In [4]:

```
train_all1=pd.read_csv('E:\\5th-Sem\\DMA Project\\Model
Evaluation\\weibo_train1_cp.csv')
train_all2=pd.read_csv('E:\\5th-Sem\\DMA Project\\Model
Evaluation\\weibo_train2_cp.csv')
frames=[train_all1,train_all2]
train_all=pd.concat(frames)
```

In [71]:

```
train_all.shape[0]
```

Out[71]:

```
1229618
```

In [73]:

```
df_merge = pd.merge(train_all, df_stat, how='left', on=['u_id'])
```

In [5]:

```
df1=pd.read_csv("E:\\5th-Sem\\DMA Project\\Project\\weibo_train1_cpts.csv")
df2=pd.read_csv("E:\\5th-Sem\\DMA Project\\Project\\weibo_train2_cpts.csv")
frames=[df1,df2]
train_all=pd.concat(frames)
```

In [6]:

```
X=train_all[["content_media_count","content_#_count","content_length","content_emoji_
count","forward_median","comment_median","like_median"]]
y=train_all[['forward_count', 'comment_count', 'like_count']]
```

In [7]:

```
from sklearn import cross_validation
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train, features_test, labels_train, labels_test = cross_validation.train_tes
t_split(X, y, test_size=0.3, random_state=1)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\cross_validation.py:41: Deprecation
Warning: This module was deprecated in version 0.18 in favor of the model_selection m
odule into which all the refactored classes and functions are moved. Also note that t
he interface of the new CV iterators are different from that of this module. This
module will be removed in 0.20.
  "This module will be removed in 0.20.", DeprecationWarning)
```

Model 1 (Predicting all 3 values together)

In [ ]:

```
from sklearn.ensemble import RandomForestRegressor

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test



regr = RandomForestRegressor(max_depth=30, random_state=0,n_estimators=100)
regr.fit(x, y)
y11_predict = regr.predict(x1)
```

```
y11_predict=y11_predict.round()
y11_predict=(np.maximum(y11_predict,0.))
#print(r2_score(y1, y11_predict) ) #Random forest regressor
```

In [16]:

```
np.savetxt("E:\\weibo_predict_result.csv",y11_predict,delimiter=',',header="forward_count,comment_count,like_count",comments="")
result=pd.read_csv("E:\\weibo_predict_result.csv")
```

In [20]:

```
train_real_pred = labels_test
forward=result['forward_count'].values
comment=result['comment_count'].values
like=result['like_count'].values
train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,like
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score on the training set:30.04%
```

In [24]:

```
train_all.head(1).T
```

Out[24]:

	0
u_id	d38e9bed5d98110dc2489d0d1cac3c2a
m_id	7d45833d9865727a88b960b0603c19f6
forward_count	0
comment_count	0
like_count	0
content	丽江旅游(sz002033)#股票##炒股##财经##理财##投资#推荐包赢股，盈利对半分成...
date	2015-02-23
time	17:41:29
content_media_count	0
content_#_count	10
content_@_count	0
content_?_count	0
content_!_count	0
content_length	62

~~content_length~~	~~62~~
~~content_emoji_count~~	~~0~~
hour	17
min	41
sec	29
forward_min	0
forward_max	114
forward_median	0
forward_mean	1
comment_min	0
comment_max	48
comment_median	0
comment_mean	0
like_min	0
like_max	5
like_median	0
like_mean	0

Model 2 - Constructing 3 individual models and concatinating the results

In [7]:

```
X=train_all[["forward_median","forward_mean","forward_min","content_media_count","con
tent_emoji_count"]]
y=train_all['forward_count']
from sklearn import cross_validation
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train, features_test, labels_train, labels_test = cross_validation.train_tes
t_split(X, y, test_size=0.3, random_state=1)
from sklearn.ensemble import RandomForestRegressor

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test



regr = RandomForestRegressor(max_depth=30, random_state=0,n_estimators=100)
regr.fit(x, y)
y11_predict = regr.predict(x1)
```

```
#print(r2_score(y1, y11_predict) ) #Random forest regressor
np.savetxt("E:\\weibo_predict_result1.csv",y11_predict,delimiter=',',header="forward_
count",comments="")
result1=pd.read_csv("E:\\weibo_predict_result1.csv")
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\cross_validation.py:41: Deprecation
Warning: This module was deprecated in version 0.18 in favor of the model_selection m
odule into which all the refactored classes and functions are moved. Also note that t
he interface of the new CV iterators are different from that of this module. This
module will be removed in 0.20.
  "This module will be removed in 0.20.", DeprecationWarning)
```

In [11]:

```
X=train_all[["comment_median","comment_mean","comment_min","content_media_count","con
tent_emoji_count"]]
y=train_all['comment_count']
from sklearn import cross_validation
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train, features_test, labels_train, labels_test = cross_validation.train_tes
t_split(X, y, test_size=0.3, random_state=1)
from sklearn.ensemble import RandomForestRegressor

x = features_train
y = labels_train
x1 = features_test
y2 = labels_test



regr = RandomForestRegressor(max_depth=30, random_state=0,n_estimators=100)
regr.fit(x, y)
y11_predict = regr.predict(x1)
#print(r2_score(y1, y11_predict) ) #Random forest regressor
np.savetxt("E:\\weibo_predict_result2.csv",y11_predict,delimiter=',',header="comment_
count",comments="")
result2=pd.read_csv("E:\\weibo_predict_result2.csv")
```

In [12]:

```
X=train_all[["like_median","like_mean","like_min","content_media_count","content_emoj
i_count"]]
y=train_all['like_count']
from sklearn import cross_validation
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train, features_test, labels_train, labels_test = cross_validation.train_tes
t_split(X, y, test_size=0.3, random_state=1)
from sklearn.ensemble import RandomForestRegressor

x = features_train
y = labels_train
x1 = features_test
```

```
y3 = labels_test



regr = RandomForestRegressor(max_depth=30, random_state=0,n_estimators=100)
regr.fit(x, y)
y11_predict = regr.predict(x1)
#print(r2_score(y1, y11_predict) ) #Random forest regressor
np.savetxt("E:\\weibo_predict_result3.csv",y11_predict,delimiter=',',header="like_cou
nt",comments="")
result3=pd.read_csv("E:\\weibo_predict_result3.csv")
```

In [13]:

```
train_real_pred = pd.concat([y1,y2,y3],axis=1)
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result2['comment_count']
train_real_pred['lp']=result3['like_count']
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.4f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:12.1019%
```

In [1]:

```
import pandas as pd
import csv
```

In [2]:

```
import _pickle as cPickle
import import_ipynb
import pandas as pd
import numpy as np
from genUidStat import loadData,genUidStat
from evaluation import precision
from runTime import runTime
from pathos.pools import _ProcessPool
from multiprocess.pool import Pool
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

In [3]:

```
df1=pd.read_csv("weibo_train1.csv")
df2=pd.read_csv("weibo_train2.csv")
frames=[df1,df2]
traindata=pd.concat(frames)
```

In [4]:

```
def splitDataFrameIntoSmaller(df, chunkSize = 10000):
    listOfDf = list()
    numberChunks = len(df) // chunkSize + 1
    for i in range(numberChunks):
        listOfDf.append(df[i*chunkSize:(i+1)*chunkSize])
    return listOfDf
```

In [5]:

```
uid_stat=pd.read_csv("train_uid_stat.csv")
```

In [6]:

```
uid = splitDataFrameIntoSmaller(uid_stat, chunkSize = 500)
```

In [7]:

```
uid[0].shape[0]
```

Out[7]:

```
500
```

In [8]:

```
def search_all_uid(stat_dic,file):
 import pandas as pd
 import numpy as np
 def _deviation(predict, real, kind):
  t = 5.0 if kind=='f' else 3.0
  return abs(predict - real) / (real + t)
 def _precision_i(fp, fr, cp, cr, lp, lr):
  return 1 - 0.5 * _deviation(fp, fr, 'f') - 0.25 * _deviation(cp, cr, 'c') - 0.25 *
_deviation(lp, lr, 'l')
 def _sgn(x):
  return 1 if x>0 else 0
 def _count_i(fr, cr, lr):
  x = fr + cr + lr
  return 101 if x>100 else (x+1)
 def precision(real_and_predict):
  numerator,denominator = 0.0,0.0
  for  fr, cr, lr,fp, cp, lp in real_and_predict:
   numerator += _count_i(fr, cr, lr) * _sgn(_precision_i(fp, fr, cp, cr, lp, lr) - 0.
8)
   denominator += _count_i(fr, cr, lr)
  return (numerator / denominator)
 def score(uid_data,pred):
  """
  uid_data:
   pd.DataFrame
  pred:
   list, [fp,cp,lp]
  """
  uid_real_pred = uid_data[['forward_count','comment_count','like_count']]
  uid_real_pred['fp'] = pred[0]
  uid_real_pred['cp'] = pred[1]
  uid_real_pred['lp'] = pred[2]
  return precision(uid_real_pred.values)
 def search(uid_data,target,args):
  args = list(args)
  target_index = ['forward_count','comment_count','like_count'].index(target)
  target_min,target_median,target_max = args[3*target_index:3*target_index+3]
  del args[3*target_index:3*target_index+3]
  pred = (args[1],args[4])

  best_num = [target_median]
  best_pred = list(pred)
  best_pred.insert(target_index,target_median)
  best_score = score(uid_data,best_pred)
  for num in range(target_min,target_max+1):
   this_pred = list(pred)
   this_pred.insert(target_index,num)
   this_score = score(uid_data,this_pred)
   if this_score >= best_score:
    if this_score > best_score:
     best_num = [num]
     best_score = this_score
    else:
```

```
    else:
     best_num.append(num)

  return best_num[np.array([abs(i - target_median) for i in best_num]).argmin()]
 uid_best_pred = {}
 pool = _ProcessPool()
 uids,f,c,l = [],[],[],[]
 m=1
 for uid in stat_dic:
  print ("search uid:{}".format(uid),m)
  m=m+1
  uid_data = traindata[traindata.u_id == uid]
  arguments = stat_dic[uid][['forward_min','forward_median','forward_max','comment_mi
n',\
      'comment_median','comment_max','like_min','like_median','like_max']]
  arguments = tuple([int(i) for i in arguments])
  f.append(pool.apply_async(search,args=(uid_data,'forward_count',arguments)))
  c.append(pool.apply_async(search,args=(uid_data,'comment_count',arguments)))
  l.append(pool.apply_async(search,args=(uid_data,'like_count',arguments)))
  uids.append(uid)
 pool.close()
 pool.join()
 f = [i.get() for i in f]
 c = [i.get() for i in c]
 l = [i.get() for i in l]
 for i in range(len(uids)):
  uid_best_pred[uids[i]] = [f[i],c[i],l[i]]
 #cPickle.dump(uid_best_pred,open('uid_best_pred'+str(file)+'.pkl','ab'))
 label = ['forward_count','comment_count','like_count']
 pd.DataFrame.from_dict(data=uid_best_pred,orient='index').to_csv("G:\\Anconda Prog\\
BestPred\\weibo_uidbest"+str(file)+".csv",header=label)
 print("Written to file")
```

In [ ]:

```
uid_stat=pd.read_csv("train_uid_stat.csv")
uid_stat=uid_stat.set_index('u_id')
uid = splitDataFrameIntoSmaller(uid_stat, chunkSize = 100)
n=8
while n<75:
    df=uid[n].T
    stat=df.to_dict('series')
    n=n+1
    search_all_uid(stat,n)
```

```
search uid:059e69f515a8ccae9005d9184082e1a7 1
search uid:059f1af2f4d0cc0c11f7c2333fb56df9 2
search uid:05a17e58a7d0318c02ca957ea287c63a 3
search uid:05a3e00d1bf81123eaa16d9140781814 4
search uid:05a86ee2ef6ca329c2d7bd29a0bd43a2 5
search uid:05aa7401f543aff4eaa9804faf94fe5d 6
search uid:05abd155225287be6ccc9e851743c33d 7
search uid:05ac93f1cea114840ec678882df58bde 8
```

search uid:05ac976dd6c437b557aacc0f8bf95820 9
search uid:05ad91adac4f36090687b821074a6839 10
search uid:05b00857a652495ecd61ff287eefa0fa 11
search uid:05b0ed6b6c5a3c7ec0ee133658afc455 12
search uid:05ba03da99f9a8fd86ce5cedabb74eaa 13
search uid:05ba689e3f3d89f4f1de80b156f09c51 14
search uid:05bab1fcb0bef33fd6ab88f718d5d41d 15
search uid:05bc20ee20f50b744c00d948da2ee82f 16
search uid:05bc29c0517afb7cb63379e447646db2 17
search uid:05bc52673524ae6b2342f8c00e815aa8 18
search uid:05bd6785b6c3ca20728be79ed7e2fd73 19
search uid:05be804ef16a4d1b3b442cc1668c15ca 20
search uid:05bf76486b0c1eac3fab100d88678514 21
search uid:05c1a7c2eecd8568015fcb7245aba5d8 22
search uid:05c324e0a53b7b8b548163168e5c1763 23
search uid:05ca5e5ab3bc016c4056bebfd971af90 24
search uid:05cb634bc84a59d89c3747b9684cee56 25
search uid:05cc9da72ceb5ad3e8fcbd5e3178f70c 26
search uid:05ce6400d4ecf6b8c89cc281689da137 27
search uid:05cfb9c7126bf9aa546686673c01eaee 28
search uid:05d081c07b61499dd9647ebf883472e9 29
search uid:05d219d1ce32acb7591dca2ca181bb51 30
search uid:05d2b10375eaa12878f398267c2bedf9 31
search uid:05d43f272ed3dfce12a22a4d4c509fcc 32
search uid:05d79a718397917cfbe233968f069345 33
search uid:05dc5aac901219181ccbd75f50afd0b4 34
search uid:05df0f5c8252ae78d8bfd2e62290a7fa 35
search uid:05e101976ec8f0d28ae4f25f5f5a4df4 36
search uid:05e12cb9f7db55e84bf89006906e0f60 37
search uid:05e18af6ed9b5a23b1642bf118e740d0 38
search uid:05e4492aeefc260d3c8d0fbd70523c48 39
search uid:05e60e17f6f7d473d2b0fc6c471f5af9 40
search uid:05eab8ab56fc145464ae489d5e5ca9c1 41
search uid:05ed33dbc866e3ce5d597e650bb99d65 42
search uid:05edcddbfd2fcc147f7fb1bc09d3c0d9 43
search uid:05ef9ec5b807b59c6788626408c44754 44
search uid:05f0eee4768432862a7661085ed6533d 45
search uid:05f57a02ea3698e84d45e10383e44d63 46
search uid:05f974da06803245c215a2e13e059160 47
search uid:05fec84bb78c23377204a76411be1be7 48
search uid:05fff005c1d91f6ed477dbcd1c34111c 49
search uid:0604bdbdc3d0c12ee5ed75f300f99f73 50
search uid:0606698e2eb897452aa862bdac512726 51
search uid:06079f6c6929fe184ecc805679066bed 52
search uid:0609a0d54851bf22862d754ceda87b2b 53
search uid:060b9e5107e8f29baed68962f6f8eaff 54
search uid:060d776b251d79f434b75c69c4940462 55
search uid:060f5a4f7e058bb2ff9c9de92cfad542 56
search uid:061589a44fc0b6a40cf3e9807c510b6c 57
search uid:0615c6631b18572c9b6387eb90d85ab5 58
search uid:061a5a5ef25b09e39620d0408e7fec31 59
search uid:061b887b096b9d808a474bff00473fc1 60
search uid:061bd14b8a30dcc2231a6a610730a5b2 61

```
search uid:061bd14b8a30dca2331a6c619739a5b3 61
search uid:061c29516f8c179782a5546f47b47317 62
search uid:061d1cbc09f676d9be499136844ecc16 63
search uid:061dcf335c3c77727b8bdacb1eddc2f9 64
search uid:061eff81086b93a607360775a2497998 65
search uid:061f989b85ac194f5b4d845644d4310a 66
search uid:062087b718dcf91fc9ccdb3164778d46 67
search uid:0621633270b62ed5bd67cf932f3415f5 68
search uid:0621b7682d67938d9b63c745fe2fd401 69
search uid:0621eaff870b91d9c5177bb9a0534470 70
search uid:06229bb279bedc152ba845da65da941b 71
search uid:06240eed2b2c20c30c29c948d6ab5b73 72
search uid:0625890a7a1cdef6336cffadd84f9e29 73
search uid:0626b7ac922a88e8b6782ce9d3de2605 74
search uid:062731665285bdb5c8e9e0a11a71c85e 75
search uid:06275826c69fa270b3979f50368f4ecc 76
search uid:06276dceec3540eeef29cc488c2a4b45 77
search uid:06294a4f2333bedf4b33f9a0357cc4ce 78
search uid:0629ef303d35298e48fb02d4424ab909 79
search uid:062b899802ceff6a713702887d9d2e90 80
search uid:0630665026540a028878b4cc753a356a 81
search uid:0631e635b7a1eb8e3275ed767b2188cb 82
search uid:063306849f9adab61d662f67f90a5d23 83
search uid:063371083b2bb8cfaca892db2a703b2b 84
search uid:06348c1b6f53b5434b57b786d50a0104 85
search uid:0635ff2e769fc70d4f643dc639b4e9cc 86
search uid:06371151752b567f1ca4de664faf3250 87
search uid:06377961d878de50acea93b23219e7fe 88
search uid:063a41bd09fbc1790b43263cc6107d2f 89
search uid:063be5817b395ae8f439de921443179c 90
search uid:063e88517736cab464595cf98676ede3 91
search uid:063ee4a5343d064c2e49dd1cc9b45a6b 92
search uid:064275777ee18e51251f78abfbd4e1ce 93
search uid:0642a5738b33696fa17e69f3e46eaa96 94
search uid:06437d2b81aa54e843967bbc8684fb2c 95
search uid:064507c048c4185dcac8b4e9af81af5c 96
search uid:0645345d36c461a0d2b53278cd926c99 97
search uid:064978a78f30bf1637bcd794a6bc66b0 98
search uid:064a46a128786589314717 88f3eecff7 99
search uid:064b5927535578d5b54b5f533a490819 100
```

FILES GENERATED

In [92]:

```
@runTime
def predict_by_search(submission=True):
 traindata,testdata = loadData()
 #concat all frames here
```

```
 ub=pd.read_csv("train_best_pred.csv")
 ub=ub.set_index('u_id')
 df=ub.T
 uid_best_pred=df.to_dict('series')
 #uid_best_pred = search_all_uid()
 #print ("search done,now predict on traindata and testdata...")

 #predict traindata with uid's best fp,cp,lp
 forward,comment,like = [],[],[]
 for uid in traindata['u_id']:
  if uid in uid_best_pred:
   forward.append(int(uid_best_pred[uid][0]))
   comment.append(int(uid_best_pred[uid][1]))
   like.append(int(uid_best_pred[uid][2]))
  else:
   forward.append(0)
   comment.append(0)
   like.append(0)
 #score on the traindata
 train_real_pred = traindata[['forward_count','comment_count','like_count']]
 train_real_pred['fp'],train_real_pred['cp'],train_real_pred['lp'] = forward,comment,
like
 print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values
)*100))
 if submission:
  test_pred = testdata[['u_id','m_id']]
  forward,comment,like = [],[],[]
  for uid in testdata['u_id']:
   if uid in uid_best_pred:
    forward.append(int(uid_best_pred[uid][0]))
    comment.append(int(uid_best_pred[uid][1]))
    like.append(int(uid_best_pred[uid][2]))
   else:
    forward.append(0)
    comment.append(0)
    like.append(0)
  test_pred['fp'],test_pred['cp'],test_pred['lp'] = forward,comment,like

  #generate submission file
  result = []
  filename = "weibo_predict_search.txt"
  for _,row in test_pred.iterrows():
   result.append("{0}\t{1}\t{2},{3},{4}\n".format(row[0],row[1],row[2],row[3],row[4])
)
  f = open(filename,'w')
  f.writelines(result)
  f.close()
  print ('generate submission file "{}"'.format(filename))
```

In [93]:

```
predict_by_search()
```

```
search uid:24b621c98f2594b698c0b1d60c9ae6db
search uid:d38e9bed5d98110dc2489d0d1cac3c2a
search uid:d80f3d3c5c1d658e82b837a4dd1af849
search uid:da534fe87e7a52777bee5c30573ed5fd
search uid:e06a22b7e065e559a1f0bf7841a85c51
search uid:e44d81d630e4f382f657e72aa4b685da
search uid:f349a67d1cd7c8683c5bbc5f8486e193
search uid:f9828598f9664d4e347ef2048ce17734
search uid:fa13974743d3fe6ff40d21b872325e9e
search uid:fbe6c953632e1b3dda66cf6118b6ab12
1
Before loop

search done,now predict on traindata and testdata...

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:20: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

Score on the training set:55.56%

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:34: SettingWithCopyWa
rning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

generate submission file "weibo_predict_search.txt"
predict_by_search run time: 72.50s
```

In [1]:

```
import pandas as pd
import numpy as np
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from matplotlib import pyplot as plt
import statsmodels.api as sm
import import_ipynb
from evaluation import precision
```

```
importing Jupyter notebook from evaluation.ipynb
```

In [4]:

```
train_month1=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_feb_cpts.csv")
train_month2=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_march_cpts.csv")
train_month3=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_april_cpts.csv")
train_month4=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_may_cpts.csv")
train_month5=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_june_cpts.csv")
train_month6=pd.read_csv("E:\5th Sem\DMA Project\Model
Evaluation\weibo_train_july_cpts.csv")
```

In [4]:

```
frames1=[train_month1,train_month2,train_month3,train_month4,train_month5]
train=pd.concat(frames1)
predict=train_month6
```

In [5]:

```
X_train1=train[["forward_median","forward_mean","forward_min","content_media_count",
"content_emoji_count"]]
Y_train1=train[["forward_count"]]
X_test1=predict[["forward_median","forward_mean","forward_min","content_media_count",
"content_emoji_count"]]
Y_test1=predict[["forward_count"]]

X_train2=train[["comment_median","comment_mean","comment_min","content_media_count",
"content_emoji_count"]]
Y_train2=train[["comment_count"]]
X_test2=predict[["comment_median","comment_mean","comment_min","content_media_count",
"content_emoji_count"]]
Y_test2=predict[["comment_count"]]

X_train3=train[["like_median","like_mean","like_min","content_media_count","content_e
moji_count"]]
```

```
Y_train3=train[["like_count"]]
X_test3=predict[["like_median","like_mean","like_min","content_media_count","content_
emoji_count"]]
Y_test3=predict[["like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
X_train2.fillna(X_train2.max(),inplace=True)
X_test2.fillna(X_test2.max(),inplace=True)
X_train3.fillna(X_train3.max(),inplace=True)
X_test3.fillna(X_test3.max(),inplace=True)

print(X_train1.shape,Y_train1.shape)
print(X_test1.shape,Y_test1.shape)

print(X_train2.shape,Y_train2.shape)
print(X_test2.shape,Y_test2.shape)

print(X_train3.shape,Y_train3.shape)
print(X_test3.shape,Y_test3.shape)
```

```
G:\Anaconda\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

```
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
(1044681, 5) (1044681, 1)
(184937, 5) (184937, 1)
```

In [6]:

```
model1=sm.OLS(Y_train1,X_train1).fit()
pred1=model1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
print(model1.summary())

model2=sm.OLS(Y_train2,X_train2).fit()
pred2=model2.predict(X_test2)
pred2=pred2.round()
pred2=(np.maximum(pred2,0.))
print(model2.summary())

model3=sm.OLS(Y_train3,X_train3).fit()
pred3=model3.predict(X_test3)
pred3=pred3.round()
```

```
pred3=(np.maximum(pred3,0.))
print(model3.summary())
```

```
                            OLS Regression Results
==============================================================================
Dep. Variable:          forward_count   R-squared:                       0.155
Model:                            OLS   Adj. R-squared:                  0.155
Method:                 Least Squares   F-statistic:                 3.837e+04
Date:                Thu, 08 Nov 2018   Prob (F-statistic):               0.00
Time:                        18:51:04   Log-Likelihood:            -6.0303e+06
No. Observations:             1044681   AIC:                         1.206e+07
Df Residuals:                 1044676   BIC:                         1.206e+07
Df Model:                           5
Covariance Type:            nonrobust
==============================================================================
=
                         coef    std err          t      P>|t|      [0.025      0.97
]
------------------------------------------------------------------------------
-
forward_median           0.4510      0.011     41.482      0.000       0.430
0.472
forward_mean             0.8472      0.008    104.955      0.000       0.831
0.863
forward_min             -0.2918      0.224     -1.301      0.193      -0.731       0.1
8
content_media_count      0.1469      0.089      1.651      0.099      -0.028       0.3
21
content_emoji_count     -0.0135      0.329     -0.041      0.967      -0.658       0.6
31
==============================================================================
Omnibus:                  5350284.603   Durbin-Watson:                   2.008
Prob(Omnibus):                  0.000   Jarque-Bera (JB):   394619723036624.188
Skew:                         234.725   Prob(JB):                         0.00
Kurtosis:                   95216.359   Cond. No.                         152.
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly spec
ified.
                            OLS Regression Results
==============================================================================
Dep. Variable:          comment_count   R-squared:                       0.141
Model:                            OLS   Adj. R-squared:                  0.141
Method:                 Least Squares   F-statistic:                 3.437e+04
Date:                Thu, 08 Nov 2018   Prob (F-statistic):               0.00
Time:                        18:51:05   Log-Likelihood:            -4.5502e+06
No. Observations:             1044681   AIC:                         9.100e+06
Df Residuals:                 1044676   BIC:                         9.101e+06
Df Model:                           5
Covariance Type:            nonrobust
==============================================================================
```

```
=
                            coef    std err          t      P>|t|      [0.025      0.97
]
------------------------------------------------------------------------------------
-
comment_median         -0.2502      0.017    -14.783      0.000      -0.283      -
0.217
comment_mean            1.1808      0.010    119.894      0.000       1.161
1.200
comment_min             0.0641      0.160      0.401      0.689      -0.249       0.3
8
content_media_count    -0.1673      0.022     -7.733      0.000      -0.210      -0.1
25
content_emoji_count     0.0507      0.080      0.635      0.525      -0.106       0.2
07
==============================================================================
Omnibus:                  5213202.872   Durbin-Watson:                     1.956
Prob(Omnibus):                  0.000   Jarque-Bera (JB):   199884674609233.969
Skew:                         214.327   Prob(JB):                          0.00
Kurtosis:                   67766.344   Cond. No.                          73.3
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly spec
ified.
                            OLS Regression Results
==============================================================================
Dep. Variable:             like_count   R-squared:                       0.370
Model:                            OLS   Adj. R-squared:                  0.370
Method:                 Least Squares   F-statistic:                 1.229e+05
Date:                Thu, 08 Nov 2018   Prob (F-statistic):               0.00
Time:                        18:51:06   Log-Likelihood:            -5.1616e+06
No. Observations:             1044681   AIC:                         1.032e+07
Df Residuals:                 1044676   BIC:                         1.032e+07
Df Model:                           5
Covariance Type:            nonrobust
==============================================================================
=
                            coef    std err          t      P>|t|      [0.025      0.97
]
------------------------------------------------------------------------------------
-
like_median             0.1165      0.014      8.225      0.000       0.089       0.1
4
like_mean               0.9511      0.012     78.935      0.000       0.927       0.9
5
like_min               -0.1539      0.252     -0.610      0.542      -0.649       0.3
1
content_media_count    -0.2240      0.039     -5.791      0.000      -0.300      -0.1
48
content_emoji_count    -0.0588      0.143     -0.411      0.681      -0.340       0.2
22
```

```
==============================================================================
Omnibus:                  4825971.004   Durbin-Watson:                   1.943
Prob(Omnibus):                  0.000   Jarque-Bera (JB):   88805152128512.828
Skew:                         163.871   Prob(JB):                         0.00
Kurtosis:                   45170.018   Cond. No.                         247.
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly spec
ified.
```

In [7]:

```
print(pred1[0:5])

print(pred2[0:5])

print(pred3[0:5])
```

```
0     3.0
1     3.0
2     3.0
3    13.0
4    12.0
dtype: float64
0    4.0
1    4.0
2    4.0
3    4.0
4    3.0
dtype: float64
0    3.0
1    3.0
2    3.0
3    6.0
4    4.0
dtype: float64
```

In [8]:

```
np.savetxt("G://DMA_PROJECT//weibo_predict_resulto1.csv",pred1,delimiter=',',header="
forward_count",comments="")
result1=pd.read_csv("G://DMA_PROJECT//weibo_predict_resulto1.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resulto2.csv",pred2,delimiter=',',header="
comment_count",comments="")
result2=pd.read_csv("G://DMA_PROJECT//weibo_predict_resulto2.csv")
np.savetxt("G://DMA_PROJECT//weibo_predict_resulto3.csv",pred3,delimiter=',',header="
like_count",comments="")
result3=pd.read_csv("G://DMA_PROJECT//weibo_predict_resulto3.csv")
```

In [9]:

```
train_real_pred = pd.concat([Y_test1,Y_test2,Y_test3],axis=1)
```

```
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result2['comment_count']
train_real_pred['lp']=result3['like_count']
train_real_pred=train_real_pred.round()
print ("Score on the training set:{0:.2f}%".format(precision(train_real_pred.values)
*100))
```

```
Score on the training set:27.86%
```

In [1]:

```
import pandas as pd
import numpy as np
import re
from sklearn import linear_model
from sklearn.linear_model import Lasso
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
from matplotlib import pyplot as plt
from textblob import TextBlob
import statsmodels.api as sm
```

In [2]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

In [3]:

```
df1=pd.read_csv("E:\\5th-Sem\\DMA Project\\Project\\weibo_train1_cpts.csv")
df2=pd.read_csv("E:\\5th-Sem\\DMA Project\\Project\\weibo_train2_cpts.csv")
frames=[df1,df2]
train_all=pd.concat(frames)
```

In [5]:

```
train_all.shape[0]
```

Out[5]:

```
1229618
```

In [6]:

```
train=train_all[0:983694]
predict=train_all[983695:1229618]
```

In [8]:

```
train.columns
```

Out[8]:

```
Index(['u_id', 'm_id', 'forward_count', 'comment_count', 'like_count',
       'content', 'date', 'time', 'content_media_count', 'content_#_count',
       'content_@_count', 'content_?_count', 'content_!_count',
       'content_length', 'content_emoji_count', 'hour', 'min', 'sec',
       'forward_min', 'forward_max', 'forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean'],
      dtype='object')
```

Model 1 - Linear Regression

In [14]:

```
X_train=train[["content_media_count","content_length","content_emoji_count","hour","min","sec","for
ward_median","comment_median","like_median"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["content_media_count","content_length","content_emoji_count","hour","min","sec","fo
rward_median","comment_median","like_median"]]
```

```
fward_median", "comment_median", "like_median"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)

pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred1=lm.predict(X_test)
```

```
(983694, 9) (983694, 3)
(245923, 9) (245923, 3)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [15]:

```
temp = pd.DataFrame.from_records(pred1)
temp=temp.round()
temp=(np.maximum(temp,0))
train_real_pred=Y_test
train_real_pred['fp']=temp[0].values
train_real_pred['cp']=temp[1].values
train_real_pred['lp']=temp[2].values
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  """
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  import sys
```

```
Score:22.83%
```

In [ ]:

```
from sklearn.model_selection import KFold
kf = KFold(n_splits=10)
kf.get_n_splits(X)
KFold(n_splits=10, random_state=None, shuffle=False)
for train_index, test_index in kf.split(X):
print("TRAIN:", train_index, "TEST:", test_index)
X_train, X_test = X[train_index], X[test_index]
y_train, y_test = y[train_index], y[test_index]
```

Model 2 - Random Forest

In [9]:

```
from sklearn.ensemble import RandomForestRegressor
```

In [111]:

```
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train=train[["content_media_count","content_#_count","content_length","content_emoji_count
","forward_median","comment_median","like_median"]]
features_test=predict[["content_media_count","content_#_count","content_length","content_emoji_cour
t","forward_median","comment_median","like_median"]]
labels_train=train[['forward_count', 'comment_count', 'like_count']]
labels_test=predict[['forward_count', 'comment_count', 'like_count']]

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test



regr = RandomForestRegressor(max_depth=50, random_state=0,n_estimators=100)
regr.fit(x, y)
pred2 = regr.predict(x1)
```

In [112]:

```
temp = pd.DataFrame.from_records(pred2)
temp=temp.round()
temp=(np.maximum(temp,0))
temp=temp.abs()
temp=temp.astype(int)
train_real_pred=Y_test
train_real_pred['fp']=temp[0].values
train_real_pred['cp']=temp[1].values
train_real_pred['lp']=temp[2].values
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  import sys
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:9: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  if __name__ == '__main__':
```

```
Score:30.01%
```

In [118]:

```
#train_real_pred
```

Model 3 - OLS

In [38]:

```
model3=sm.OLS(Y_train,X_train).fit()
pred3=model3.predict(X_test)
```

Model 4- Ridge

In [39]:

```
lm1=linear_model.Ridge(alpha=3)
model4=lm1.fit(X_train,Y_train)
pred4=lm1.predict(X_test)
```

Model 5- Lasso

In [40]:

```
lm1=Lasso(alpha=0.01)
model5=lm1.fit(X_train,Y_train)
pred5=lm1.predict(X_test)
```

Ensemble - Averaging

In [41]:

```
pred=(pred1+pred2+pred3+pred4+pred5)/5
```

In [46]:

```
pred=pred.round()
pred=(np.maximum(pred,0))
```

In [58]:

```
pred=pred.abs()
pred1=pred.astype(int)
```

In [61]:

```
pred1
```

Out[61]:

	0	1	2
368886	1	0	0
368887	1	0	0
368888	1	0	0
368889	1	0	0
368890	0	0	0
368891	106	22	91
368892	1	0	0
368893	1	2	2
368894	6	3	3
368895	1	0	0
368896	1	0	0
368897	1	0	0
368898	0	1	1

	0	1	2
368898	0	1	1
368899	2	1	1
368900	1	0	0
368901	1	2	2
368902	0	1	1
368903	1	0	0
368904	0	0	0
368905	1	0	0
368906	2	0	0
368907	4	3	3
368908	0	1	1
368909	0	1	1
368910	45	131	495
368911	0	1	1
368912	1	0	0
368913	4	2	3
368914	0	0	0
368915	0	0	0
...	...	...	...
614779	0	1	1
614780	2	0	0
614781	16	4	5
614782	3	0	0
614783	0	0	0
614784	0	0	0
614785	7	1	2
614786	0	1	1
614787	1	0	0
614788	1	0	0
614789	103	51	66
614790	3	0	1
614791	0	0	0
614792	1	0	0
614793	0	0	0
614794	1	0	0
614795	2	1	4
614796	6	3	3
614797	2	1	2
614798	0	1	0
614799	0	1	1
614800	2	0	0
614801	0	1	1
614802	0	1	1
614803	1	0	0
614804	1	0	0
614805	0	1	1

	0	1	2
614806	0	1	1
614807	1	0	0
614808	2	0	0

245923 rows × 3 columns

In [59]:

```
#np.savetxt("E://DMA_PRED//result_Ensemble.csv",pred1,delimiter=',',header="forward_count,comment_
,like_count",comments="")
#result1=pd.read_csv("E://DMA_PRED//result_Ensemble.csv")
```

In [63]:

```
#result1
```

In [85]:

```
train_real_pred=Y_test
train_real_pred['fp']=pred1[0]
train_real_pred['cp']=pred1[1]
train_real_pred['lp']=pred1[2]
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score:24.22%
```

In [113]:

```
#train_real_pred
```

XG Boost

In [116]:

```
x = features_train
y = labels_train
x1 = features_test
y1 = labels_test
import xgboost as xgb
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\sklearn\cross_validation.py:41: DeprecationWarning: This
module was deprecated in version 0.18 in favor of the model_selection module into which all the re
factored classes and functions are moved. Also note that the interface of the new CV iterators are
different from that of this module. This module will be removed in 0.20.
```

```
  "This module will be removed in 0.20.", DeprecationWarning)
```

In [119]:

```
#T_train_xgb = xgb.DMatrix(x, y)
#params = {"objective": "reg:linear", "booster":"gblinear"}
#gbm = xgb.train(dtrain=T_train_xgb,params=params)
#Y_pred = gbm.predict(xgb.DMatrix(x1))
#print(r2_score(y1, Y_pred) )  #xgboost
```

Mapping Uid

In [140]:

```
unique_id=train_all['u_id'].unique().tolist()
```

In [141]:

```
uid_df = pd.DataFrame({'u_id':unique_id})
```

In [143]:

```
uid_df.shape[0]
```

Out[143]:

```
37263
```

In [160]:

```
from sklearn import preprocessing
le = preprocessing.LabelEncoder()
le.fit(unique_id)
#list(le.classes_)
```

Out[160]:

```
LabelEncoder()
```

In [161]:

```
l=[]
l=le.transform(unique_id)
df = pd.DataFrame({'u_id':l})
uid_df['id']=df['u_id']
```

In [163]:

```
train_all=train_all.set_index('u_id').join(uid_df.set_index('u_id'))
```

In [168]:

```
train=train_all[0:983694]
predict=train_all[983695:1229618]
```

In [169]:

```
X_train=train[["id","content_media_count","content_length","content_emoji_count","hour","min","sec"
,"forward_median","comment_median","like_median"]]
Y_train=train[["forward_count","comment_count","like_count"]]
X_test=predict[["id","content_media_count","content_length","content_emoji_count","hour","min","sec
","fo
                rward_median","comment_median","like_median"]]
Y_test=predict[["forward_count","comment_count","like_count"]]
print(X_train.shape,Y_train.shape)
print(X_test.shape,Y_test.shape)
```

```
print(X_test.shape,Y_test.shape)

pd.options.mode.use_inf_as_na = True
X_train.fillna(X_train.max(),inplace=True)
X_test.fillna(X_test.max(),inplace=True)

lm=linear_model.LinearRegression()
model=lm.fit(X_train,Y_train)
pred1=lm.predict(X_test)
```

```
(983694, 10) (983694, 3)
(245923, 10) (245923, 3)
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [170]:

```
temp = pd.DataFrame.from_records(pred1)
temp=temp.round()
temp=(np.maximum(temp,0))
temp=temp.abs()
temp=temp.astype(int)
train_real_pred=Y_test
train_real_pred['fp']=temp[0].values
train_real_pred['cp']=temp[1].values
train_real_pred['lp']=temp[2].values
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  import sys
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:9: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  if __name__ == '__main__':
```

```
Score:25.69%
```

In [173]:

```
## Spliting of training dataset into 70% training data and 30% testing data randomly
features_train=train[["id","content_media_count","content_#_count","content_length","content_emoji_
count","forward_median","comment_median","like_median"]]
features_test=predict[["id","content_media_count","content_#_count","content_length","content_emoji
_count","forward_median","comment_median","like_median"]]
labels_train=train[['forward_count', 'comment_count', 'like_count']]
labels_test=predict[['forward_count', 'comment_count', 'like_count']]

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test
```

```
regr = RandomForestRegressor(max_depth=50, random_state=0,n_estimators=100)
regr.fit(x, y)
pred2 = regr.predict(x1)
```

In [174]:

```
temp = pd.DataFrame.from_records(pred2)
temp=temp.round()
temp=(np.maximum(temp,0))
temp=temp.abs()
temp=temp.astype(int)
train_real_pred=Y_test
train_real_pred['fp']=temp[0].values
train_real_pred['cp']=temp[1].values
train_real_pred['lp']=temp[2].values
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  import sys
C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\DELL\Anaconda3\lib\site-packages\ipykernel_launcher.py:9: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  if __name__ == '__main__':
```

```
Score:20.74%
```

In [4]:

```
import pandas as pd
import numpy as np
import re
from sklearn import linear_model
from sklearn.linear_model import Lasso
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
from matplotlib import pyplot as plt
from textblob import TextBlob
import statsmodels.api as sm
```

In [5]:

```
import import_ipynb
from evaluation import precision
from runTime import runTime
```

```
importing Jupyter notebook from evaluation.ipynb
importing Jupyter notebook from runTime.ipynb
```

----------Polarity as a factor----------

Sentences with positive meaning have positive polarity and negative meaning ones have negative polarity and neutral ones have zero as polarity

In [7]:

```
dfpol=pd.read_csv("C:/Users/user/Downloads/weibo_polarity.csv")
```

In [8]:

```
dfpol.head(10)
```

Out[8]:

	Unnamed: 0	u_id	m_id	forward_count	comment_count	l
0	0	d38e9bed5d98110dc2489d0d1cac3c2a	7d45833d9865727a88b960b0603c19f6	0	0	(
1	1	d38e9bed5d98110dc2489d0d1cac3c2a	00755196c77936bf44656ada98291c59	0	0	(
2	2	d38e9bed5d98110dc2489d0d1cac3c2a	4fedf3888b1e16592f0e0bdc8b393845	0	0	(
3	3	d38e9bed5d98110dc2489d0d1cac3c2a	91be0b8612265aae32725cd4fa80b222	0	0	(

	Unnamed: 0	u_id	m_id	forward_count	comment_count	l
4	4	d38e9bed5d98110dc2489d0d1cac3c2a	bd2af99ecf1298f5539f0ddfcdd3ed64	0	0	0
5	5	d38e9bed5d98110dc2489d0d1cac3c2a	182078c5a409834f2128b3c9c2c289c3	0	0	0
6	6	d38e9bed5d98110dc2489d0d1cac3c2a	2c9697e5d6f1d9d479540173c4c374cb	0	0	0
7	7	d38e9bed5d98110dc2489d0d1cac3c2a	0ce5d103d7712b398ee2e81f83f49751	0	0	0
8	8	d38e9bed5d98110dc2489d0d1cac3c2a	a651facd0523d2a85a0717b83928c6c8	0	0	0
9	9	d38e9bed5d98110dc2489d0d1cac3c2a	3e1895f6017e0214f7392013552ac96a	0	0	0

10 rows × 39 columns

In [9]:

```
dfpol.columns
```

Out[9]:

```
Index(['Unnamed: 0', 'u_id', 'm_id', 'forward_count', 'comment_count',
       'like_count', 'content', 'date', 'time', 'content_media_count',
       'content_#_count', 'content_@_count', 'content_?_count',
       'content_!_count', 'content_length', 'content_emoji_count', 'hour',
       'min', 'sec', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean',
       'Unnamed: 0.1', 'content_spchar', 'non_emoji_content', 'en_content',
       'Unnamed: 1', 'url_rem', 'contentwurl', 'polarity'],
      dtype='object')
```

In [10]:

```
dfpol['date']=pd.to_datetime(dfpol['date'],errors='coerce')
train_month=[g for n, g in dfpol.groupby(pd.Grouper(key='date',freq='M'))]
```

In [11]:

```
train_month[0]=pd.read_csv("C:/Users/user/Downloads/weibo_train_feb_cpts10000.csv")
train_month[1]=pd.read_csv("C:/Users/user/Downloads/weibo_train_march_cpts10000.csv")
train_month[2]=pd.read_csv("C:/Users/user/Downloads/weibo_train_april_cpts10000.csv")
train_month[3]=pd.read_csv("C:/Users/user/Downloads/weibo_train_may_cpts10000.csv")
train_month[4]=pd.read_csv("C:/Users/user/Downloads/weibo_train_june_cpts10000.csv")
train_month[5]=pd.read_csv("C:/Users/user/Downloads/weibo_train_july_cpts10000.csv")
```

In [12]:

```
frames1=[train_month[0],train_month[1],train_month[2],train_month[3],train_month[4]]
train=pd.concat(frames1)
predict=train_month[5]
```

Model 7: (Factors: Media, Length, Emoji, Median,Polarity)

In [9]:

```
X_train1=train[["content_media_count","content_length","forward_median","comment_median","like_medi
an","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_median","comment_median","like_med
ian","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [10]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [11]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[ -3.60345081e-01   6.74510609e-03  -9.03871388e+00  -5.69877934e+00
    1.46618263e+01  -3.00702607e-01]
 [ -4.52559256e-01   2.88854313e-04  -2.58935392e+00   3.20973326e-01
    2.56664104e+00   1.78063868e-01]
 [ -1.70607807e-01  -1.73336140e-03  -2.49319057e+00  -7.66383744e-01
    3.84877692e+00   1.34944972e-01]]
[ 0.09961692  0.27754213  0.23556883]
```

In [12]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result51.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result51.csv")
```

In [13]:

```
print(mean_squared_error(Y_test1,result1))
```

```
21.2745912995
```

In [14]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
```

```
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

```
Score:35.39%
```

Analysis: Result with Polarity as factor are satisfactory considering the data used for train. This might prove to be a good factor for whole dataset prediction.

Model 8: (Factors: Media, Length,Median,Polarity)

In [15]:

```
X_train1=train[["content_media_count","content_length","forward_mean","comment_mean","like_mean","p
olarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_mean","comment_mean","like_mean",
"polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [16]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [17]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[  1.84153944e-01   1.16499672e-02   1.23769730e+00   5.03985664e-01
   -5.30125012e-01   2.40824642e-01]
 [ -4.34205066e-01   2.65588900e-03   4.65693627e-02   8.21537197e-01
```

```
   -4.63148333e-03   8.38895495e-02]
 [ -1.07997853e-01  -6.08462330e-04   1.24279057e-01  -2.25635181e-02
    7.47271891e-01   1.46482193e-01]]
[-1.685958    0.04881615  0.00796132]
```

In [18]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result51.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result51.csv")
```

In [19]:

```
print(mean_squared_error(Y_test1,result1))
```

```
21.0421169299
```

In [20]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score:34.58%
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

Model 9: (Factors: Media, Length, Emoji, Median,Mean,Polarity)

In [28]:

```
X_train1=train[["content_media_count","content_length","forward_mean","forward_median","comment_mea
n","comment_median","like_mean","like_median","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_mean","forward_median","comment_me
an","comment_median","like_mean","like_median","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
```

```
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [29]:

```
lm1=linear_model.LinearRegression()
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [30]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[  4.24002976e-01   1.39830856e-02   1.77218462e+00   5.28953775e+00
    5.32073405e-01   2.72797599e+00   9.08606236e-02  -8.60889360e+00
    4.57317719e-01]
 [ -3.94970258e-01   2.85864515e-03   1.34655712e-01   5.14556038e-01
    7.61232739e-01   4.96108919e-01   2.61640134e-02  -1.03251918e+00
    1.30303697e-01]
 [ -2.52656284e-01  -1.69108114e-03  -1.95657316e-01  -2.51251894e+00
    9.14012006e-02  -1.71242671e+00   4.71094851e-01   4.48754073e+00
   -7.29299942e-04]]
[-2.47378947 -0.06752787  0.45657126]
```

In [31]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result51.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result51.csv")
```

In [32]:

```
print(mean_squared_error(Y_test1,result1))
```

```
20.9952895539
```

In [33]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score:34.22%
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path
```

```
  after removing the cwd from sys.path.
```

Model10: (Factors: Media, Length, Emoji, Median,Polarity) with OLS

OLS is a type of linear least sqaures methods for estimating parameters in a linear regression model

In [13]:

```
X_train1=train[["content_media_count","content_length","forward_median","comment_median","like_medi
an","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_median","comment_median","like_med
ian","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [15]:

```
model1=sm.OLS(Y_train1,X_train1).fit()
pred1=model1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [16]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result52.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result52.csv")
```

In [17]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
```

```
  after removing the cwd from sys.path.
```

```
Score:35.39%
```

Model11: (Factors: Media, Length, Emoji, Median,Polarity) with Ridge regression

Ridge regression is used to prevent multicollinearity among variables by shrinking the parameters

In [18]:

```
X_train1=train[["content_media_count","content_length","forward_median","comment_median","like_medi
an","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_median","comment_median","like_med
ian","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [19]:

```
lm1=linear_model.Ridge(alpha=3)
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [20]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[ -3.86510208e-01   6.41054941e-03  -8.34912342e+00  -5.36638332e+00
    1.39393510e+01  -2.63639792e-01]
 [ -4.56306722e-01   1.98158232e-04  -2.45402009e+00   3.77596491e-01
    2.43239453e+00   1.84454477e-01]
 [ -1.76866329e-01  -1.82770299e-03  -2.31640230e+00  -6.84262708e-01
    3.66606306e+00   1.43628492e-01]]
[ 0.12872141  0.28577674  0.2444117 ]
```

In [21]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result53.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result53.csv")
```

In [22]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score:35.48%
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

Model 12: (Factors: Media, Length, Emoji, Median,Polarity) with Lasso regression

Lasso regression does automatic feature selection that means if some features are correlated then lasso will pick only one feature

In [23]:

```
X_train1=train[["content_media_count","content_length","forward_median","comment_median","like_medi
an","polarity"]]
Y_train1=train[["forward_count","comment_count","like_count"]]
X_test1=predict[["content_media_count","content_length","forward_median","comment_median","like_med
ian","polarity"]]
Y_test1=predict[["forward_count","comment_count","like_count"]]

pd.options.mode.use_inf_as_na = True
X_train1.fillna(X_train1.max(),inplace=True)
X_test1.fillna(X_test1.max(),inplace=True)
```

```
C:\Users\user\Anaconda3\lib\site-packages\pandas\core\generic.py:5430: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [24]:

```
lm1=Lasso(alpha=0.01)
model1=lm1.fit(X_train1,Y_train1)
pred1=lm1.predict(X_test1)
pred1=pred1.round()
pred1=(np.maximum(pred1,0.))
```

In [25]:

```
print(model1.coef_)
print(model1.intercept_)
```

```
[[ -3.93885876e-01   5.30762986e-03  -7.01981756e+00  -4.71960564e+00
    1.25490926e+01  -8.17241037e-02]
 [ -3.98749279e-01  -1.15532108e-03  -1.29700987e+00   7.65902250e-01
    1.36959059e+00   8.67988313e-02]
 [ -1.33179860e-01  -2.99999206e-03  -8.19004244e-01  -0.00000000e+00
    2.14881763e+00   4.81255664e-02]]
[ 0.09786835  0.4897481   0.43776902]
```

In [26]:

```
np.savetxt("C:/Users/user/Downloads/weibo_predict_result54.csv",pred1,delimiter=',',header="forward
_count,comment_count,like_count",comments="")
result1=pd.read_csv("C:/Users/user/Downloads/weibo_predict_result54.csv")
```

In [27]:

```
train_real_pred=Y_test1
train_real_pred['fp']=result1['forward_count']
train_real_pred['cp']=result1['comment_count']
train_real_pred['lp']=result1['like_count']
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
Score:35.58%
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy

C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

In [1]:

```
import pandas as pd
```

Normalizing polarity over complete dataset

In [175]:

```
p0=pd.read_csv("polarityL0.csv")
p1=pd.read_csv("polarityL1.csv")
p2=pd.read_csv("polarityL2.csv")
p3=pd.read_csv("polarityL3.csv")
p4=pd.read_csv("polarityL4.csv")
p5=pd.read_csv("polarityL5.csv")
p6=pd.read_csv("polarityL6.csv")
p7=pd.read_csv("polarityL7.csv")
p8=pd.read_csv("polarityL8.csv")
p9=pd.read_csv("polarityL9.csv")
p10=pd.read_csv("polarityL10.csv")
p11=pd.read_csv("polarityL11.csv")
```

In [176]:

```
frames1=[p0,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11]
```

In [177]:

```
polarity=pd.concat(frames1)
```

```
/home/shashwat/anaconda3/lib/python3.6/site-packages/ipykernel_launcher.py:1: FutureW
arning: Sorting because non-concatenation axis is not aligned. A future version
of pandas will change to not sort by default.

To accept the future behavior, pass 'sort=False'.

To retain the current behavior and silence the warning, pass 'sort=True'.

  """Entry point for launching an IPython kernel.
```

In [178]:

```
polarity.shape[0]
```

Out[178]:

```
1223517
```

In [179]:

```
preprocess1=pd.read_csv("preprocessed_1.csv")
```

In [180]:

```
preprocess2=pd.read_csv("preprocessed_2.csv")
```

In [181]:

```
frames=[preprocess1,preprocess2]
```

In [182]:

```
train=pd.concat(frames)
```

In [183]:

```
train.shape[0]
```

Out[183]:

```
1223517
```

In [187]:

```
train=train.reset_index()
```

In [188]:

```
polarity.shape[0]
```

Out[188]:

```
1223517
```

In [197]:

```
res=pd.merge(polarity, train,left_index=True, right_index=True)
```

In [198]:

```
res.shape[0]
```

Out[198]:

```
1223517
```

In [202]:

```
res=res.rename(columns={'u_id_x':'u_id'})
```

In [203]:

```
uid_stat=pd.read_csv("train_uid_stat.csv")
```

In [204]:

```
uid_stat.size
```

Out[204]:

```
484419
```

In [205]:

```
dfmerge=pd.merge(res,uid_stat, on=['u_id'],how='left')
```

In [206]:

```
dfmerge.columns
```

Out[206]:

```
Index(['Stemming', 'Stemmingle', 'Stopword_removed', 'Stopwrod_removed',
       'Unnamed: 0', 'Unnamed: 1_x', 'comment_count_x', 'content_x',
       'content_media_count_x', 'content_spchar_x', 'date_x', 'en_content_x',
       'en_contentst', 'en_contenturl', 'forward_count_x', 'lemmatization',
       'lemmatizationtl', 'lemmatizationtlp', 'like_count_x', 'lower',
       'm_id_x', 'no_num', 'no_num.1', 'no_punc', 'non_emoji_content_x',
       'polarity', 'time_x', 'u_id', 'url_rem', 'url_rem.1', 'index', 'u_id_y',
       'm_id_y', 'forward_count_y', 'comment_count_y', 'like_count_y',
       'content_y', 'date_y', 'time_y', 'content_media_count_y',
       'content_spchar_y', 'non_emoji_content_y', 'en_content_y',
       'Unnamed: 1_y', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean'],
      dtype='object')
```

In [207]:

```
dfmerge.shape[0]
```

Out[207]:

```
1223517
```

In [208]:

```
dfmerge.columns
```

Out[208]:

```
Index(['Stemming', 'Stemmingle', 'Stopword_removed', 'Stopwrod_removed',
       'Unnamed: 0', 'Unnamed: 1_x', 'comment_count_x', 'content_x',
       'content_media_count_x', 'content_spchar_x', 'date_x', 'en_content_x',
       'en_contentst', 'en_contenturl', 'forward_count_x', 'lemmatization',
       'lemmatizationtl', 'lemmatizationtlp', 'like_count_x', 'lower',
       'm_id_x', 'no_num', 'no_num.1', 'no_punc', 'non_emoji_content_x',
       'polarity', 'time_x', 'u_id', 'url_rem', 'url_rem.1', 'index', 'u_id_y',
       'm_id_y', 'forward_count_y', 'comment_count_y', 'like_count_y',
       'content_y', 'date_y', 'time_y', 'content_media_count_y',
       'content_spchar_y', 'non_emoji_content_y', 'en_content_y',
       'Unnamed: 1_y', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean'],
      dtype='object')
```

In [ ]:

```
dfmerge=dfmerge.drop(['Unnamed: 1_x','Unnamed: 0','lemmatizationtlp'],axis=1)
```

In [211]:

```
import pandas as pd
import numpy as np
import re
from sklearn import linear_model
from sklearn.linear_model import Lasso
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
from matplotlib import pyplot as plt
#from textblob import TextBlob
import statsmodels.api as sm
import import_ipynb
from evaluation import precision
from runTime import runTime
```

In [212]:

```
import sklearn
```

In [213]:

```
df1=dfmerge
```

In [214]:

```
def normalize(df):
    result = df.copy()
    for feature_name in df.columns:

        result[feature_name] = (df[feature_name] - min_value) / (max_value - min_valu
e)
    return result
```

In [215]:

```
max_value = df1['polarity'].max()
min_value = df1['polarity'].min()
df1['pnorm'] = (df1['polarity'] - min_value) / (max_value - min_value)
```

In [216]:

```
df1 = sklearn.utils.shuffle(df1)
```

In [217]:

```
df1=df1.fillna(0)
```

In [218]:

```
train=df1[0:110000]
predict=df1[110000:]
```

In [221]:

```
from sklearn.ensemble import RandomForestRegressor
features_train=train[['content_media_count_y','pnorm','forward_min', 'forward_max', '
forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean']]
features_test=predict[['content_media_count_y','pnorm','forward_min', 'forward_max',
'forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean']]
labels_train=train[['forward_count_x', 'comment_count_x', 'like_count_x']]
labels_test=predict[['forward_count_x', 'comment_count_x', 'like_count_x']]

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test
```

In [222]:

```
regr = RandomForestRegressor(max_depth=50, random_state=0,n_estimators=100)
regr.fit(x, y)
pred2 = regr.predict(x1)
temp = pd.DataFrame.from_records(pred2)
temp=temp.round()
temp=(np.maximum(temp,0))
temp=temp.abs()
temp=temp.astype(int)
```

In [223]:

```
train_real_pred=y1
train_real_pred['fp']=temp[0].values
train_real_pred['cp']=temp[1].values
train_real_pred['lp']=temp[2].values
print("Score:{0:.2f}%".format(precision(train_real_pred.values)*100))
```

```
/home/shashwat/anaconda3/lib/python3.6/site-packages/ipykernel_launcher.py:2: Setting
WithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/ind
exing.html#indexing-view-versus-copy

/home/shashwat/anaconda3/lib/python3.6/site-packages/ipykernel_launcher.py:3: Setting
WithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
/home/shashwat/anaconda3/lib/python3.6/site-packages/ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

Score:78.98%

Predicting for the test data and generating submission file

In [224]:

```
pred1=pd.read_csv("weibo_predict_cpts.csv")
```

In [225]:

```
p=pd.read_csv("polarity_pred.csv")
```

In [226]:

```
p.shape[0]
```

Out[226]:

123517

In [227]:

```
res=pd.merge(p, pred1,left_index=True, right_index=True)
```

In [228]:

```
res.shape[0]
```

Out[228]:

123517

In [229]:

```
predict=res
```

In [230]:

```
predict.shape[0]
```

Out[230]:

```
123517
```

In [232]:

```
train=df1
```

In [233]:

```
train.shape[0]
```

Out[233]:

```
1223517
```

In [234]:

```
train.columns
```

Out[234]:

```
Index(['Stemming', 'Stemmingle', 'Stopword_removed', 'Stopwrod_removed',
       'Unnamed: 0', 'Unnamed: 1_x', 'comment_count_x', 'content_x',
       'content_media_count_x', 'content_spchar_x', 'date_x', 'en_content_x',
       'en_contentst', 'en_contenturl', 'forward_count_x', 'lemmatization',
       'lemmatizationtl', 'lemmatizationtlp', 'like_count_x', 'lower',
       'm_id_x', 'no_num', 'no_num.1', 'no_punc', 'non_emoji_content_x',
       'polarity', 'time_x', 'u_id', 'url_rem', 'url_rem.1', 'index', 'u_id_y',
       'm_id_y', 'forward_count_y', 'comment_count_y', 'like_count_y',
       'content_y', 'date_y', 'time_y', 'content_media_count_y',
       'content_spchar_y', 'non_emoji_content_y', 'en_content_y',
       'Unnamed: 1_y', 'forward_min', 'forward_max', 'forward_median',
       'forward_mean', 'comment_min', 'comment_max', 'comment_median',
       'comment_mean', 'like_min', 'like_max', 'like_median', 'like_mean',
       'pnorm'],
      dtype='object')
```

In [199]:

```
#pred2.shape[0]
```

In [235]:

```
predict=predict.fillna(0)
```

In [243]:

```
max_value = predict['polarity'].max()
min_value = predict['polarity'].min()
predict['pnorm'] = (predict['polarity'] - min_value) / (max_value - min_value)
```

In [244]:

```
predict['forward_count']=0
predict['comment_count']=0
predict['like_count']=0
```

In [245]:

```
predict.columns
```

Out[245]:

```
Index(['Unnamed: 0', 'lemmatizationtlp', 'no_punc', 'polarity', 'u_id', 'm_id',
       'content', 'date', 'time', 'content_media_count', 'content_#_count',
       'content_@_count', 'content_?_count', 'content_!_count',
       'content_length', 'content_emoji_count', 'hour', 'min', 'sec',
       'forward_min', 'forward_max', 'forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean', 'forward_count',
       'comment_count', 'like_count', 'pnorm'],
      dtype='object')
```

In [246]:

```
from sklearn.ensemble import RandomForestRegressor
features_train=train[['content_media_count_y','pnorm','forward_min', 'forward_max', '
forward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean']]
features_test=predict[['content_media_count','pnorm','forward_min', 'forward_max', 'f
orward_median', 'forward_mean',
       'comment_min', 'comment_max', 'comment_median', 'comment_mean',
       'like_min', 'like_max', 'like_median', 'like_mean']]
labels_train=train[['forward_count_x', 'comment_count_x', 'like_count_x']]
labels_test=predict[['forward_count', 'comment_count', 'like_count']]

x = features_train
y = labels_train
x1 = features_test
y1 = labels_test
```

In [247]:

```
regr = RandomForestRegressor(max_depth=50, random_state=0,n_estimators=100)
regr.fit(x, y)
pred2 = regr.predict(x1)
temp = pd.DataFrame.from_records(pred2)
temp=temp.round()
temp=(np.maximum(temp,0))
temp=temp.abs()
temp=temp.astype(int)
```

In [248]:

```
predict['forward_count']=temp[0].values
predict['comment_count']=temp[1].values
predict['like_count']=temp[2].values
```

In [249]:

```
predictf=predict[['u_id','m_id','forward_count','comment_count','like_count']].copy()
```

In [250]:

```
result = []
filename = "SUBMISSION_POLARITY.txt"
#predictf1=predictf.head(10000)
for _,row in predictf.iterrows():
    result.append("{0}\t{1}\t{2},{3},{4}\n".format(row[0],row[1],row[2],row[3],row[4]
))
f = open(filename,'w')
f.writelines(result)
f.close()
print ('generate submission file'.format(filename))
```

```
generate submission file
```