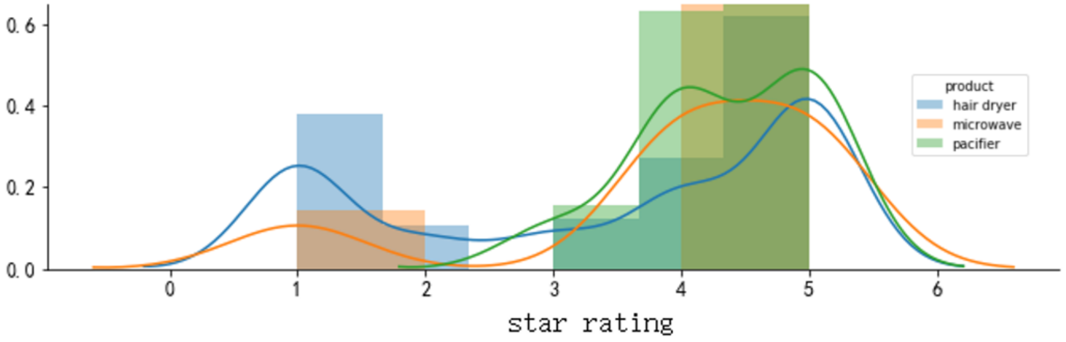
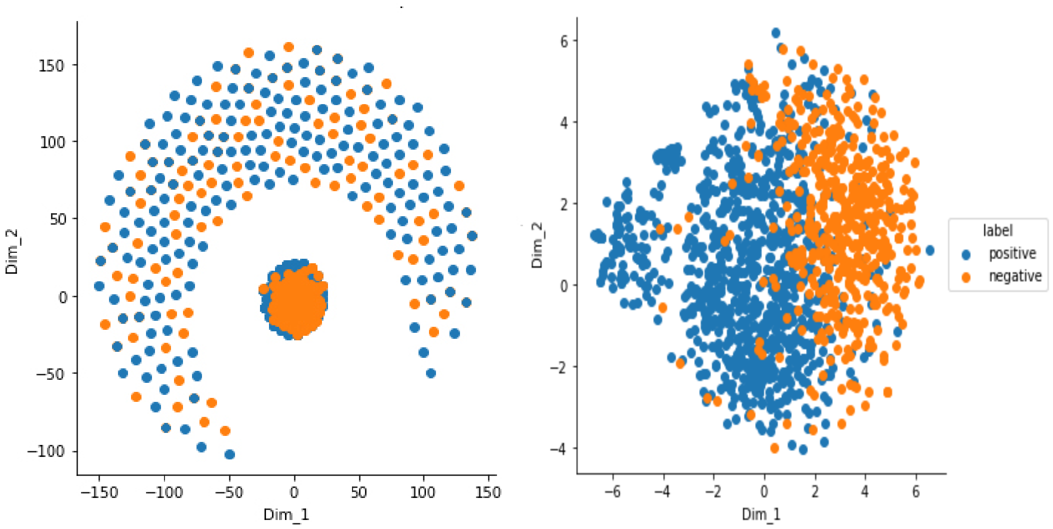
100%

x	dxx



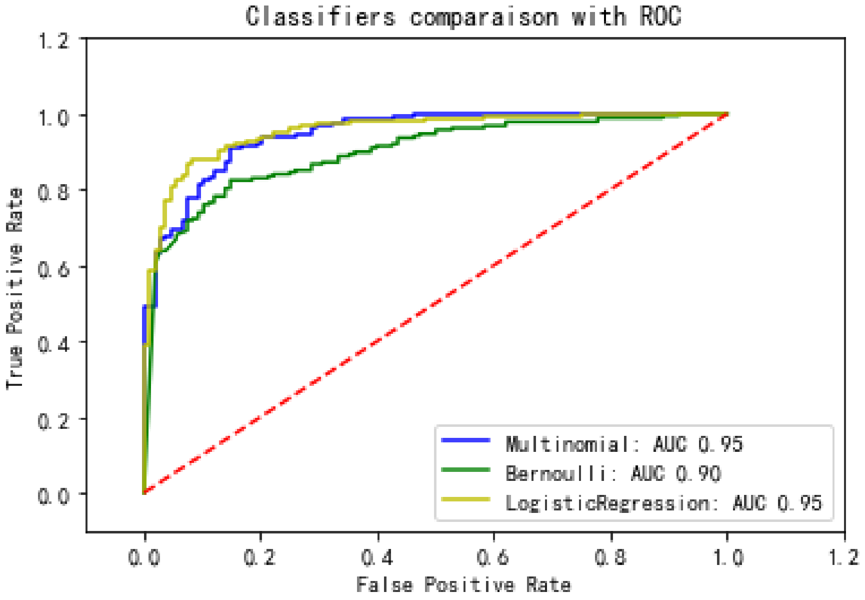
$$(X) = E\left[\left(\frac{X-\mu}{\sigma}\right)^3\right] = \frac{k_3}{\sigma^3} = \frac{k_3}{k_2^{3/2}}$$

$$NPS = (Promoters - Detractors)/Totalratings * 100$$

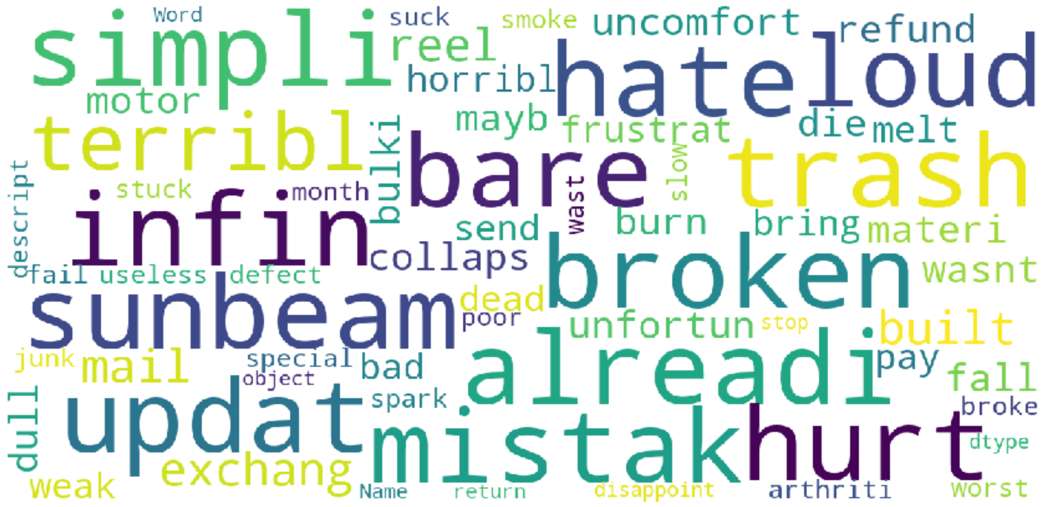


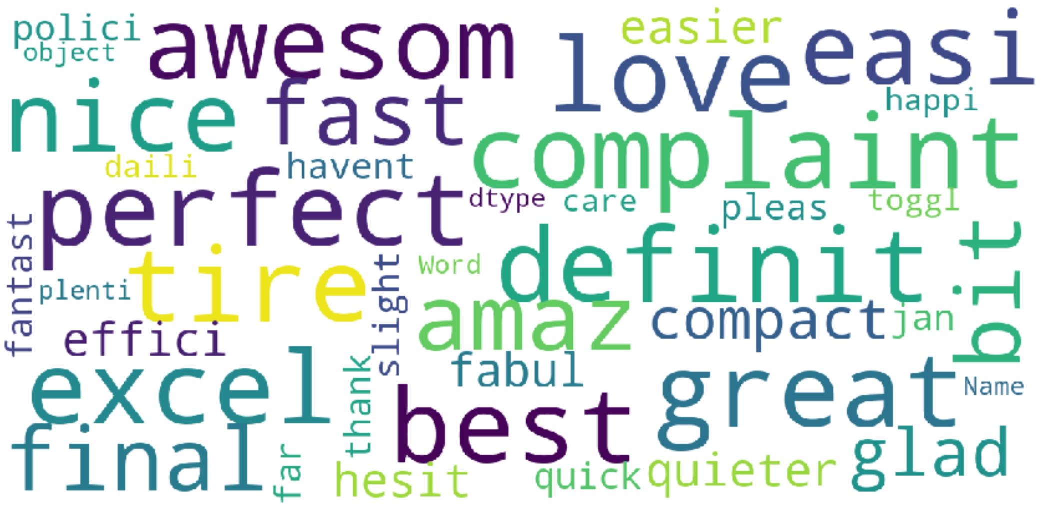
$$y = \frac{1}{1 + e^{-\left(w^{T}x+b\right)}}$$

$$L = -[y \log \hat{y} + (1 - y) \log(1 - \hat{y})]$$



$|coefficient| > 1$





RE

$$E_i = \sum_{n=1}^{N} e_n, e_n \in R$$

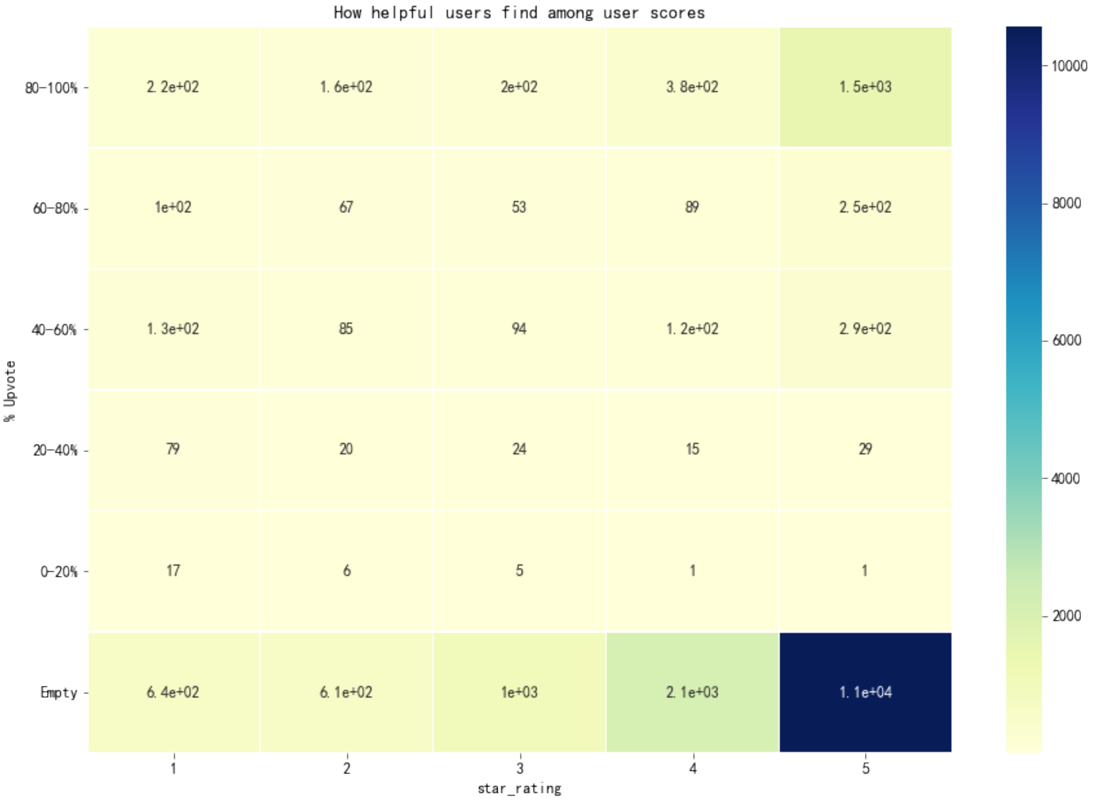
NRe_nR

. . .	. . .

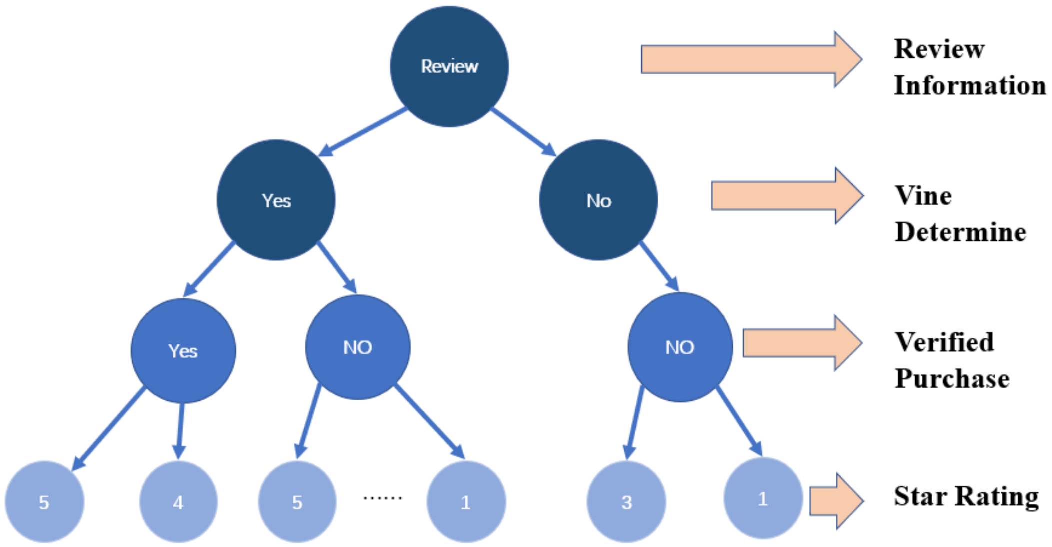
C

$$C = \frac{h}{t}(t \neq 0)$$

$htt = 0C0C$



C


Review
Yes
No
Yes
NO
NO
5
4
5
......
1
3
1
Review Information
Vine Determine
Verified Purchase
Star Rating

C

...	...	...	...	...

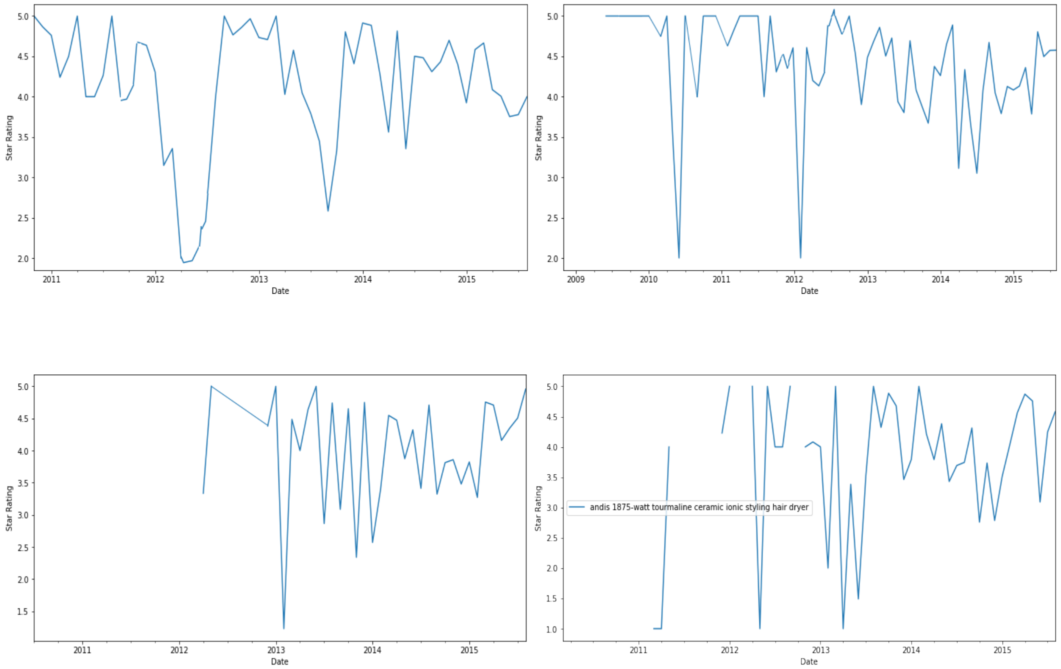
ΔT

$$P=\frac{\sum_{n=1}^{N} R\cdot H}{\sum_{n=1}^{N} H}$$

$P\Delta TNH$

$$H=\begin{cases}C,(V=0)\\10C,(V=1)\end{cases}$$

$CVV10$



$I=\{i_1,i_2,\cdots,i_m\}iD=\{I\}k-lengthII_kX\subseteq I_xY\subseteq I_y(x,y\in\{1,2,\cdots,n\})X$
Y

$$Sup(X\bigcap Y)=\frac{num(X\bigcap Y)}{num(AllSample)}$$

$num(X\bigcap Y)num(AllSample)XYX\bigcap YSup(X,Y)>Sup_{min}Sup_{min}XY$

$$Conf(X\leftarrow Y)=\frac{num(XY)}{num(Y)}$$

$XYConf(X\leftarrow Y)>Conf_{min}Conf_{min}$

X

$$Sup(X) \geqslant Sup(X \bigcap Y) > Sup_{min}$$

XX

$$Sup_{min} > Sup(X) \geqslant Sup(X \bigcap Y)$$

	[]		
	[]		
	$\cdots\cdots$	$\cdots$	$\cdots$
	[]		
	[]		
	$\cdots\cdots$	$\cdots$	$\cdots$
	[]		
	[]		

$A = [a_1, a_2, \cdots, a_s] B = [b_1, b_2, \cdots, b_s] a_i b_i t_i t_{i+1} \{t_i\} \Delta t t_{i+1} - t_i = \Delta t AB$

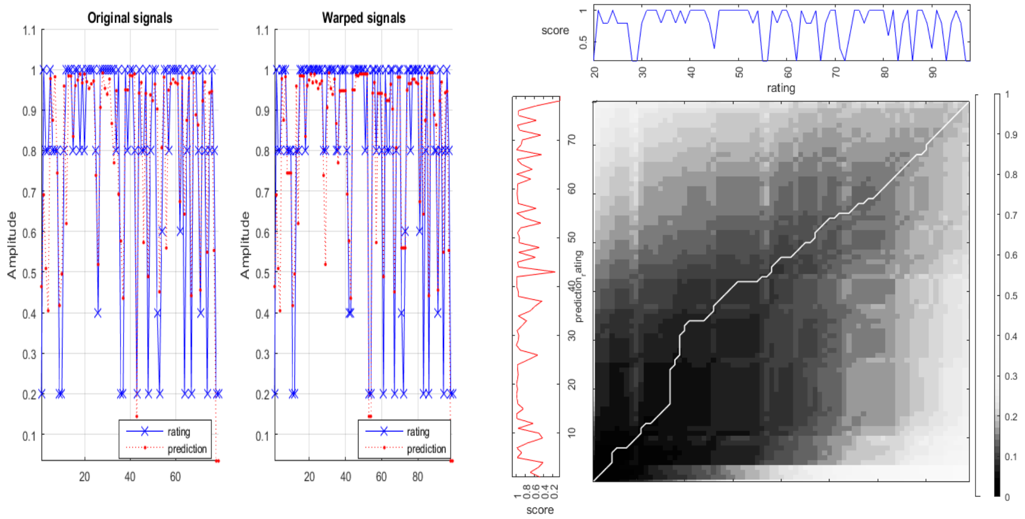
$$a_i \leftarrow a_i / a_{max}$$
$$b_i \leftarrow b_i / b_{max}$$

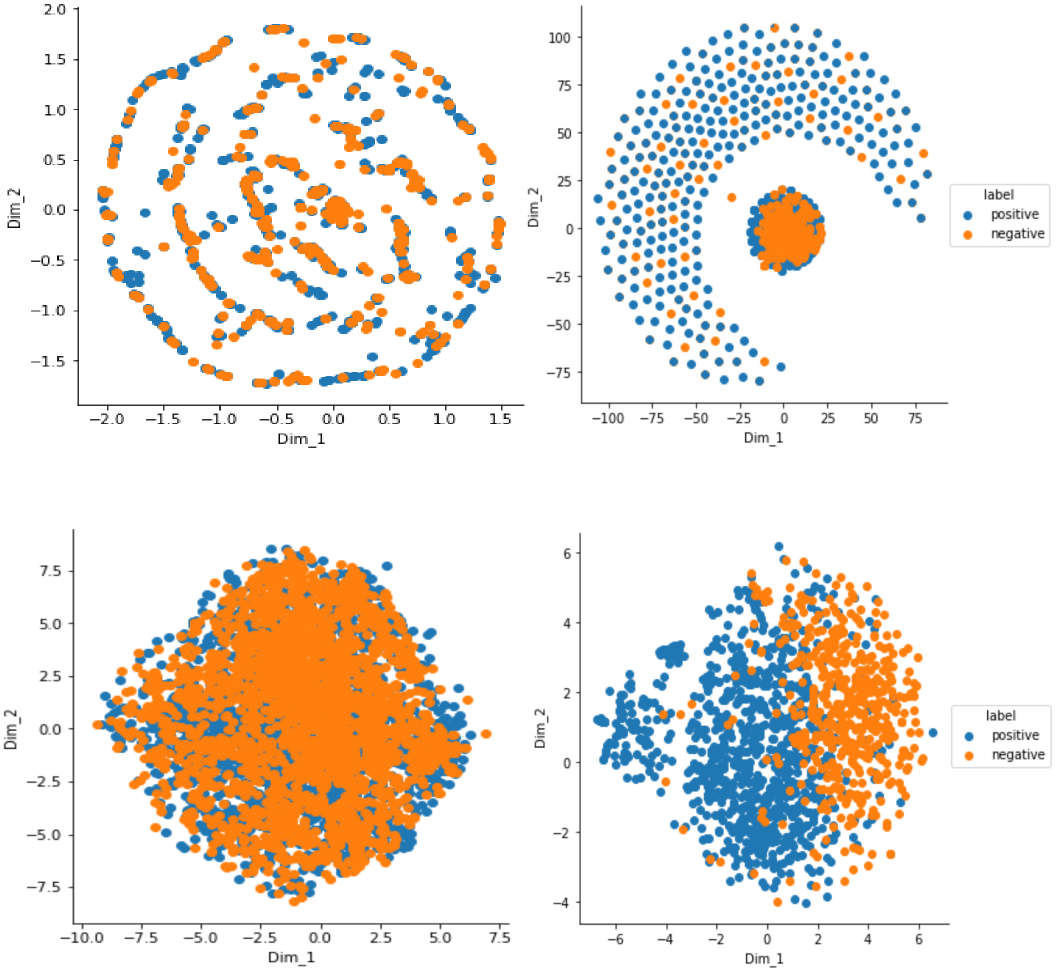
$a_{max} b_{max} \{b_1, \cdots, b_m\}\ (1 \leqslant m < s) BBB = [b_1, b_2, \cdots, b_t] (t < s) a_i b_j \delta(a_i, b_j)$

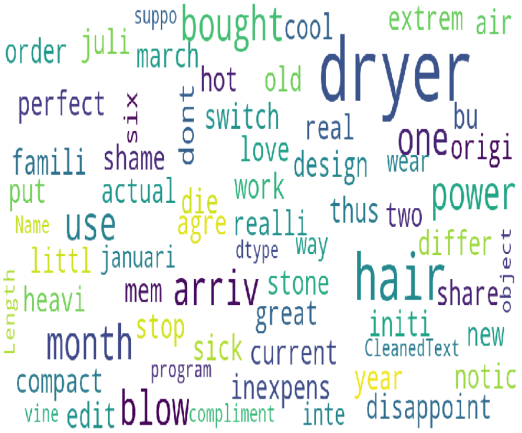
$$D = \frac{\sum_{n=1}^{N} \delta(a_i, b_j) \cdot W_n}{\sum_{n=1}^{N} W_n}$$

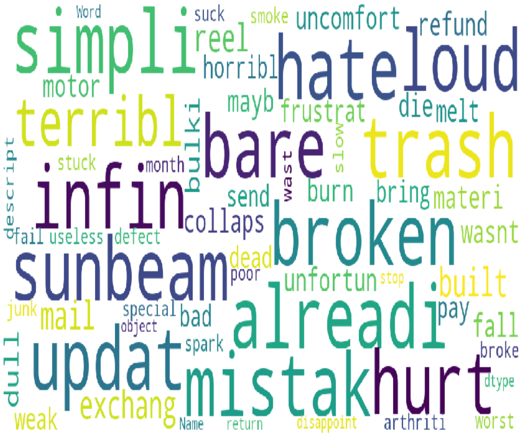
$DABD$

```
$A = [a_1, a_2, \cdots, a_s]$
$B = [b_1, b_2, \cdots, b_t]$

$\delta$

 $m[1, 1, 1:2] \leftarrow (\delta(a, b), (0, 0))$

    $m[i, 1, 1:2] \leftarrow (m[i, 1, 1] + \delta(a_i, b_1), (i-1, 1))$


    $m[1, j, 1:2] \leftarrow (m[1, j-1, 1] + \delta(a_1, b_j), (1, j-1))$



        $minimum \leftarrow minVal(m[i-1, j, 1], m[i, j-1, 1], m[i-1, j-1, 1])$
        $m[i, j, 1:2] \leftarrow (first(minimum) + \delta(a_i, b_j), second(minimum))$


$M[S, T]$
```



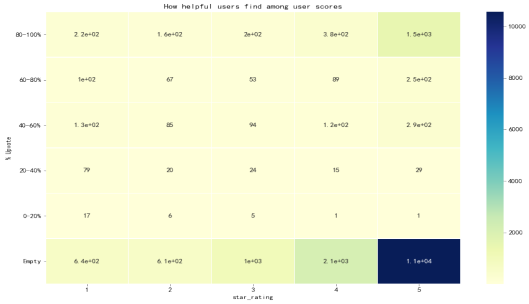

Dim_1
Dim_2
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
Dim_1
Dim_2
100
75
50
25
0
−25
−50
−75
−100
−75
−50
−25
0
25
50
75
label
positive
negative
Dim_1
Dim_2
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
Dim_1
Dim_2
6
4
2
0
−2
−4
−6
−4
−2
0
2
4
6
label
positive
negative

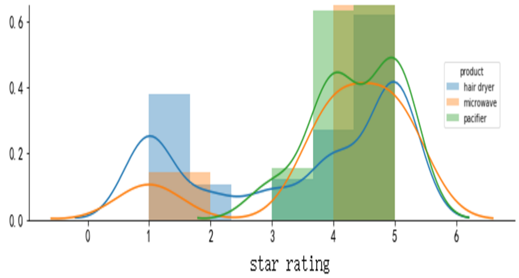

suppo
bought
cool
extrem
air
order
juli
march
dryer
hot
old
perfect
six
dont
switch
real
one
bu
origi
famili
shame
love
design
wear
put
actual
die
work
power
Name
use
agre
realli
thus
two
differ
littl
januari
dtype
way
object
Length
heavi
mem
arriv
stone
hair
share
great
initi
month
stop
sick
current
CleanedText
new
compact
program
inexpens
year
notic
vine
edit
blow
compliment
inte
disappoint


Word
suck
smoke
uncomfort
simpli
reel
refund
hate
loud
horribl
motor
mayb
die
melt
terribl
bulki
frustrat
bare
trash
descript
stuck
month
slow
wast
infin
send
burn
bring
materi
collaps
broken
wasnt
fail
useless
defect
sunbeam
dead
poor
unfortun
stop
built
junk
mail
special
bad
alreadi
pay
object
fall
dull
updat
spark
broke
mistak
hurt
dtype
exchang
weak
Name
return
disappoint
arthriti
worst

&

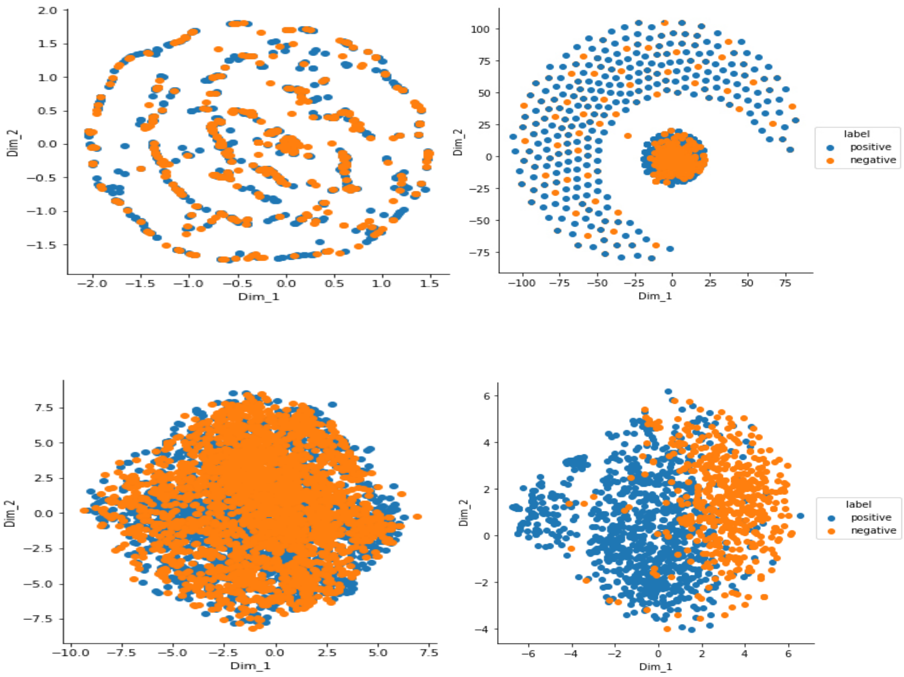
&

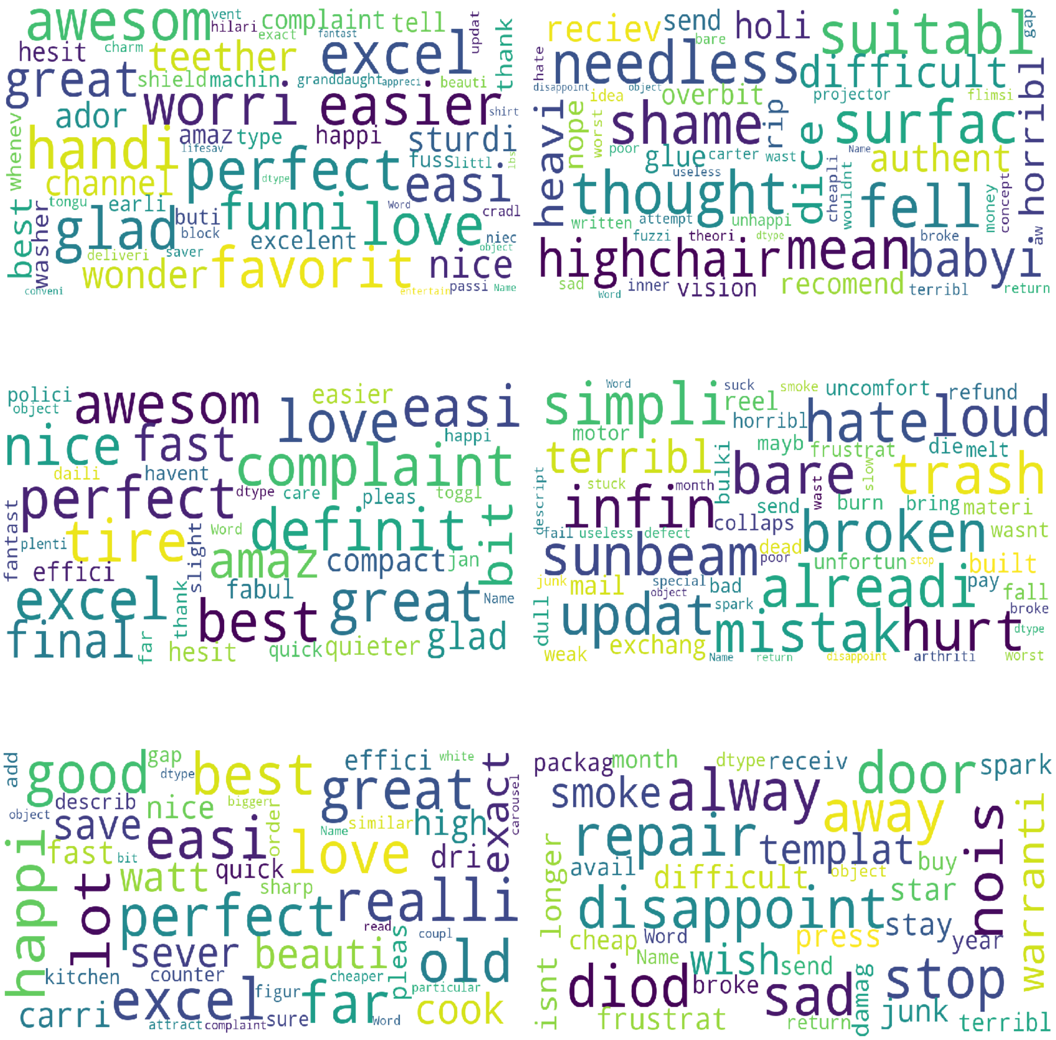




```
df['Helpful␣%'] = np.where(df['helpful_votes'] > 0,
                df['helpful_votes'] / df['total_votes'], -1)
df['%␣Upvote'] = pd.cut(df['Helpful␣%'],
        bins = [-1, 0, 0.2, 0.4, 0.6, 0.8, 1.0],
        labels = ['Empty', '0-20%', '20-40%',
                '40-60%', '60-80%', '80-100%']
                    , include_lowest = True)
df.head()
df_s = df.groupby(['star_rating', '%␣Upvote'])
                .agg({'review_id': 'count'})
df_s = df_s.unstack()
df_s.columns = df_s.columns.get_level_values(1)
fig = plt.figure(figsize=(15,10))
sns.heatmap(df_s[df_s.columns[::-1]].T,
            cmap = 'YlGnBu', linewidths=.5, annot = True)
```

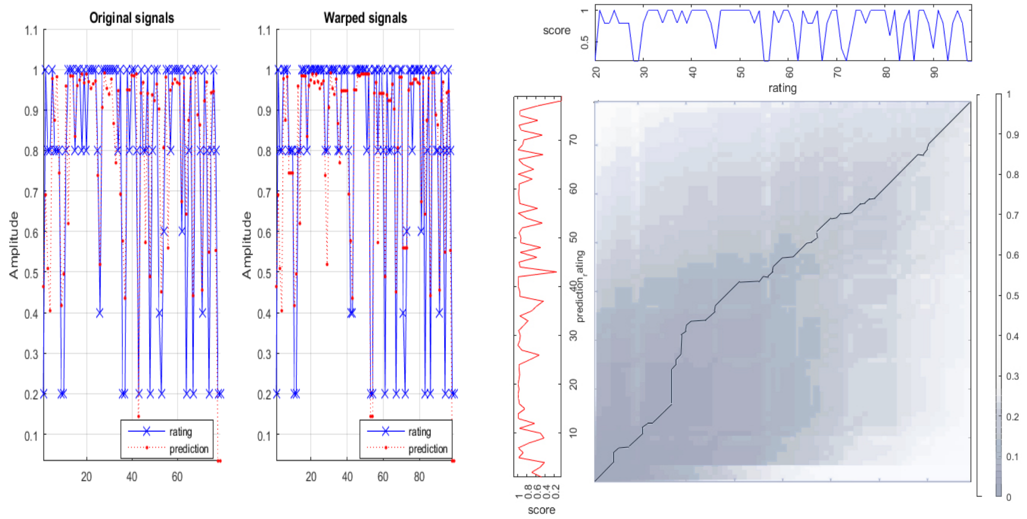
```
plt.yticks(rotation=0)
plt.title('How␣helpful␣users␣find␣among␣user␣scores')
plt.show()
```



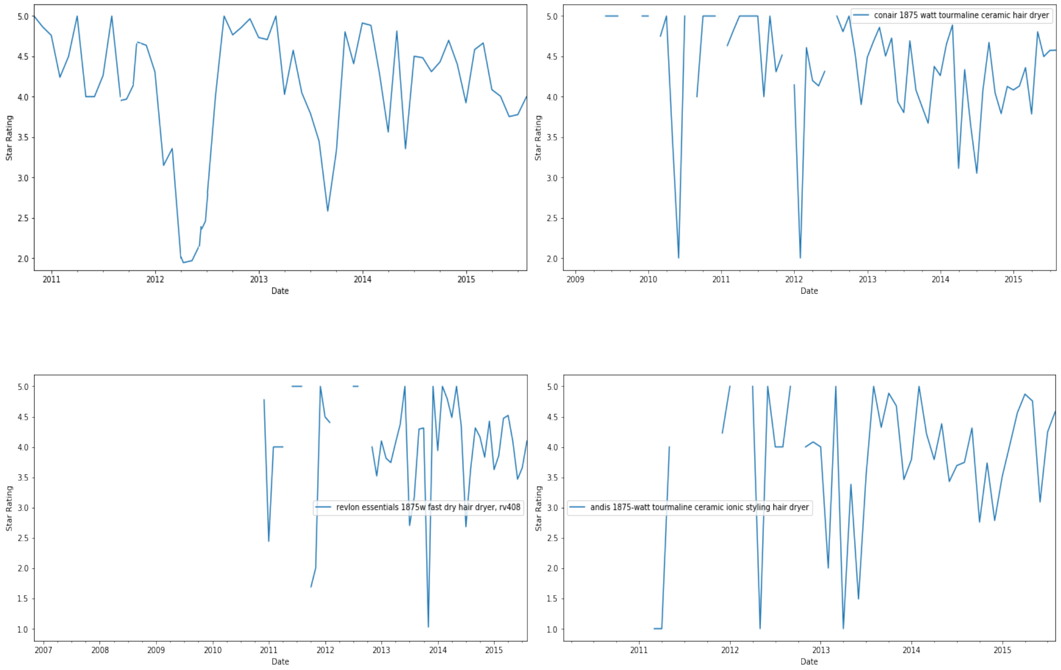


```
import re
# Important steps to clean the text data.
filtered_data = df[df['star_rating'] != 3]
def partition(x):
    if x>3:
        return 'positive'
    return 'negative'

actual_score = filtered_data['star_rating']
positiveNegative = actual_score.map(partition)
filtered_data['Score'] = positiveNegative
filtered_data.head()
```

```
# Defining function to clean html tags
def cleanhtml(sentence):
    cleaner = re.compile('<.*>')
    cleantext = re.sub(cleaner, '␣', sentence)
    return cleantext

# Defining function to remove special symbols
def cleanpunc(sentence):
    cleaned = re.sub
        (r'[?|.|!|*|@|#|\'|"|,|)|(|\|/]',␣r'',␣sentence)
␣␣␣␣return␣cleaned


def text_fit(X, y, model, clf_model, coef_show=1):
    X_c = model.fit_transform(X)
    print('#␣features:␣{}'.format(X_c.shape[1]))
    X_train, X_test, y_train, y_test = \
        train_test_split(X_c, y, random_state=0)
    print('#␣train␣records:␣{}'.format(X_train.shape[0]))
    print('#␣test␣records:␣{}'.format(X_test.shape[0]))
    clf = clf_model.fit(X_train, y_train)
    acc = clf.score(X_test, y_test)
    print('Model␣Accuracy:␣{}'.format(acc))

    if coef_show == 1:
        w = model.get_feature_names()
        coef = clf.coef_.tolist()[0]
        coeff_df = pd.DataFrame({'Word': w, 'Coefficient': coef})
        coeff_df = coeff_df.sort_values\
            (['Coefficient', 'Word'], ascending=[0, 1])
        print('-Top␣20␣positive-')
        print(coeff_df.head(20).to_string(index=False))
        print('')
        print('-Top␣20␣negative-')
        print(coeff_df.tail(20).to_string(index=False))
    return coeff_df


coeff_df = text_fit(X, y, c, LogisticRegression())
```



```
function [Dist,D,k,w,rw,tw]=dtw(r,t,pflag)
[row,M]=size(r); if (row > M) M=row; r=r'; end;
[row,N]=size(t); if (row > N) N=row; t=t'; end;
d=sqrt((repmat(r',1,N)-repmat(t,M,1)).^2);
 %this makes clear the above instruction Thanks Pau Mic
D=zeros(size(d));
D(1,1)=d(1,1);
for m=2:M
    D(m,1)=d(m,1)+D(m-1,1);
end
for n=2:N
    D(1,n)=d(1,n)+D(1,n-1);
end
for m=2:M
    for n=2:N
        D(m,n)=d(m,n)+min(D(m-1,n),min(D(m-1,n-1),D(m,n-1)));
    end
end
Dist=D(M,N);n=N;m=M;k=1;w=[M N];
while ((n+m)~=2)
    if (n-1)==0
        m=m-1;
    elseif (m-1)==0
        n=n-1;
    else
      [values,number]=min([D(m-1,n),D(m,n-1),D(m-1,n-1)]);
      switch number
      case 1
        m=m-1;
      case 2
        n=n-1;
      case 3
        m=m-1;n=n-1;
      end
  end
    k=k+1;
    w=[m n; w]; % this replace the above sentence.
end
% warped waves
rw=r(w(:,1));
tw=t(w(:,2));
end
```



```
rating_series = pd.DataFrame(kindle.review_date)
dforms=[]
for x in rating_series.review_date:
    dforms.append((pd.to_datetime(x)).value)
# now we have dforms which has dates transformed to numeric values
rating2 = rating_series.assign(date_min = dforms)
rating2.reset_index(inplace=True)
#rating2.set_index('date_min')
#rating2.columns=['timestamp_string','review_count','date_min']
bins = np.linspace(min(rating2.date_min),max(rating2.date_min),num
rating2.hist(column='date_min', bins=20,figsize=(10,6),)
rating2.hist(column='date_min', bins=30,figsize=(10,6))
rating2.hist(column='date_min', bins=50,figsize=(10,6))

def NPS_eval (A):
    score =0
    for x in A[:]:
        if (x>4) :
            score+=1
        elif (x<3) :
            score-=1
    return 100*score/len(A)
```

```
NPS_overtime = kindle[['temp','star_rating']]
NPS_overtime.groupby(by='temp').agg(NPS_eval).plot(figsize=(15,10)

for i in range(8):
    title = final['product_title'].value_counts().index[i]
    XXXX = final[final['product_title']==title]
    month = XXXX.resample('M').sum()
    month['H/P'] = month['H']/month['P']
    month_dates = month['H/P']
    month_dates.sort_index(inplace=True)
    month_dates.plot(figsize=(12,6))
    plt.legend([title])
    plt.ylabel('Star␣Rating')
    plt.show()
```

...	...	...	...	...

```
$D$
$Sup_{min}$
$Conf_{min}$
$F$

 $t \leftarrow 1$
 $C_t = \varnothing$
 $length = 1$

    $I_i$
      $I_i$

        $I_i(j) \notin C_t$
            $C_t = C_t \cup I_i(j)$

$F_t = \{f | f \in C_t, Sup(f) > Sup_{min}\}$
 $F \neq \varnothing$

    $C_t \leftarrow F_{t-1}$
    $F_t = \{f | f \in C_t, (Sup(f) > Sup_{min}) \bigcap (Comf(f) > Conf_{min})\}$

$F_{t-1}$
```

		[]
		[]
		[]
		[]
		[]
		[]