

```
In [57]: import pandas as pd
import matplotlib.pyplot as plt
from surprise import Reader, Dataset, SVD
from surprise.accuracy import rmse, mae
from surprise.model_selection import cross_validate
```

```
In [58]: df = pd.read_csv('E:\Portfolio\Movie Recommendation System Using Surprise\'ratings.csv')
df
```

Out[58]:

| | userid | movieId | rating | timestamp |
|--------|--------|---------|--------|------------|
| 0 | 1 | 1 | 4.0 | 964982703 |
| 1 | 1 | 3 | 4.0 | 964981247 |
| 2 | 1 | 6 | 4.0 | 964982224 |
| 3 | 1 | 47 | 5.0 | 964983815 |
| 4 | 1 | 50 | 5.0 | 964982931 |
| ... | ... | ... | ... | ... |
| 100831 | 610 | 166534 | 4.0 | 1493848402 |
| 100832 | 610 | 168248 | 5.0 | 1493850091 |
| 100833 | 610 | 168250 | 5.0 | 1494273047 |
| 100834 | 610 | 168252 | 5.0 | 1493848352 |
| 100835 | 610 | 170875 | 3.0 | 1493846415 |

100836 rows x 4 columns

```
In [59]: #we don not need timestamp to recommend
df.drop('timestamp',axis=1,inplace=True) #axis=1 means dropping column
```

```
In [60]: df.head()
```

Out[60]:

| | userid | movieId | rating |
|---|--------|---------|--------|
| 0 | 1 | 1 | 4.0 |
| 1 | 1 | 3 | 4.0 |
| 2 | 1 | 6 | 4.0 |
| 3 | 1 | 47 | 5.0 |
| 4 | 1 | 50 | 5.0 |

```
In [61]: #checking for missing values
df.isna().sum()
```

```
Out[61]: userid      0
movieId    0
rating      0
dtype: int64
```

```
In [62]: #check for the numbers of total movies and users
movies=df['movieId'].nunique() #nunique is similar to count but only takes unique values
users=df['userid'].nunique()
print('total number of movies =', movies)
print('total number of users =', users)

total number of movies = 9724
total number of users = 610
```

```
In [63]: #count the ratings or how many times a rating is given
df['rating'].value_counts().plot(kind='bar',colormap='Accent')
```

```
Out[63]: <matplotlib.axes._subplots.AxesSubplot at 0x135cd034910>
```



```
[In]: Remove or filter movies which have been rated less than 5 times
      filter_movies = df['movieid'].value_counts() > 5
      #make a list of those movies
      filter_movies = filter_movies[filter_movies.index.tolist()]
      filter_movies

Out[64]:
1366,
318,
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53519,
106487,
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8783,
3556,
112183,
2795,
2409,
89492,
+1)

```
In [65]: #remove or filter the users who have rated less than 5 times
filter_users = df['userId'].value_counts() > 5
#make a list of those users
filter_users = filter_users[filter_users].index.tolist()
filter_users
```

```
Out[65]: [414,
599,
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610,
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