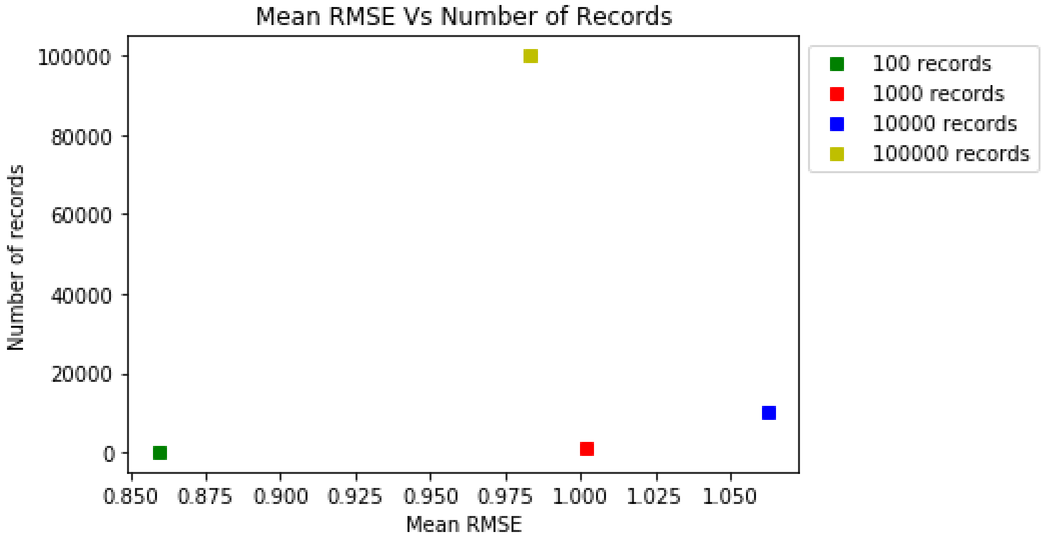
```
Python 3.6.1 |Anaconda custom (64-bit)| (default, May 11 2017, 13:25:24) [MSC v.1900 64 bit
(AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 5.3.0 -- An enhanced Interactive Python.
?         -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help      -> Python's own help system.
object?   -> Details about 'object', use 'object??' for extra details.

Restarting kernel...
```

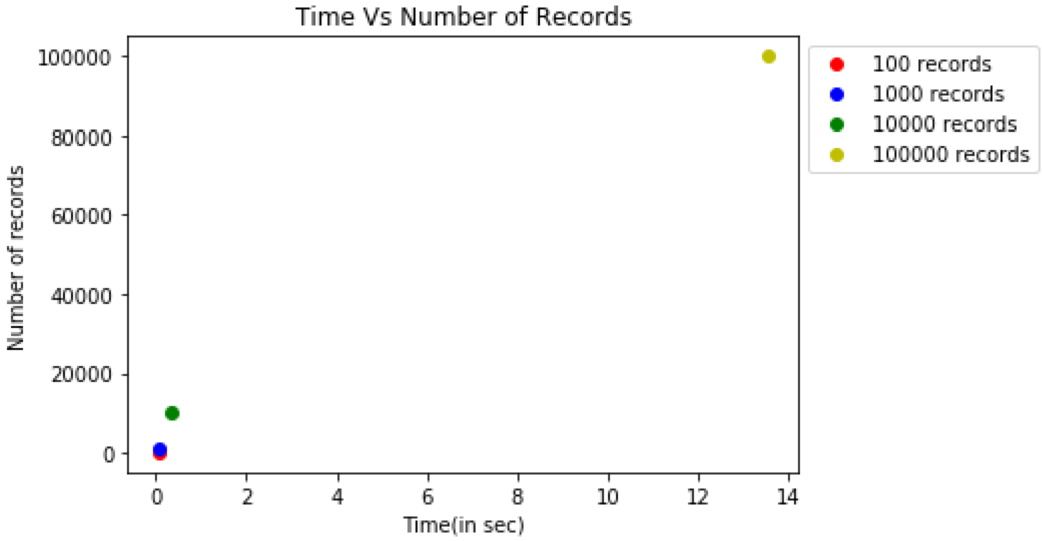
```
In [1]: import numpy as np
   ...: import surprise
   ...: import pandas as pd
   ...: from surprise import Reader
   ...: from surprise import Dataset
   ...: import time
   ...: import matplotlib.pyplot as plt
   ...: import psutil
   ...:
   ...:
   ...: timex=[]
   ...: mem=[]
   ...: m1=psutil.virtual_memory().percent
   ...:
   ...:
   ...: #For 100 record dataset
   ...: start = time.time()
   ...: df1 = pd.read_csv('C:/Users/dell pc/Desktop/Project/ratings_1million1.csv', dtype=
{'rating': float})
   ...: reader = Reader(rating_scale=(1, 5))
   ...: data = Dataset.load_from_df(df1[['user_id','book_id','rating']], reader)
   ...: data.split(2)
   ...: algo = surprise.KNNBasic()
   ...: result1 = surprise.evaluate(algo, data, measures=['RMSE'])
   ...: end = time.time()
   ...: print("Time1",end - start)
   ...: timex.append(end-start)
   ...: m2=psutil.virtual_memory().percent
   ...: #print(m2)
   ...: mem.append(m2)
   ...:
   ...:
   ...: #For 1000 record dataset
   ...: start = time.time()
   ...: df2 = pd.read_csv('C:/Users/dell pc/Desktop/Project/ratings_1million2.csv', dtype=
{'rating': float})
   ...: reader = Reader(rating_scale=(1, 5))
   ...: data = Dataset.load_from_df(df2[['user_id','book_id','rating']], reader)
   ...: data.split(2)
   ...: algo = surprise.KNNBasic()
   ...: result2 = surprise.evaluate(algo, data, measures=['RMSE'])
   ...: end = time.time()
   ...: print("Time2",end - start)
   ...: timex.append(end-start)
   ...: m3=psutil.virtual_memory().percent
   ...: #print(m2)
   ...: mem.append(m3)
   ...:
   ...:
   ...: #For 10000 record dataset
   ...: start = time.time()
   ...: df3 = pd.read_csv('C:/Users/dell pc/Desktop/Project/ratings_1million3.csv', dtype=
{'rating': float})
   ...: reader = Reader(rating_scale=(1, 5))
```

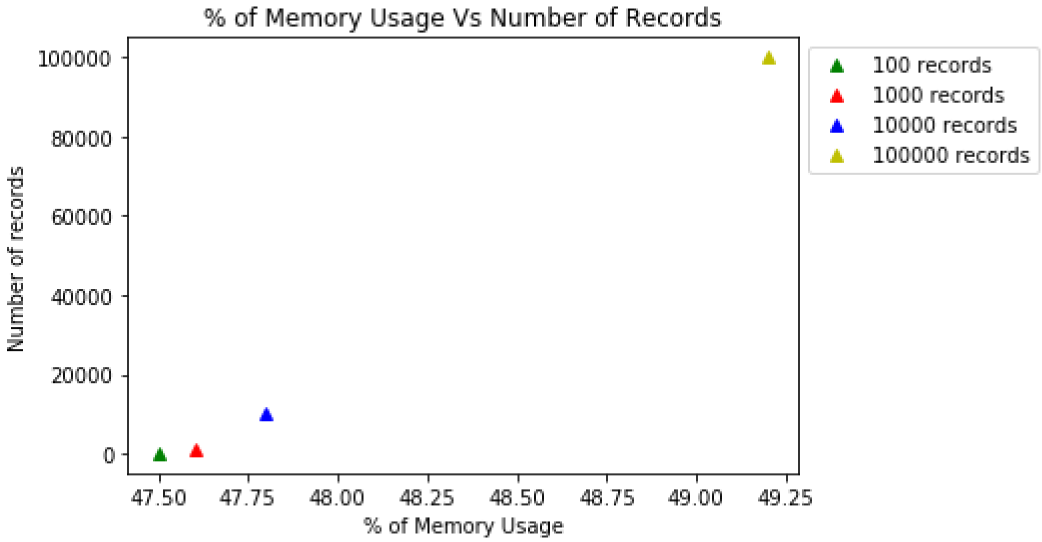
```
    ...: data = Dataset.load_from_df(df3[['user_id','book_id','rating']], reader)
    ...: data.split(2)
    ...: algo = surprise.KNNBasic()
    ...: result3 = surprise.evaluate(algo, data, measures=['RMSE'])
    ...: end = time.time()
    ...: print("Time3",end - start)
    ...: timex.append(end-start)
    ...: m4=psutil.virtual_memory().percent
    ...: #print(m2)
    ...: mem.append(m4)
    ...:
    ...:
    ...: #For 100000 record dataset
    ...: start = time.time()
    ...: df4 = pd.read_csv('C:/Users/dell pc/Desktop/Project/ratings_1million4.csv', dtype=
{'rating': float})
    ...: reader = Reader(rating_scale=(1, 5))
    ...: data = Dataset.load_from_df(df4[['user_id','book_id','rating']], reader)
    ...: data.split(2)
    ...: algo = surprise.KNNBasic()
    ...: result4 = surprise.evaluate(algo, data, measures=['RMSE'])
    ...: end = time.time()
    ...: print("Time4",end - start)
    ...: timex.append(end-start)
    ...: m5=psutil.virtual_memory().percent
    ...: #print(m2)
    ...: mem.append(m5)
    ...:
    ...: #Plotting the Mean RMSE Vs Number of Records
    ...: y = [len(df1),len(df2),len(df3),len(df4)]
    ...: plt.plot( np.mean(result1['rmse']),y[0],'gs',label='100 records')
    ...: plt.plot( np.mean(result2['rmse']),y[1],'rs',label='1000 records')
    ...: plt.plot( np.mean(result3['rmse']),y[2],'bs',label='10000 records')
    ...: plt.plot( np.mean(result4['rmse']),y[3],'ys',label='100000 records')
    ...: legend = plt.legend(loc='upper left',bbox_to_anchor=(1, 1))
    ...: frame = legend.get_frame()
    ...: plt.xlabel('Mean RMSE')
    ...: plt.ylabel('Number of records')
    ...: plt.title('Mean RMSE Vs Number of Records')
    ...: plt.show()
    ...:
    ...:
    ...: #Plotting the Time Vs Number of Records
    ...: y = [len(df1),len(df2),len(df3),len(df4)]
    ...: plt.plot( timex[0],y[0],'ro',label='100 records')
    ...: plt.plot( timex[1], y[1],'bo',label='1000 records')
    ...: plt.plot( timex[2],y[2],'go',label='10000 records')
    ...: plt.plot( timex[3], y[3],'yo',label='100000 records')
    ...: legend = plt.legend(loc='upper left',bbox_to_anchor=(1, 1))
    ...: frame = legend.get_frame()
    ...: plt.xlabel('Time(in sec)')
    ...: plt.ylabel('Number of records')
    ...: plt.title('Time Vs Number of Records')
    ...: plt.show()
    ...:
    ...:
    ...:
    ...: #Plotting the % of Memory Usage Vs Number of Records
    ...: y = [len(df1),len(df2),len(df3),len(df4)]
    ...: plt.plot( mem[0],y[0],'g^',label='100 records')
    ...: plt.plot( mem[1],y[1],'r^',label='1000 records')
    ...: plt.plot( mem[2],y[2],'b^',label='10000 records')
    ...: plt.plot( mem[3],y[3],'y^',label='100000 records')
    ...: legend = plt.legend(loc='upper left',bbox_to_anchor=(1, 1))
    ...: frame = legend.get_frame()
    ...: plt.xlabel('% of Memory Usage')
    ...: plt.ylabel('Number of records')
    ...: plt.title('% of Memory Usage Vs Number of Records')
    ...: plt.show()
```

```
U:\Anaconda3\lib\site-packages\surprise\evaluate.py:66: UserWarning: The evaluate() method is
deprecated. Please use model_selection.cross_validate() instead.
  'model_selection.cross_validate() instead.', UserWarning)
U:\Anaconda3\lib\site-packages\surprise\dataset.py:193: UserWarning: Using data.split() or
using load_from_folds() without using a CV iterator is now deprecated.
  UserWarning)
Evaluating RMSE of algorithm KNNBasic.

------------
Fold 1
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 0.8278
------------
Fold 2
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 0.8911
------------
------------
Mean RMSE: 0.8594
------------
------------
Time1 0.07320332527160645
Evaluating RMSE of algorithm KNNBasic.

------------
Fold 1
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 1.0032
------------
Fold 2
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 1.0011
------------
------------
Mean RMSE: 1.0021
------------
------------
Time2 0.06704211235046387
Evaluating RMSE of algorithm KNNBasic.

------------
Fold 1
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 1.0624
------------
Fold 2
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 1.0629
------------
------------
Mean RMSE: 1.0627
------------
------------
Time3 0.36824488639831543
Evaluating RMSE of algorithm KNNBasic.

------------
Fold 1
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 0.9860
------------
Fold 2
```

```
Computing the msd similarity matrix...
Done computing similarity matrix.
RMSE: 0.9806
------------
------------
Mean RMSE: 0.9833
------------
------------
Time4 13.53800892829895
```







```
In [2]:
```