Pandas With Data Science.AI

August 28, 2024

1 import the data set

[372]:
```
import pandas as pd
```

2 Read the dataset

[374]:
```
movies = pd.read_csv(r'C:\Users\HP\Downloads\archive\movie.csv',sep=',')
```

[375]:
```
ratings = pd.read_csv(r'C:\Users\HP\Downloads\archive\rating.csv',sep=',')
```

[376]:
```
tags = pd.read_csv(r'C:\Users\HP\Downloads\archive\tag.csv',sep=',')
```

[377]:
```
movies.head(1)
```

[377]:

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy

[378]:
```
print(movies.shape)
print(ratings.shape)
print(tags.shape)
```

```
(27278, 3)
(20000263, 4)
(465564, 4)
```

[379]:
```
print(movies.columns)
print(ratings.columns)
print(tags.columns)
```

```
Index(['movieId', 'title', 'genres'], dtype='object')
Index(['userId', 'movieId', 'rating', 'timestamp'], dtype='object')
Index(['userId', 'movieId', 'tag', 'timestamp'], dtype='object')
```

[380]:
```
print(type(movies))
movies.head(20)
```

```
<class 'pandas.core.frame.DataFrame'>
```

[380]:

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	2	Jumanji (1995)	Adventure|Children|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	5	Father of the Bride Part II (1995)	Comedy
5	6	Heat (1995)	Action|Crime|Thriller
6	7	Sabrina (1995)	Comedy|Romance
7	8	Tom and Huck (1995)	Adventure|Children
8	9	Sudden Death (1995)	Action
9	10	GoldenEye (1995)	Action|Adventure|Thriller
10	11	American President, The (1995)	Comedy|Drama|Romance
11	12	Dracula: Dead and Loving It (1995)	Comedy|Horror
12	13	Balto (1995)	Adventure|Animation|Children
13	14	Nixon (1995)	Drama
14	15	Cutthroat Island (1995)	Action|Adventure|Romance
15	16	Casino (1995)	Crime|Drama
16	17	Sense and Sensibility (1995)	Drama|Romance
17	18	Four Rooms (1995)	Comedy
18	19	Ace Ventura: When Nature Calls (1995)	Comedy
19	20	Money Train (1995)	Action|Comedy|Crime|Drama|Thriller

[381]:
```
tags.head() #Default Behavior: head() shows the first 5 rows.
```

[381]:

	userId	movieId	tag	timestamp
0	18	4141	Mark Waters	2009-04-24 18:19:40
1	65	208	dark hero	2013-05-10 01:41:18
2	65	353	dark hero	2013-05-10 01:41:19
3	65	521	noir thriller	2013-05-10 01:39:43
4	65	592	dark hero	2013-05-10 01:41:18

By using head(), you can quickly get an overview of your dataset's structure and content.

[383]:
```
ratings.head()
```

[383]:

	userId	movieId	rating	timestamp
0	1	2	3.5	2005-04-02 23:53:47
1	1	29	3.5	2005-04-02 23:31:16
2	1	32	3.5	2005-04-02 23:33:39
3	1	47	3.5	2005-04-02 23:32:07
4	1	50	3.5	2005-04-02 23:29:40

For current analysis, we will remove timestamp

[385]:
```
del ratings['timestamp']
del tags['timestamp']
```

2.0.1 Data Structures:

Series

[388]:
```
row_0 = tags.iloc[0]
type(row_0)
```

[388]:
```
pandas.core.series.Series
```

[389]:
```
print(row_0)
```

```
userId             18
movieId          4141
tag        Mark Waters
Name: 0, dtype: object
```

[390]:
```
row_0.index
```

[390]:
```
Index(['userId', 'movieId', 'tag'], dtype='object')
```

[391]:
```
row_0['userId']
```

[391]:
```
18
```

[392]:
```
'rating' in row_0 #'rating' Not Present
```

[392]:
```
False
```

[393]:
```
row_0.name
```

[393]:
```
0
```

[394]:
```
row_0 = row_0.rename('firstRow')
row_0.name
```

[394]:
```
'firstRow'
```

2.0.2 DataFrames

[396]:
```
tags.head()
```

[396]:

	userId	movieId	tag
0	18	4141	Mark Waters
1	65	208	dark hero
2	65	353	dark hero
3	65	521	noir thriller
4	65	592	dark hero

[397]:
```
tags.index
```

[397]:
```
RangeIndex(start=0, stop=465564, step=1)
```

[398]:
```
tags.columns
```

[398]:
```
Index(['userId', 'movieId', 'tag'], dtype='object')
```

[399]:
```
tags.iloc[[0,11,500]] #iloc is used for purely integer-location-based indexing, meaning it selects rows based on their position in the DataFrame, not based on any label.
```

[399]:

	userId	movieId	tag
0	18	4141	Mark Waters
11	65	1783	noir thriller
500	342	55908	entirely dialogue

2.0.3 Descriptive Statistics

Let's look how the ratings are distributed!

[402]:
```
ratings['rating'].describe()
```

[402]:
```
count    2.000026e+07
mean     3.525529e+00
std      1.051989e+00
min      5.000000e-01
25%      3.000000e+00
50%      3.500000e+00
```

```
75%      4.000000e+00
max      5.000000e+00
Name: rating, dtype: float64
```

[403]:
```
ratings.describe()
```

[403]:
```
             userId       movieId        rating
count  2.000026e+07  2.000026e+07  2.000026e+07
mean   6.904587e+04  9.041567e+03  3.525529e+00
std    4.003863e+04  1.978948e+04  1.051989e+00
min    1.000000e+00  1.000000e+00  5.000000e-01
25%    3.439500e+04  9.020000e+02  3.000000e+00
50%    6.914100e+04  2.167000e+03  3.500000e+00
75%    1.036370e+05  4.770000e+03  4.000000e+00
max    1.384930e+05  1.312620e+05  5.000000e+00
```

[404]:
```
ratings['rating'].mean() #is more specific and returns a single value (the mean␣
↪of the rating column).
```

[404]:
```
3.5255285642993797
```

[405]:
```
ratings.mean()
```

[405]:
```
userId     69045.872583
movieId     9041.567330
rating         3.525529
dtype: float64
```

[406]:
```
ratings['rating'].max()
```

[406]:
```
5.0
```

[407]:
```
ratings['rating'].min()
```

[407]:
```
0.5
```

[408]:
```
ratings['rating'].std()
```

[408]:
```
1.051988919275684
```

[409]:
```
ratings['rating'].mode() #Mode is the value that appears most frequently in a␣
↪dataset.
```

[409]:
```
0    4.0
Name: rating, dtype: float64
```

Correlation

[411]:
```
ratings.corr() #ratings.corr() computes the correlation matrix of numerical␣
↪columns in the DataFrame.
```

[411]:
```
            userId   movieId    rating
userId    1.000000 -0.000850  0.001175
movieId  -0.000850  1.000000  0.002606
rating    0.001175  0.002606  1.000000
```

[412]:
```
filter1 = ratings['rating'] > 10
print(filter1)
filter1.any()
```

```
0           False
1           False
2           False
3           False
4           False
            …
20000258    False
20000259    False
20000260    False
20000261    False
20000262    False
Name: rating, Length: 20000263, dtype: bool
```

[412]:
```
False
```

[413]:
```
filter2 = ratings['rating'] > 0
filter2.all()
```

[413]:
```
True
```

2.0.4 Data Cleaning: Handling Missing Data

[415]:
```
movies.shape
```

[415]:
```
(27278, 3)
```

[416]:
```
movies.isnull().any().any()
```

[416]:
```
False
```

Thats Niceeee! No Null Values!

[418]:
```
ratings.shape
```

[418]:
```
(20000263, 3)
```

[419]:
```
ratings.isnull().any().any()
```

[419]: False

Thats nice! No Null values!

[421]:
```
tags.shape
```

[421]: (465564, 3)

[422]:
```
tags.isnull().any().any()
```

[422]: True

We have some tags which are Null

[424]:
```
tags = tags.dropna() #Default Behavior: By default, dropna() removes rows with␣
↪any NaN values.
```

[425]:
```
tags.isnull().any().any()
```

[425]: False

[426]:
```
tags.shape
```

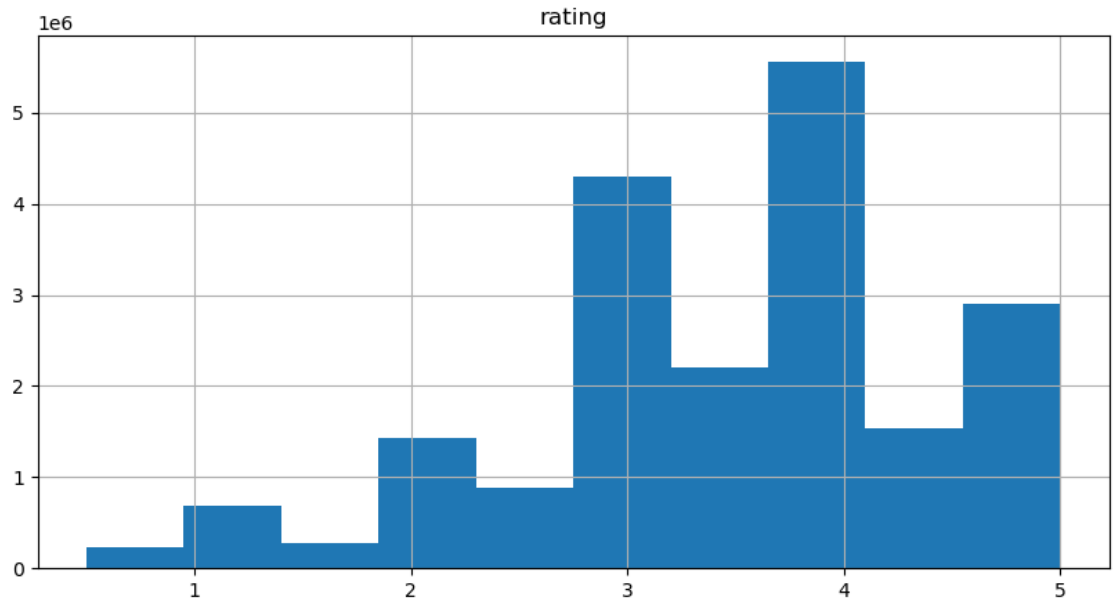
[426]: (465548, 3)

Thats nice ! No NULL values ! Notice the number of lines have reduced.

2.0.5 Data Visualization

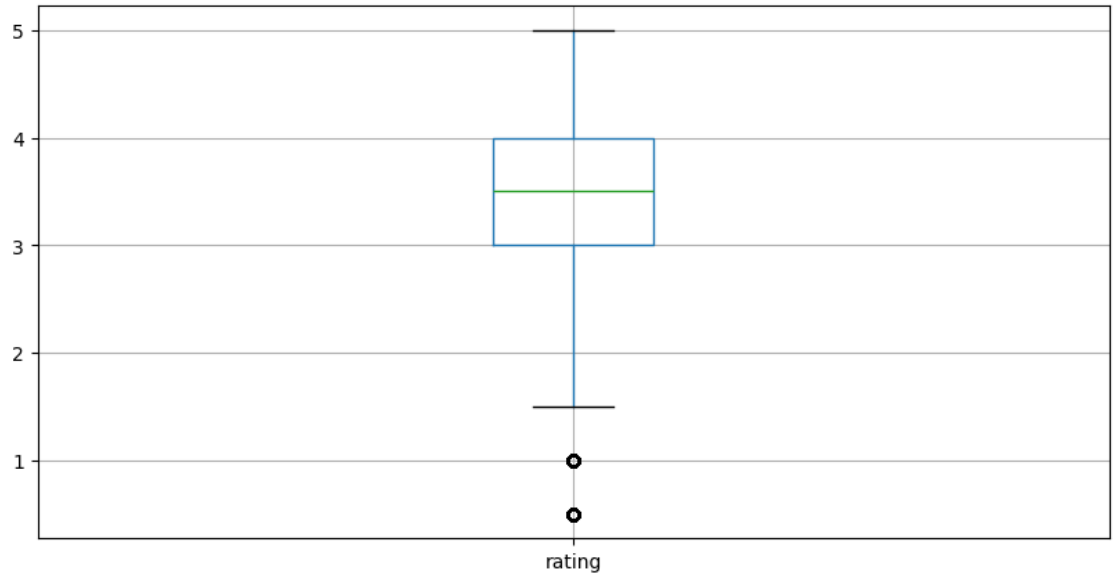
[474]:
```
%matplotlib inline
ratings.hist(column='rating',figsize=(10,5))
```

[474]: array([[<Axes: title={'center': 'rating'}>]], dtype=object)



[476]:
```
ratings.boxplot(column='rating',figsize=(10,5))
```

[476]: <Axes: >



2.0.6 Slicing Out Columns

[479]:
```
tags['tag'].head()
```

[479]:
```
0      Mark Waters
1        dark hero
2        dark hero
3    noir thriller
4        dark hero
Name: tag, dtype: object
```

[481]:
```
movies[['title','genres']].head()
```

[481]:

	title	genres
0	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	Jumanji (1995)	Adventure|Children|Fantasy
2	Grumpier Old Men (1995)	Comedy|Romance
3	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	Father of the Bride Part II (1995)	Comedy

[483]:
```
ratings[-10:]
```

[483]:

	userId	movieId	rating
20000253	138493	60816	4.5
20000254	138493	61160	4.0
20000255	138493	65682	4.5
20000256	138493	66762	4.5
20000257	138493	68319	4.5
20000258	138493	68954	4.5
20000259	138493	69526	4.5
20000260	138493	69644	3.0
20000261	138493	70286	5.0
20000262	138493	71619	2.5

[485]:
```
tag_counts = tags['tag'].value_counts()
tag_counts[-10:]
```

[485]:
```
tag
missing child    1
Ron Moore        1
Citizen Kane     1
```

```
mullet                            1
biker gang                        1
Paul Adelstein                    1
the wig                           1
killer fish                       1
genetically modified monsters     1
topless scene                     1
Name: count, dtype: int64
```

[487]:
```
tag_counts[:10].plot(kind='bar',figsize=(10,5))
```

[487]:
```
<Axes: xlabel='tag'>
```