Case Study on Titanic dataset

Frason Francis / 201903020 / SE-IT

Aim:

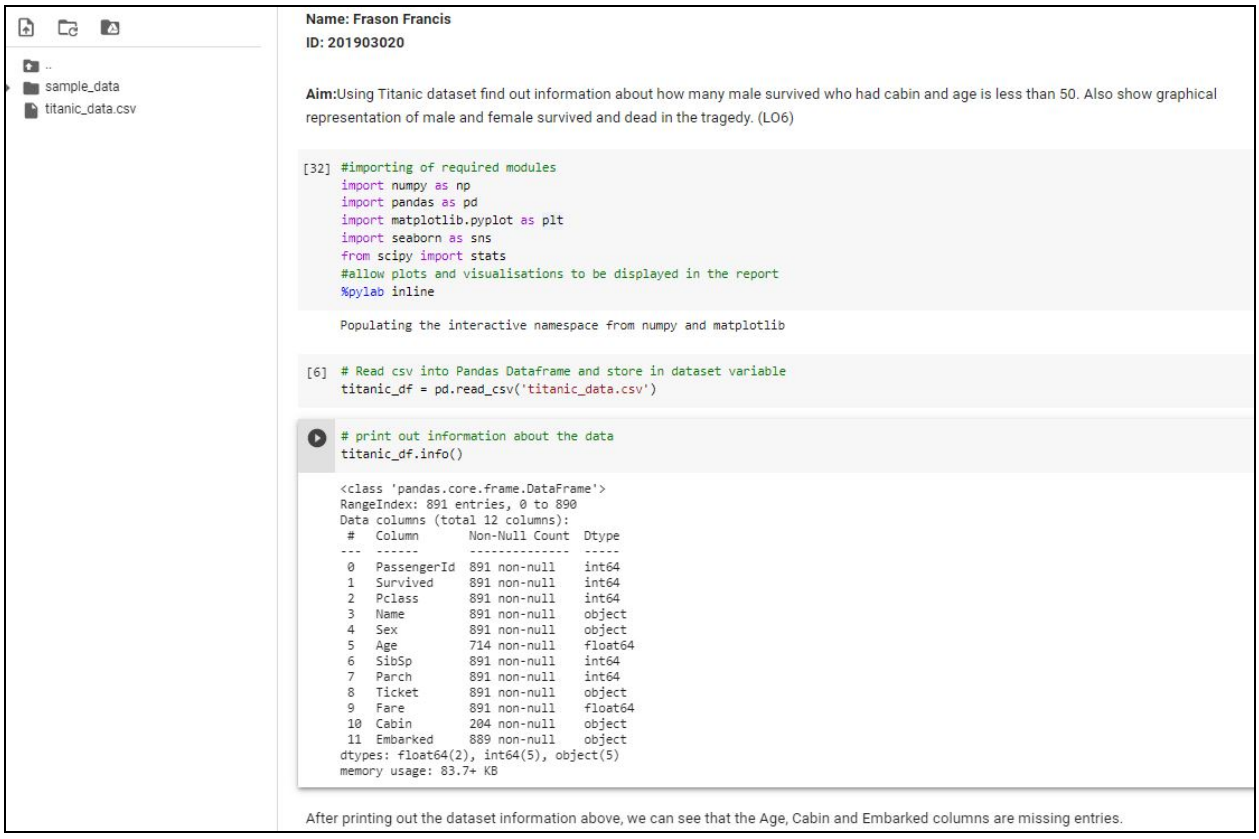
Using Titanic dataset find out information about how many male survived who had cabin and age is less than 50. Also show graphical representation of male and female survived and dead in the tragedy. (LO6)

Theory:

There were 8 decks: the upperdeck - for lifeboats, other 7 were under it and had letter symbols:

1. A: it did not run the entire length of the vessel (i.e. it did not reach from the stern to the bow of the vessel), and was intended for passengers of the 1st class.
2. B: it did not run the entire length of the ship (it was interrupted by 37 meters above the C deck, and served as a place for anchors in the front).
3. C: in the front part of the galley, dining room for the crew, as well as a walking area for passengers of the 3rd class.
4. D: a walking area for passengers .
5. E: cabins of the 1st and 2nd class.
6. F: part of the passenger cabins of the 2nd class, most of the cabins of the 3rd class.
7. G: did not run the entire length of the ship, the boiler rooms were located in the center.
8. T - boat deck ? To the passengers without deck information I will imput U letter (as unknown).

Code:



..
sample_data
titanic_data.csv

Name: Frason Francis
ID: 201903020

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```
[32] #importing of required modules
     import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt
     import seaborn as sns
     from scipy import stats
     #allow plots and visualisations to be displayed in the report
     %pylab inline
```

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

```
[6]  # Read csv into Pandas Dataframe and store in dataset variable
     titanic_df = pd.read_csv('titanic_data.csv')
```

```
# print out information about the data
titanic_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  891 non-null    int64
 1   Survived     891 non-null    int64
 2   Pclass       891 non-null    int64
 3   Name         891 non-null    object
 4   Sex          891 non-null    object
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object
 11  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

After printing out the dataset information above, we can see that the Age, Cabin and Embarked columns are missing entries.

+ Code + Text

Missing Values in Data

```
[8] total_miss = titanic_df.isnull().sum()
    percent_miss = (total_miss/titanic_df.isnull().count()*100)

    # Creating dataframe from dictionary
    missing_data = pd.DataFrame({'Total missing':total_miss,'% missing':percent_miss})

    missing_data.sort_values(by='Total missing',ascending=False).head()
```

	Total missing	% missing
Cabin	687	77.104377
Age	177	19.865320
Embarked	2	0.224467
PassengerId	0	0.000000
Survived	0	0.000000

```
[9] # Visualizing Missing Data
    import missingno as msno

    missing_data = msno.bar(titanic_df, figsize=(6,4))
    print(titanic_df.info())
    print('------'* 20 , '\n\n')
    print(titanic_df.isnull().sum())
    print('------'* 20 , '\n\n')
    print(missing_data)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
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 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object
 11  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
None
------------------------------------------------------------------------------------------------------------------------


PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
------------------------------------------------------------------------------------------------------------------------
```
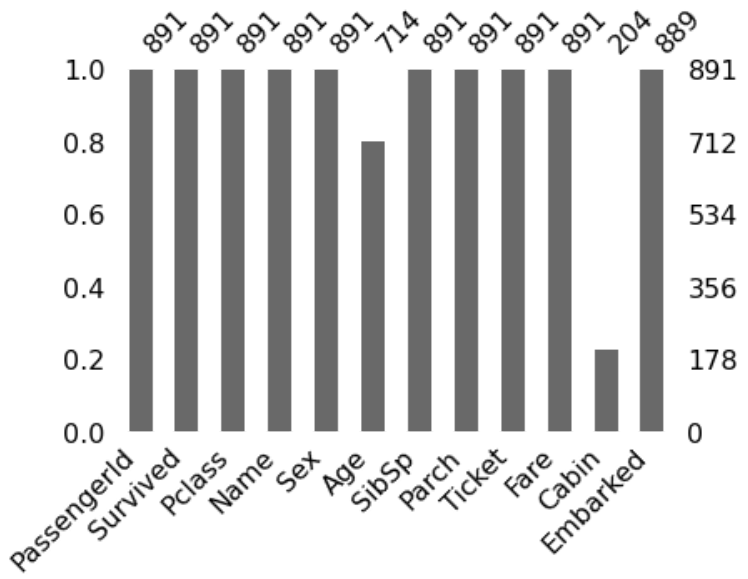



Dropping Missing Data

```
[10] df = titanic_df.dropna()
     print('origional shape: ',titanic_df.shape, '-----> ', 'New Shape',df.shape)
```

```
origional shape:  (891, 12) -----> New Shape (183, 12)
```

```
[11] #women survival
     women = df[df.Sex == 'female']["Survived"]
     #men survival
     men = df[df.Sex == 'male']["Survived"]
     print("Survival rate for women is {:.2f} and for men is {:.2f}".format((sum(women)/len(women))*100, (sum(men)/len(men))*100))
```

```
Survival rate for women is 93.18 and for men is 43.16
```

```
[ ]
```

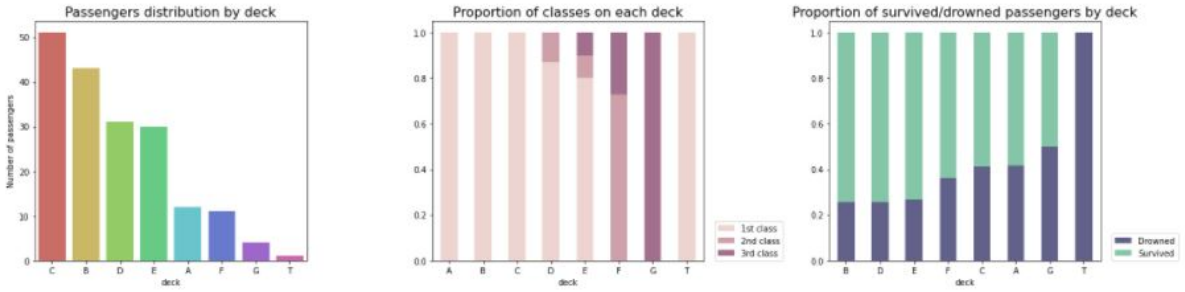
```
[33] df
```

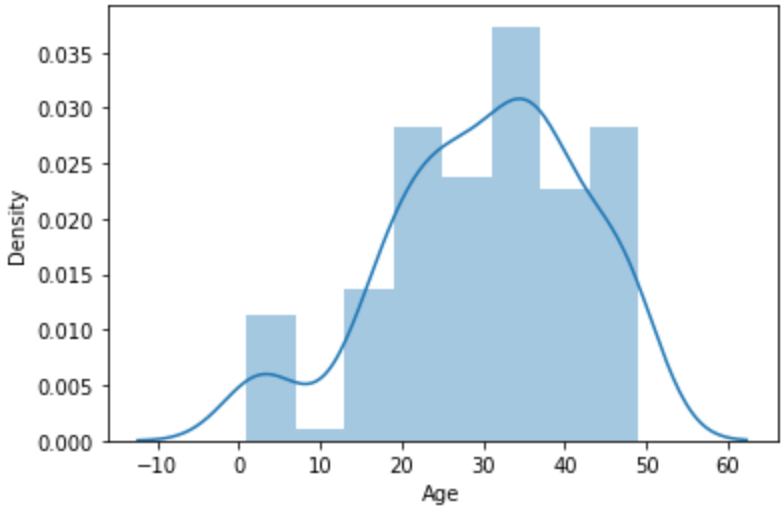
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	deck
449	450	1	1	Peuchen, Major. Arthur Godfrey	male	52.0	0	0	113786	30.5000	C104	S	C
587	588	1	1	Frolicher-Stehli, Mr. Maxmillian	male	60.0	1	1	13567	79.2000	B41	C	B
630	631	1	1	Barkworth, Mr. Algernon Henry Wilson	male	80.0	0	0	27042	30.0000	A23	S	A
647	648	1	1	Simonius-Blumer, Col. Oberst Alfons	male	56.0	0	0	13213	35.5000	A26	C	A
857	858	1	1	Daly, Mr. Peter Denis	male	51.0	0	0	113055	26.5500	E17	S	E
11	12	1	1	Bonnell, Miss. Elizabeth	female	58.0	0	0	113783	26.5500	C103	S	C
195	196	1	1	Lurette, Miss. Elise	female	58.0	0	0	PC 17569	146.5208	B80	C	B
268	269	1	1	Graham, Mrs. William Thompson (Edith Junkins)	female	58.0	0	1	PC 17582	153.4625	C125	S	C
275	276	1	1	Andrews, Miss. Kornelia Theodosia	female	63.0	1	0	13502	77.9583	D7	S	D
299	300	1	1	Baxter, Mrs. James (Helene DeLaudeniere Chaput)	female	50.0	0	1	PC 17558	247.5208	B58 B60	C	B
366	367	1	1	Warren, Mrs. Frank Manley (Anna Sophia Atkinson)	female	60.0	1	0	110813	75.2500	D37	C	D
496	497	1	1	Eustis, Miss. Elizabeth Mussey	female	54.0	1	0	36947	78.2667	D20	C	D
571	572	1	1	Appleton, Mrs. Edward Dale (Charlotte Lamson)	female	53.0	2	0	11769	51.4792	C101	S	C
591	592	1	1	Stephenson, Mrs. Walter Bertram (Martha Eustis)	female	52.0	1	0	36947	78.2667	D20	C	D
765	766	1	1	Hogeboom, Mrs. John C (Anna Andrews)	female	51.0	1	0	13502	77.9583	D11	S	D
820	821	1	1	Hays, Mrs. Charles Melville (Clara Jennings Gr...	female	52.0	1	1	12749	93.5000	B69	S	B
879	880	1	1	Potter, Mrs. Thomas Jr (Lily Alexenia Wilson)	female	56.0	0	1	11767	83.1583	C50	C	C

```
[14] data = df
```

EDA

```
[16] fig = plt.figure(figsize=(20, 5))

     ax1 = fig.add_subplot(131)
     sns.countplot(x = 'deck', data = data, palette = "hls", order = data['deck'].value_counts().index, ax = ax1)
     plt.title('Passengers distribution by deck',fontsize= 16)
     plt.ylabel('Number of passengers')

     ax2 = fig.add_subplot(132)
     deck_by_class = data.groupby('deck')['Pclass'].value_counts(normalize = True).unstack()
     deck_by_class.plot(kind='bar', stacked='True',color = ['#eed4d0', '#cda0aa', '#a2708e'], ax = ax2)
     plt.legend(('1st class', '2nd class', '3rd class'), loc=(1.04,0))
     plt.title('Proportion of classes on each deck',fontsize= 16)
     plt.xticks(rotation = False)

     ax3 = fig.add_subplot(133)
     deck_by_survived = data.groupby('deck')['Survived'].value_counts(normalize = True).unstack()
     deck_by_survived = deck_by_survived.sort_values(by = 1, ascending = False)
     deck_by_survived.plot(kind='bar', stacked='True', color=["#3f3e6fd1", "#85c6a9"], ax = ax3)
     plt.title('Proportion of survived/drowned passengers by deck',fontsize= 16)
     plt.legend(( 'Drowned', 'Survived'), loc=(1.04,0))
     plt.xticks(rotation = False)
     plt.tight_layout()

     plt.show()
```





kde graph distribution of the passenger present with an age of 50 and less

```
[18] data[data['Age'] < 50 ]
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked	deck
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C	C
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S	C
10	11	1	3	Sandstrom, Miss. Marguerite Rut	female	4.0	1	1	PP 9549	16.7000	G6	S	G
21	22	1	2	Beesley, Mr. Lawrence	male	34.0	0	0	248698	13.0000	D56	S	D
23	24	1	1	Sloper, Mr. William Thompson	male	28.0	0	0	113788	35.5000	A6	S	A
...	...	...	...	...	...	...	...	...	...	...	...	...	...
867	868	0	1	Roebling, Mr. Washington Augustus II	male	31.0	0	0	PC 17590	50.4958	A24	S	A
871	872	1	1	Beckwith, Mrs. Richard Leonard (Sallie Monypeny)	female	47.0	1	1	11751	52.5542	D35	S	D
872	873	0	1	Carlsson, Mr. Frans Olof	male	33.0	0	0	695	5.0000	B51 B53 B55	S	B
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S	B
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C	C

147 rows × 13 columns

list of passenger with age less than 50

```
[ ]
```

```
[19] df_filtered = df[(data.Survived == 1) & (data.Age >= 50)]
     print(df_filtered)
```

```
     PassengerId  Survived  Pclass  ...    Cabin Embarked  deck
11            12         1       1  ...     C103        S     C
195          196         1       1  ...     B80         C     B
268          269         1       1  ...     C125        S     C
275          276         1       1  ...      D7         S     D
299          300         1       1  ...  B58 B60        C     B
366          367         1       1  ...     D37         C     D
449          450         1       1  ...     C104        S     C
496          497         1       1  ...     D20         C     D
571          572         1       1  ...     C101        S     C
587          588         1       1  ...     B41         C     B
591          592         1       1  ...     D20         C     D
630          631         1       1  ...     A23         S     A
647          648         1       1  ...     A26         C     A
765          766         1       1  ...     D11         S     D
820          821         1       1  ...     B69         S     B
857          858         1       1  ...     E17         S     E
879          880         1       1  ...     C50         C     C

[17 rows x 13 columns]
```

list of passenger who survived with an age less than 50

```
[34] df_men = df[(data.Survived  == 1) & (data.Age >= 50) & (data.Sex == 'male')] #contains men who survived with an age less than 50
     print(df_men) # 5 Men survived with an age less than 50
     df_female = df[(data.Survived == 1) & (data.Age >= 50) & (data.Sex == 'female')] #contains men who survived with an age less than 50
     print(df_female) # 12 female survived with an age less than 50
```

```
     PassengerId  Survived  Pclass  ... Cabin Embarked  deck
449          450         1       1  ...  C104        S     C
587          588         1       1  ...   B41        C     B
630          631         1       1  ...   A23        S     A
647          648         1       1  ...   A26        C     A
857          858         1       1  ...   E17        S     E

[5 rows x 13 columns]
     PassengerId  Survived  Pclass  ...    Cabin Embarked  deck
11            12         1       1  ...    C103        S     C
195          196         1       1  ...     B80        C     B
268          269         1       1  ...    C125        S     C
275          276         1       1  ...      D7        S     D
299          300         1       1  ...  B58 B60        C     B
366          367         1       1  ...     D37        C     D
496          497         1       1  ...     D20        C     D
571          572         1       1  ...    C101        S     C
591          592         1       1  ...     D20        C     D
765          766         1       1  ...     D11        S     D
820          821         1       1  ...     B69        S     B
879          880         1       1  ...     C50        C     C

[12 rows x 13 columns]
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning:

Boolean Series key will be reindexed to match DataFrame index.

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: UserWarning:

Boolean Series key will be reindexed to match DataFrame index.
```

```
[28] frames = [df_men, df_female] #concatenating the two final data

     #concatenate dataframes
     df_new = pd.concat(frames, sort=False)
```

```
[29] df_new
```

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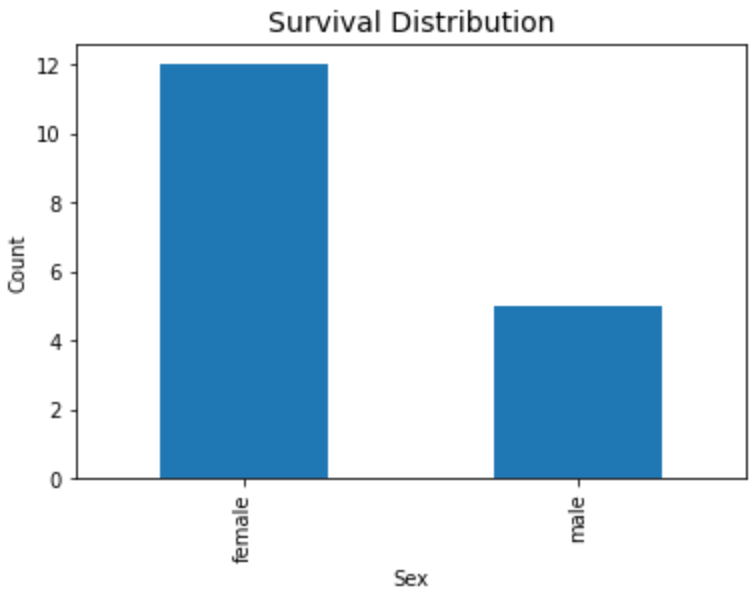
11	12	1	1	Bonnell, Miss. Elizabeth	female	58.0	0	0	113783	26.5500	C103	S	C
195	196	1	1	Lurette, Miss. Elise	female	58.0	0	0	PC 17569	146.5208	B80	C	B
268	269	1	1	Graham, Mrs. William Thompson (Edith Junkins)	female	58.0	0	1	PC 17582	153.4625	C125	S	C
275	276	1	1	Andrews, Miss. Kornelia Theodosia	female	63.0	1	0	13502	77.9583	D7	S	D
299	300	1	1	Baxter, Mrs. James (Helene DeLaudeniere Chaput)	female	50.0	0	1	PC 17558	247.5208	B58 B60	C	B
366	367	1	1	Warren, Mrs. Frank Manley (Anna Sophia Atkinson)	female	60.0	1	0	110813	75.2500	D37	C	D
496	497	1	1	Eustis, Miss. Elizabeth Mussey	female	54.0	1	0	36947	78.2667	D20	C	D
571	572	1	1	Appleton, Mrs. Edward Dale (Charlotte Lamson)	female	53.0	2	0	11769	51.4792	C101	S	C
591	592	1	1	Stephenson, Mrs. Walter Bertram (Martha Eustis)	female	52.0	1	0	36947	78.2667	D20	C	D
765	766	1	1	Hogeboom, Mrs. John C (Anna Andrews)	female	51.0	1	0	13502	77.9583	D11	S	D
820	821	1	1	Hays, Mrs. Charles Melville (Clara Jennings Gr...	female	52.0	1	1	12749	93.5000	B69	S	B
879	880	1	1	Potter, Mrs. Thomas Jr (Lily Alexenia Wilson)	female	56.0	0	1	11767	83.1583	C50	C	C



Conclusion: From this case study on titanic we can conclude that there were 5 men and 12 female passengers of age of above 50 with a known cabin who survived the titanic sink.