Amazon Best Selling Books analysis with python

April 3, 2021

[85]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline

import string
import re
```

[86]:
```
df= pd.read_csv('bestsellers with categories.csv')
```

[87]:
```
df.head()
```

[87]:
```
                                                Name  \
0                      10-Day Green Smoothie Cleanse
1                                  11/22/63: A Novel
2            12 Rules for Life: An Antidote to Chaos
3                             1984 (Signet Classics)
4  5,000 Awesome Facts (About Everything!) (Natio…

                     Author  User Rating  Reviews  Price  Year        Genre
0                  JJ Smith          4.7    17350      8  2016  Non Fiction
1              Stephen King          4.6     2052     22  2011      Fiction
2        Jordan B. Peterson          4.7    18979     15  2018  Non Fiction
3             George Orwell          4.7    21424      6  2017      Fiction
4  National Geographic Kids          4.8     7665     12  2019  Non Fiction
```

[88]:
```
df.shape
```

[88]:
```
(550, 7)
```

1 Data Preparation:

Now the next step is to prepare the data, here I will rename User Rating as user_rating, and then we will fix some spellings in the data:

[89]:
```
df.rename(columns={'User Rating': 'User_Rating'},inplace=True)
```

```
[90]: df[df.Author == 'J. K. Rowling']
```

```
[90]:
                                                  Name          Author  \
155  Harry Potter and the Goblet of Fire: The Illus…  J. K. Rowling
159         Harry Potter Paperback Box Set (Books 1-7)  J. K. Rowling

     User_Rating  Reviews  Price  Year    Genre
155          4.9     7758     18  2019  Fiction
159          4.8    13471     52  2016  Fiction
```

```
[91]: df.loc[df.Author == 'J. K. Rowling', 'Author'] = 'J.K. Rowling'
```

```
[92]: df['Name']
```

```
[92]: 0                           10-Day Green Smoothie Cleanse
      1                                       11/22/63: A Novel
      2                 12 Rules for Life: An Antidote to Chaos
      3                                  1984 (Signet Classics)
      4       5,000 Awesome Facts (About Everything!) (Natio…
                                    …
      545         Wrecking Ball (Diary of a Wimpy Kid Book 14)
      546     You Are a Badass: How to Stop Doubting Your Gr…
      547     You Are a Badass: How to Stop Doubting Your Gr…
      548     You Are a Badass: How to Stop Doubting Your Gr…
      549     You Are a Badass: How to Stop Doubting Your Gr…
      Name: Name, Length: 550, dtype: object
```

```
[93]: len(df['Name'].loc[0])
```

```
[93]: 29
```

```
[94]: df['name_len']=df['Name'].apply(lambda x: len(x)- x.count(' '))    #subtract␣
       ↪whitespces
      df['name_len']
```

```
[94]: 0      26
      1      15
      2      32
      3      20
      4      59
             ..
      545    36
      546    71
      547    71
      548    71
      549    71
      Name: name_len, Length: 550, dtype: int64
```

[95]:
```
punctuations= string.punctuation
print('list of punctuations : ', punctuations)
```

```
list of punctuations :  !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~
```

[96]:
```
# percentage of punctuations
def count_punc(text):
    """This function counts the number of punctuations in a text"""
    count = sum(1 for char in text if char in punctuations)
    return round(count/(len(text) - text.count(" "))*100, 3)
```

[97]:
```
df['punc%']=df['Name'].apply(lambda x: count_punc(x))
df['punc%']
```

[97]:
```
0       3.846
1      20.000
2       3.125
3      10.000
4      10.169
        …
545     5.556
546     1.408
547     1.408
548     1.408
549     1.408
Name: punc%, Length: 550, dtype: float64
```

[98]:
```
no_dup =df.drop_duplicates('Name')
no_dup
```

[98]:
```
                                                  Name  \
0                        10-Day Green Smoothie Cleanse
1                                    11/22/63: A Novel
2              12 Rules for Life: An Antidote to Chaos
3                               1984 (Signet Classics)
4    5,000 Awesome Facts (About Everything!) (Natio…
..                                                 …
538  Winter of the World: Book Two of the Century T…
539  Women Food and God: An Unexpected Path to Almo…
540                                             Wonder
545       Wrecking Ball (Diary of a Wimpy Kid Book 14)
546  You Are a Badass: How to Stop Doubting Your Gr…

                       Author  User_Rating  Reviews  Price  Year        Genre  \
0                    JJ Smith          4.7    17350      8  2016  Non Fiction
1                Stephen King          4.6     2052     22  2011      Fiction
2          Jordan B. Peterson          4.7    18979     15  2018  Non Fiction
3               George Orwell          4.7    21424      6  2017      Fiction
```

```
4    National Geographic Kids          4.8     7665     12  2019  Non Fiction
..                          …          …      …      …    …         …
538                 Ken Follett         4.5    10760     15  2012      Fiction
539                 Geneen Roth         4.2     1302     11  2010  Non Fiction
540               R. J. Palacio         4.8    21625      9  2013      Fiction
545                 Jeff Kinney         4.9     9413      8  2019      Fiction
546                 Jen Sincero         4.7    14331      8  2016  Non Fiction

     name_len   punc%
0          26   3.846
1          15  20.000
2          32   3.125
3          20  10.000
4          59  10.169
..        …      …
538        43   2.326
539        50   2.000
540         6   0.000
545        36   5.556
546        71   1.408

[351 rows x 9 columns]
```

[99]:

```python
g_count =no_dup['Genre'].value_counts()
g_count.head()
```

[99]:

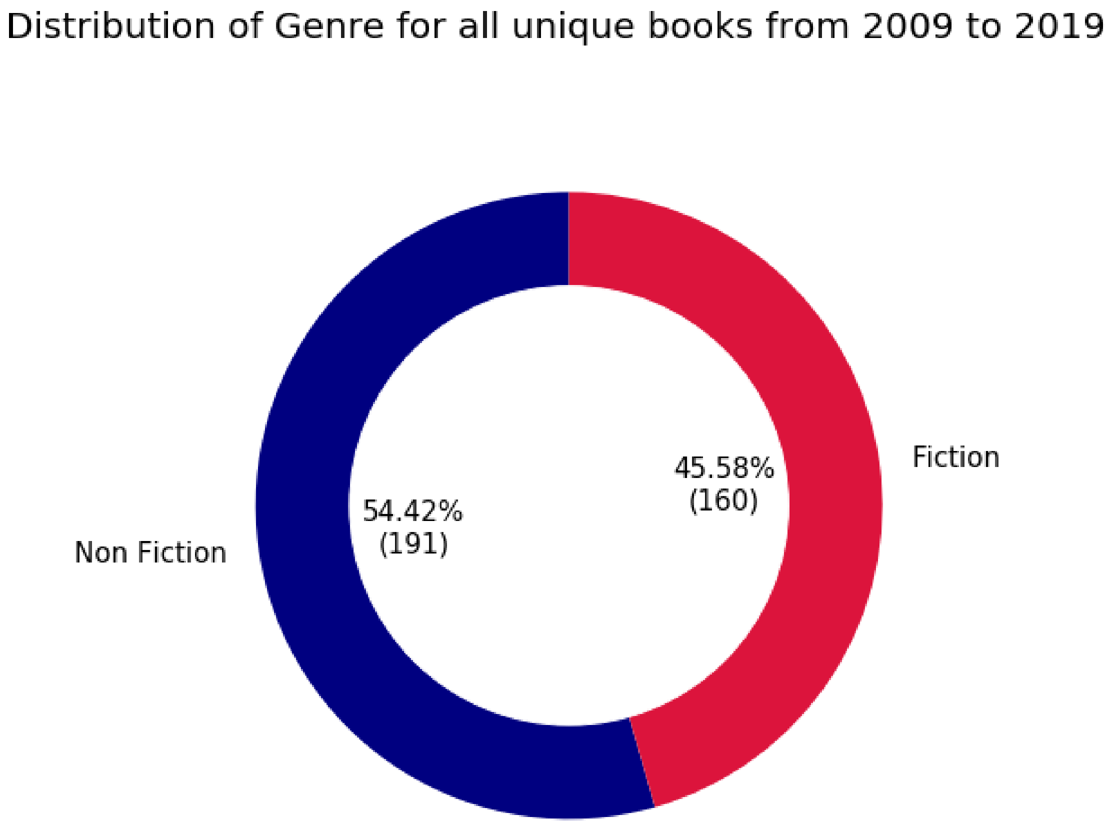
```
Non Fiction    191
Fiction        160
Name: Genre, dtype: int64
```

[100]:

```python
fig, ax =plt.subplots(figsize=(8,8))

def make_autopct(values):
    def my_autopct(pct):
        total = sum(values)
        val = int(round(pct*total/100.0))
        return '{p:.2f}%\n({v:d})'.format(p=pct,v=val)
    return my_autopct

genre_col = ['navy','crimson']


center_circle = plt.Circle((0,0),0.7,color='white')
plt.pie(x=g_count.values, labels=g_count.index, autopct=make_autopct(g_count.
 ↪values),
          startangle=90, textprops={'size': 15}, pctdistance=0.5,␣
 ↪colors=genre_col)
```

```
ax.add_artist(center_circle)

fig.suptitle('Distribution of Genre for all unique books from 2009 to 2019',␣
 ↪fontsize=20)
fig.show()
```

```
C:\Users\admin\anaconda3\lib\site-packages\ipykernel_launcher.py:20:
UserWarning: Matplotlib is currently using
module://ipykernel.pylab.backend_inline, which is a non-GUI backend, so cannot
show the figure.
```



#In the data set, Genre is a categorical dummy variable; Fiction and non-fiction. Non-fiction was a more popular category than fiction, each year from 2009 to 2019. Of the 351 unique books, 54.4% were non-fiction and 45.6% were fiction.

```
[101]: #Now, lets visualize the above insights according to each year
```

[102]:

```
y1=np.arange(2009,2014)
y2=np.arange(2014,2020)
```

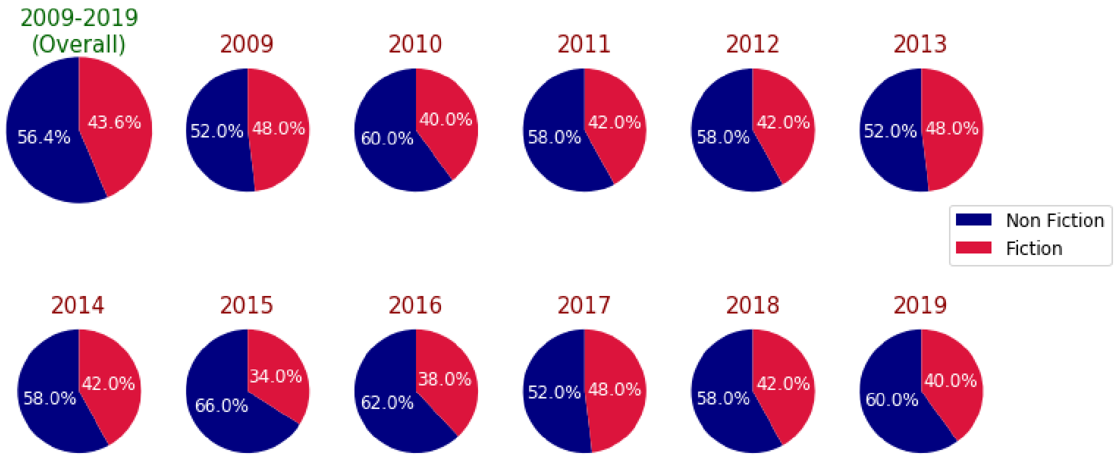
[103]:

```
g_count= df['Genre'].value_counts()
```

[104]:

```
fig,ax = plt.subplots(2,6,figsize=(12,6))
ax[0,0].pie(x=g_count.values, labels=None, autopct='%1.1f%%',startangle=90,␣
 ↪textprops={'size': 12, 'color': 'white'},pctdistance=0.5, radius=1.3,␣
 ↪colors=genre_col)
ax[0,0].set_title('2009-2019\n(Overall)',color='darkgreen',fontdict={'fontsize':
 ↪15})

for i, year in enumerate(y1):
    counts = df[df['Year'] == year]['Genre'].value_counts()
    ax[0,i+1].set_title(year, color='darkred', fontdict={'fontsize': 15})
    ax[0,i+1].pie(x=counts.values, labels=None, autopct='%1.1f%%',
                  startangle=90, textprops={'size': 12,'color': 'white'},
                  pctdistance=0.5, colors=genre_col, radius=1.1)

for i, year in enumerate(y2):
    counts = df[df['Year'] == year]['Genre'].value_counts()
    ax[1,i].pie(x=counts.values, labels=None, autopct='%1.1f%%',
                startangle=90, textprops={'size': 12,'color': 'white'},
                pctdistance=0.5, colors=genre_col, radius=1.1)
    ax[1,i].set_title(year, color='darkred', fontdict={'fontsize': 15})

#plt.suptitle('Distribution of Fiction and Non-Fiction books for every year␣
 ↪from 2009 to 2019',
             #fontsize=25)
fig.legend(g_count.index, loc='center right', fontsize=12)
fig.show()
```

```
C:\Users\admin\anaconda3\lib\site-packages\ipykernel_launcher.py:22:
UserWarning: Matplotlib is currently using
module://ipykernel.pylab.backend_inline, which is a non-GUI backend, so cannot
show the figure.
```

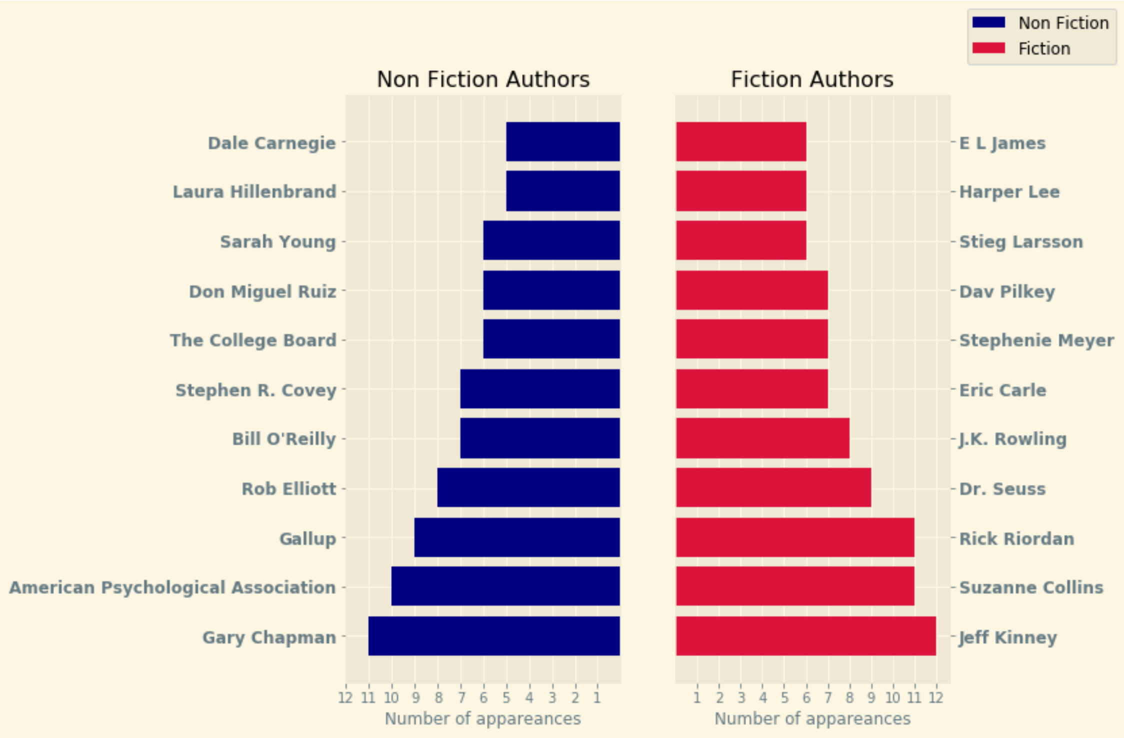


The highest fraction (66%) of non-fiction books were sold in 2015 and the lowest for fiction books. For fiction books, the highest fraction (48%) of books were sold in 2009, 2013 and 2017, and the lowest for non-fiction books.

The bestselling authors are selected based on their appearances in the top 50 bestselling books each year, from 2009 to 2019. Now let's look at the top 10 bestselling authors of both fiction and non-fiction categories:

[105]:
```
best_nf_authors= df.groupby(['Author','Genre']).agg({'Name': 'count'}).
 ↪unstack()['Name','Non Fiction'].sort_values(ascending=False)[:11]
best_f_authors=df.groupby(['Author','Genre']).agg({'Name': 'count'}).
 ↪unstack()['Name','Fiction'].sort_values(ascending=False)[:11]
```

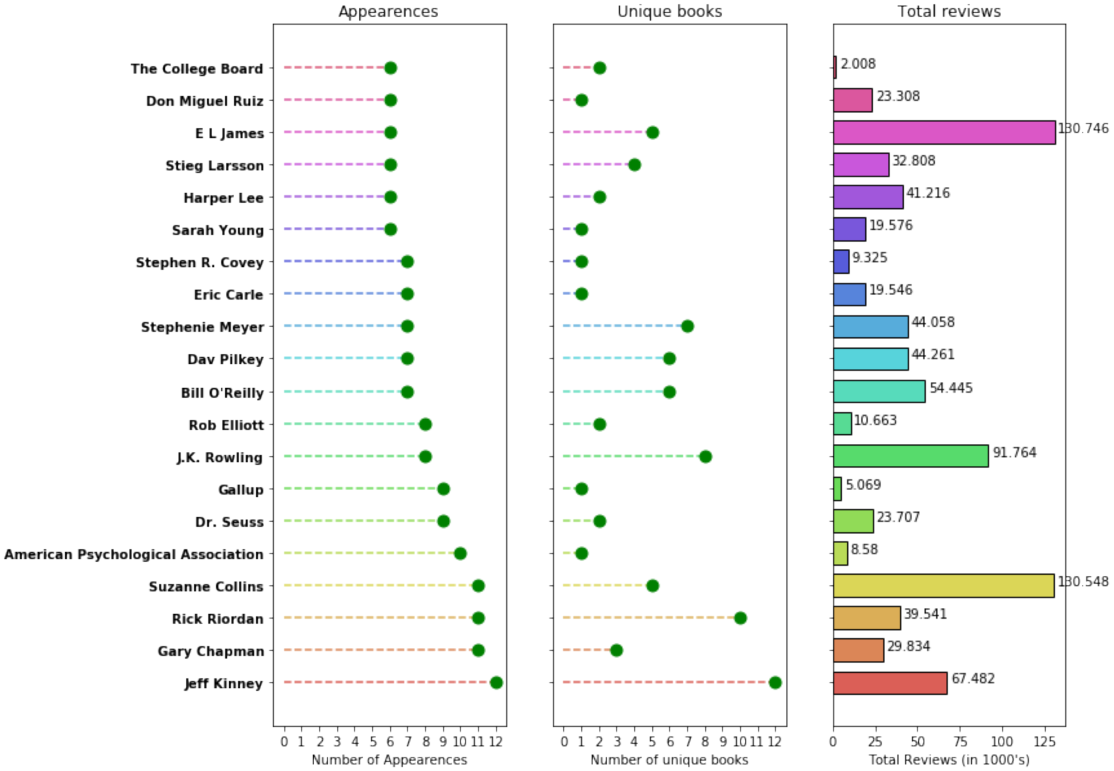
[106]:
```
with plt.style.context('Solarize_Light2'):
    fig,ax =plt.subplots(1,2,figsize=(8,8))
    ax[0].barh(y=best_nf_authors.index,width=best_nf_authors.
 ↪values,color=genre_col[0])
    ax[0].invert_xaxis()
    ax[0].yaxis.tick_left()
    ax[0].set_xticks(np.arange(max(best_f_authors.values))+1)
    ax[0].set_xlabel('Number of appearances')
    ax[0].set_yticklabels(best_nf_authors.
 ↪index,fontsize=12,fontweight='semibold')
    ax[0].set_title('Non Fiction Authors')

    ax[1].barh(y=best_f_authors.index,width=best_f_authors.
 ↪values,color=genre_col[1])
    ax[1].yaxis.tick_right()
    ax[1].set_xticks(np.arange(max(best_f_authors.values))+1)
    ax[1].set_xlabel('Number of appearances')
    ax[1].set_yticklabels(best_f_authors.
↪index,fontsize=12,fontweight='semibold')
    ax[1].set_title('Fiction Authors')

    fig.legend(['Non Fiction','Fiction'],fontsize=12)
plt.show()
```



Top-selling authors are selected based on their appearances in the top 50 best-selling books each year. The number of appearances includes duplicate book names. Their unique posts and overall reviews are featured below:

[110]:
```
n_best=20

top_authors=df['Author'].value_counts().nlargest(n_best)
no_dup=df.drop_duplicates('Name') # Remove all rows with duplicate names

fig,ax = plt.subplots(1,3,figsize=(11,10),sharey=True)

color= sns.color_palette("hls",n_best)

ax[0].hlines(y=top_authors.index,xmin=0,xmax=top_authors.
↪values,color=color,linestyles='dashed')
ax[0].plot(top_authors.values,top_authors.index,'go',markersize=9)
ax[0].set_xlabel('Number of Appearences')
```

```
ax[0].set_xticks(np.arange(top_authors.values.max()+1))
ax[0].set_yticklabels(top_authors.index,fontweight='semibold')
ax[0].set_title('Appearences')


book_count=[]
total_reviews=[]

for name,col in zip(top_authors.index,color):
    book_count.append(len(no_dup[no_dup.Author == name]['Name']))
    total_reviews.append(no_dup[no_dup.Author == name]['Reviews'].sum()/1000)

ax[1].hlines(y=top_authors.index , xmin=0, xmax=book_count, color=color,␣
 ↪linestyles='dashed')
ax[1].plot(book_count, top_authors.index, 'go', markersize=9)
ax[1].set_xlabel('Number of unique books')
ax[1].set_xticks(np.arange(max(book_count)+1))
ax[1].set_title('Unique books')

ax[2].barh(y=top_authors.index, width=total_reviews, color=color,␣
 ↪edgecolor='black', height=0.7)
for name, val in zip(top_authors.index, total_reviews):
    ax[2].text(val+2, name, val)
ax[2].set_xlabel("Total Reviews (in 1000's)")
ax[2].set_title('Total reviews')

plt.show()
```



2 Observation:

Author Jeff Kinney is the best-selling author with 12 appearances in best-selling books from 2009 to 2019.

```
[ ]:
```