This is the First part of my journey to become a data scientist to achieve that let's start exploring data set of good reads books dataset and this is obtained from kaggle link

https://www.kaggle.com/jealousleopard/goodreadsbooks/downloads/goodreadsbooks.zip/6
(https://www.kaggle.com/jealousleopard/goodreadsbooks/downloads/goodreadsbooks.zip/6)

Exploratory Data Analysis

- Exploratory Data Analysis is a task of analysing data using basics of mathematics and statistics
- Univariate Analysis ---->histograms,pdf,cdf
- bi variate analysis ---->Scatter plots and pair plots No of pair plots formed if we have n features is
- nC2 Height of histogram gives how often we will find the value on x-axis ,More frequent we estimate more chance it belongs to that class PDF is smoothed version of histogram d(cdf)/dx = pdf
- Mean is prone to outliers.
- Median ---> central value & not prone to outliers.
- Median gets corrupted if more than 50% of our data is corrupted. Now a days,percentiles are more used than std-dev
- IQR = (75-25)%les
- IQR ---> proxy for std & no affect of outliers.
- BOXPLOTS--->Whiskers
- seaborn(1.5*IQR)
- General-->min,max
- VIOLINPLOTS--->BOXPLOTS+histogram

In [9]:
```
data = pd.read_csv("/content/drive/My Drive/Data_Scientist/EDA/books.csv",error_bad_lines=F
data.head()
```

```
b'Skipping line 4012: expected 10 fields, saw 11\nSkipping line 5688: expected 10 field
s, saw 11\nSkipping line 7056: expected 10 fields, saw 11\nSkipping line 10601: expected
10 fields, saw 11\nSkipping line 10668: expected 10 fields, saw 11\n'
```

Out[9]:

	bookID	title	authors	average_rating	isbn	isbn13	language_code	# num_pages	ratings_count
0	1	Harry Potter and the Half-Blood Prince (Harry ...	J.K. Rowling-Mary GrandPré	4.56	0439785960	9780439785969	eng	652	1944099
1	2	Harry Potter and the Order of the Phoenix (Har	J.K. Rowling-Mary GrandPré	4.49	0439358078	9780439358071	eng	870	1996446

In [11]:
```
print(data.shape)
```

```
(13714, 10)
```

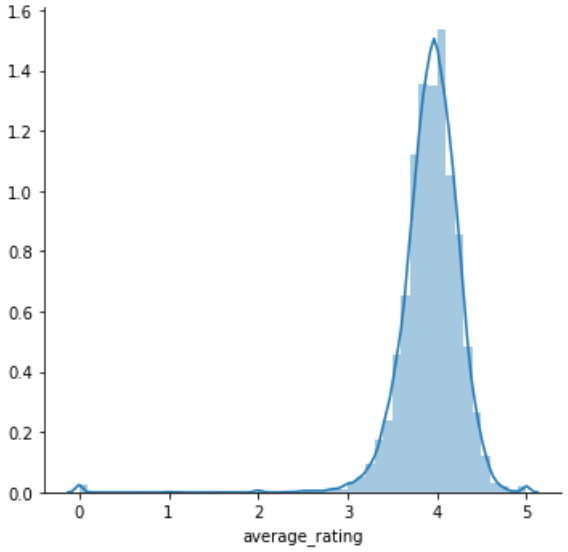
It is a dataset containing 13714 records with 10 features

In [26]:
```
data.describe()
```

Out[26]:

	bookID	average_rating	isbn13	# num_pages	ratings_count	text_reviews_count
count	13714.000000	13714.000000	1.371400e+04	13714.000000	1.371400e+04	13714.000000
mean	22159.859195	3.930620	9.764017e+12	342.402727	1.776540e+04	533.632128
std	13700.926816	0.357893	3.987679e+11	252.650165	1.129572e+05	2529.006691
min	1.000000	0.000000	8.987060e+09	0.000000	0.000000e+00	0.000000
25%	10619.250000	3.770000	9.780345e+12	196.000000	8.300000e+01	7.000000
50%	21321.500000	3.960000	9.780613e+12	301.000000	6.305000e+02	40.000000
75%	33311.750000	4.130000	9.780940e+12	421.000000	4.742250e+03	222.000000
max	47709.000000	5.000000	9.790008e+12	6576.000000	5.629932e+06	93619.000000

In [16]:
```
sns.FacetGrid(data,size=5)\
.map(sns.distplot,"average_rating")\
.add_legend();
plt.show();
```

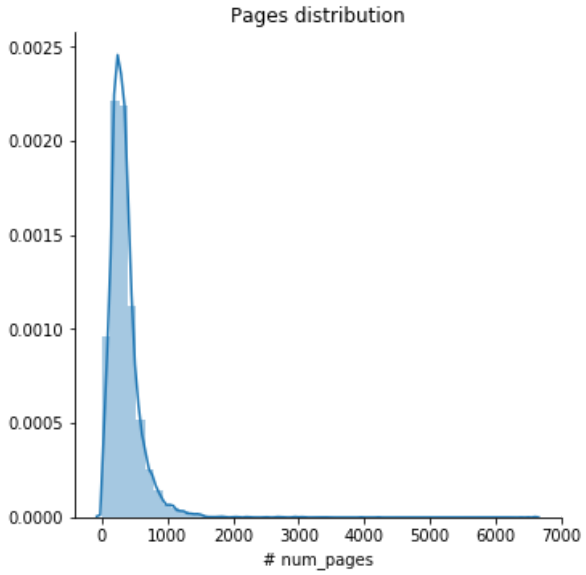


The most of the average rating presents between 3 - 5

In [20]:
```
data.columns
```

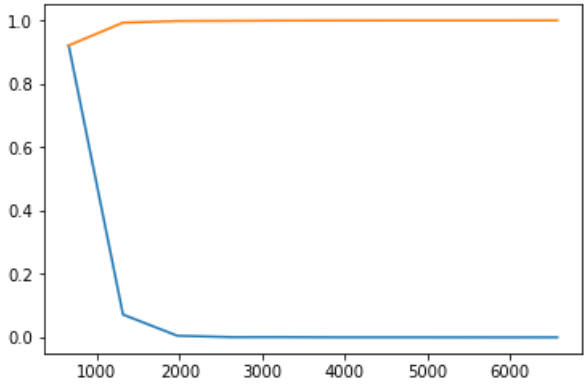
Out[20]:
```
Index(['bookID', 'title', 'authors', 'average_rating', 'isbn', 'isbn13',
       'language_code', '# num_pages', 'ratings_count', 'text_reviews_count'],
      dtype='object')
```

In [24]:
```
sns.FacetGrid(data,size=5)\
.map(sns.distplot,"# num_pages")\
.add_legend();
plt.title("Pages distribution");
plt.show();
```



In [87]:
```
counts,bin_edges =  np.histogram(data['# num_pages'],bins=10,density=True)
pdf = counts/(sum(counts))
cdf = np.cumsum(pdf)
plt.plot(bin_edges[1:],pdf)
plt.plot(bin_edges[1:],cdf)
plt.show();
```

```
[9.21175441e-01 7.18973312e-02 5.10427301e-03 6.56263672e-04
 7.29181858e-04 1.45836372e-04 1.45836372e-04 7.29181858e-05
 0.00000000e+00 7.29181858e-05]
[   0.   657.6 1315.2 1972.8 2630.4 3288.  3945.6 4603.2 5260.8 5918.4
 6576. ]
```

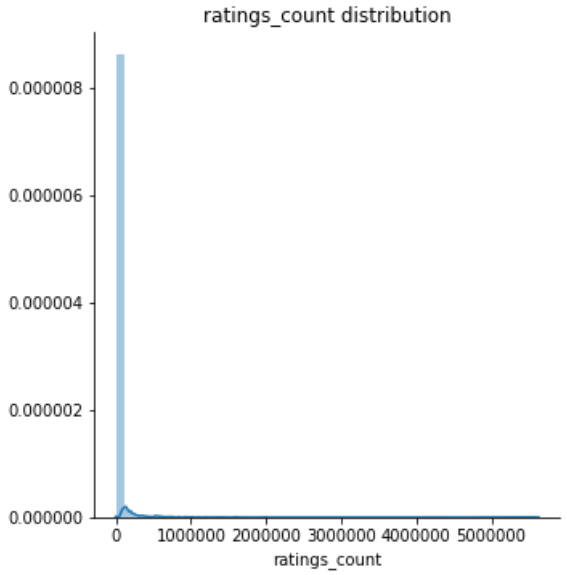


In [91]:
```
num_pages_list = list(data['# num_pages'])
num_pages_list.sort()
print("99 th percentile value is",np.percentile(data['# num_pages'],99))
```

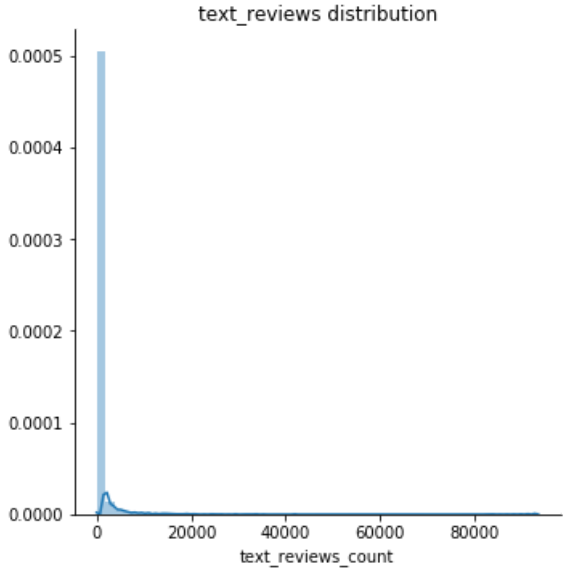
```
99 th percentile value is 1200.0
```

1% of the books are more than 1200 pages

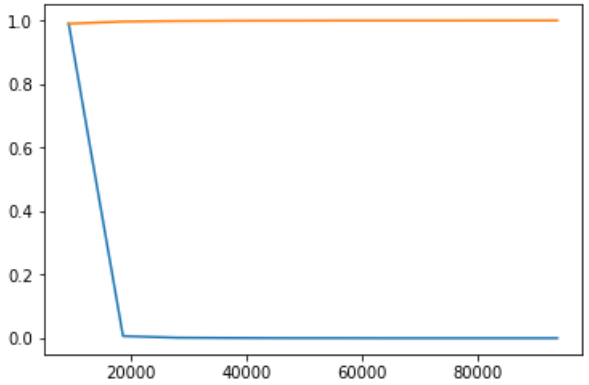
In [31]:
```
sns.FacetGrid(data,size=5)\
.map(sns.distplot,"ratings_count")\
.add_legend();
plt.title("ratings_count distribution");
plt.show();
```



In [29]:
```
sns.FacetGrid(data,size=5)\
.map(sns.distplot,"text_reviews_count")\
.add_legend();
plt.title("text_reviews distribution");
plt.show();
```



In [92]:
```
counts,bin_edges =  np.histogram(data['text_reviews_count'],bins=10,density=True)
pdf = counts/(sum(counts))
cdf = np.cumsum(pdf)
plt.plot(bin_edges[1:],pdf)
plt.plot(bin_edges[1:],cdf)
plt.show();
```



In [97]:
```
num_pages_list = list(data['text_reviews_count'])
num_pages_list.sort()
print("99.5 th percentile value is",np.percentile(data['text_reviews_count'],99.5))
```

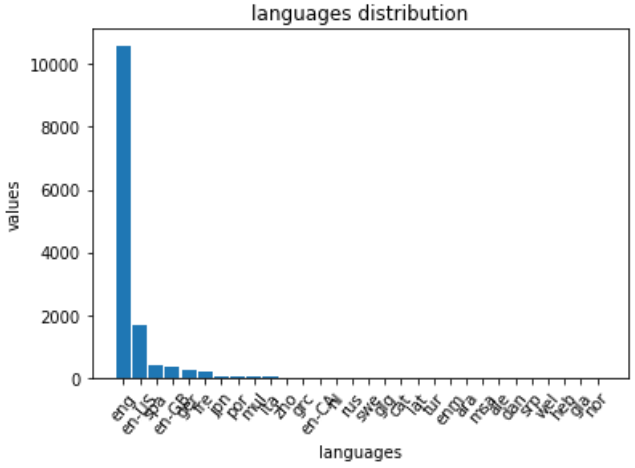
```
99.5 th percentile value is 14443.609999999997
```

0.5 percentile of the text_reviews_count is greater than 15000

In [42]:
```
lang_list = data['language_code'].value_counts()
lang_list_index = list(lang_list.index)
lang_lis_values = []
for i in lang_list :
  lang_lis_values.append(i)
print(lang_list_index)
print(lang_lis_values)
```

```
['eng', 'en-US', 'spa', 'en-GB', 'ger', 'fre', 'jpn', 'por', 'mul', 'ita', 'zho', 'grc',
'en-CA', 'nl', 'rus', 'swe', 'glg', 'cat', 'lat', 'tur', 'enm', 'ara', 'msa', 'ale', 'da
n', 'srp', 'wel', 'heb', 'gla', 'nor']
[10594, 1699, 419, 341, 238, 209, 64, 27, 21, 19, 16, 12, 9, 7, 7, 6, 4, 3, 3, 3, 3, 2, 1,
1, 1, 1, 1, 1, 1, 1]
```

In [65]:
```
plt.bar(lang_list_index,lang_lis_values,width=0.9)
plt.xlabel('values', fontsize=10)
plt.ylabel('languages', fontsize=10)
plt.xticks(lang_list_index, fontsize=10, rotation=50)
plt.title("languages distribution");
plt.show();
```

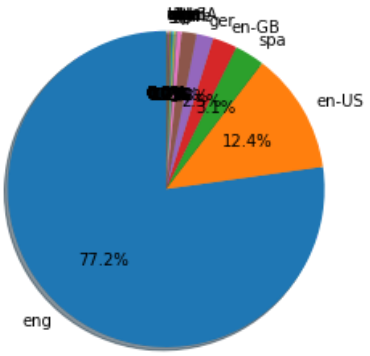


In [86]:
```
# pie plot : https://pythonspot.com/matplotlib-pie-chart/

import matplotlib.pyplot as plt

# Plot
plt.pie(lang_lis_values, labels=lang_list_index,
autopct='%0.1f%%', shadow=True, startangle=90)

plt.axis('equal')
plt.show()
```



77.2% of the books are english language based

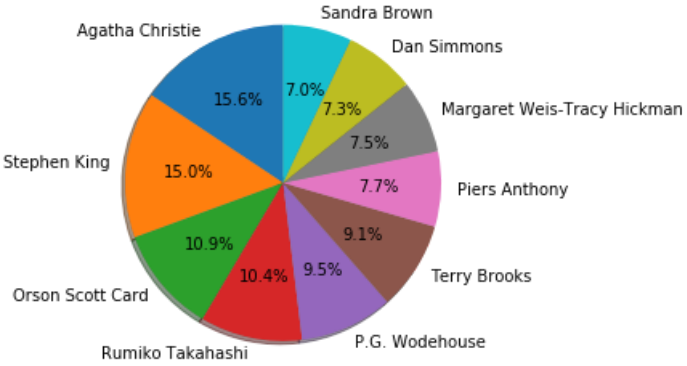
In [0]:
```
authors_list = data['authors'].value_counts()
authors_list = authors_list[:10]
authors_list_index = list(authors_list.index)
authors_lis_values = []
for i in authors_list :
  authors_lis_values.append(i)
```

In [107]:
```
# pie plot : https://pythonspot.com/matplotlib-pie-chart/

import matplotlib.pyplot as plt

# Plot
plt.pie(authors_lis_values, labels=authors_list_index,
autopct='%0.1f%%', shadow=True, startangle=90)

plt.axis('equal')
plt.show()
```



The above picture gives us the top 10 authors of the given data set

In [115]:
```
!pip install tqdm
```

```
Requirement already satisfied: tqdm in /usr/local/lib/python3.6/dist-packages (4.28.1)
```

In [0]:
```
from tqdm import tqdm
```

In [0]:
```
# https://stackoverflow.com/a/47091490/4084039
import re

def decontracted(phrase):
    # specific
    phrase = re.sub(r"won't", "will not", phrase)
    phrase = re.sub(r"can\'t", "can not", phrase)

    # general
    phrase = re.sub(r"n\'t", " not", phrase)
    phrase = re.sub(r"\'re", " are", phrase)
    phrase = re.sub(r"\'s", " is", phrase)
    phrase = re.sub(r"\'d", " would", phrase)
    phrase = re.sub(r"\'ll", " will", phrase)
    phrase = re.sub(r"\'t", " not", phrase)
    phrase = re.sub(r"\'ve", " have", phrase)
    phrase = re.sub(r"\'m", " am", phrase)
    return phrase
```

In [122]:
```
preprocessed_text_values = []

for sentence in tqdm(data['title'].values) :
  term = decontracted(sentence)
  term = term.replace(")","")
  term = term.replace("(","")
  term = term.replace("&","_")
  term = term.replace("#","")
  preprocessed_text_values.append(term.lower().strip())
```

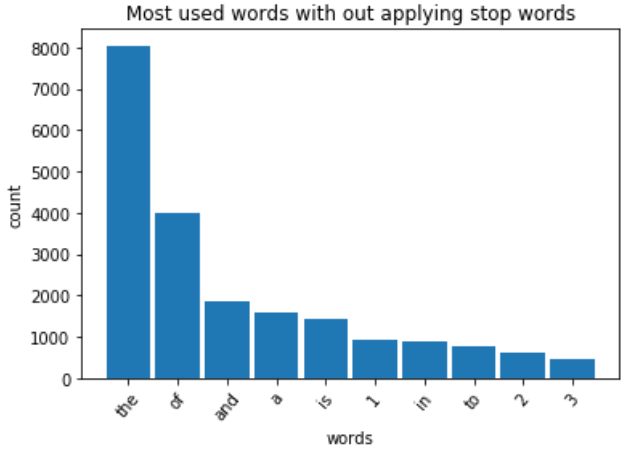
```
100%|██████████| 13714/13714 [00:00<00:00, 73761.77it/s]
```

In [0]:
```
from collections import Counter
my_counter = Counter()
for word in preprocessed_text_values:
    my_counter.update(word.split())
```

In [0]:
```
sorted_my_counter = sorted(my_counter.items(), key=lambda kv: kv[1],reverse=True)
```

In [0]:
```
for i in sorted_my_counter[0:10] :
  words.append(i[0])
  word_count.append(i[1])
```

In [149]:
```
plt.bar(words[0:10],word_count[0:10],width=0.9)
plt.xlabel('words', fontsize=10)
plt.ylabel('count', fontsize=10)
plt.xticks(words[0:10], fontsize=10, rotation=50)
plt.title("Most used words with out applying stop words");
plt.show();
```

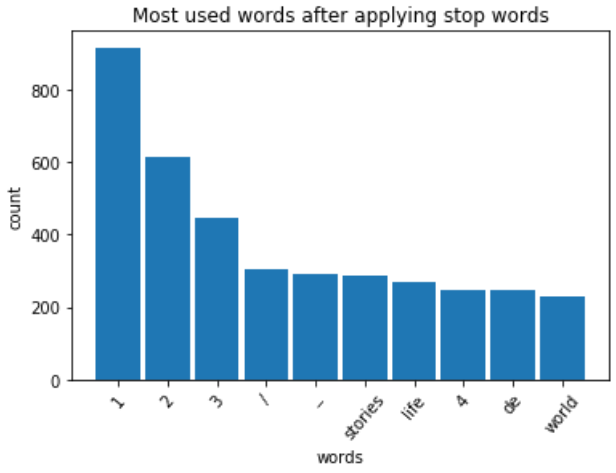


In [0]:
```
# https://gist.github.com/sebleier/554280
# we are removing the words from the stop words list: 'no', 'nor', 'not'
stopwords= ['i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "you're", "
            "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves', 'he', 'him', 'his
            'she', "she's", 'her', 'hers', 'herself', 'it', "it's", 'its', 'itself', 'they'
            'theirs', 'themselves', 'what', 'which', 'who', 'whom', 'this', 'that', "that'l
            'am', 'is', 'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had',
            'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or', 'because', 'as', 'u
            'at', 'by', 'for', 'with', 'about', 'against', 'between', 'into', 'through', 'd
            'above', 'below', 'to', 'from', 'up', 'down', 'in', 'out', 'on', 'off', 'over',
            'then', 'once', 'here', 'there', 'when', 'where', 'why', 'how', 'all', 'any', '
            'most', 'other', 'some', 'such', 'only', 'own', 'same', 'so', 'than', 'too', 'v
            's', 't', 'can', 'will', 'just', 'don', "don't", 'should', "should've", 'now',
            've', 'y', 'ain', 'aren', "aren't", 'couldn', "couldn't", 'didn', "didn't", 'do
            "hadn't", 'hasn', "hasn't", 'haven', "haven't", 'isn', "isn't", 'ma', 'mightn',
            "mustn't", 'needn', "needn't", 'shan', "shan't", 'shouldn', "shouldn't", 'wasn'
            'won', "won't", 'wouldn', "wouldn't"]
```

In [0]:
```
required_counter_list = []
for i in sorted_my_counter  :
  if i[0] not in stopwords :
    required_counter_list.append(i)
```

In [0]:
```
words = []
word_count = []
for i in required_counter_list[0:10] :
  words.append(i[0])
  word_count.append(i[1])
```

In [162]:
```
plt.bar(words[0:10],word_count[0:10],width=0.9)
plt.xlabel('words', fontsize=10)
plt.ylabel('count', fontsize=10)
plt.xticks(words[0:10], fontsize=10, rotation=50)
plt.title("Most used words after applying stop words");
plt.show();
```



Continue: ***This is the EDA part and we need to do data preprocessing and data cleaning and machine learning models a lot more to go so let's keep learning***