

```

import numpy as np
import pandas as pd
import nltk
from nltk.sentiment.vader import SentimentIntensityAnalyzer
import re
from textblob import TextBlob
from wordcloud import WordCloud
import seaborn as sns
import matplotlib.pyplot as plt
import cufflinks as cf
from plotly.offline import init_notebook_mode, iplot
import plotly.graph_objs as go
from plotly.subplots import make_subplots
import warnings
from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer

```

```

warnings.filterwarnings("ignore")
warnings.warn("this will not show")

```

```

pd.set_option('display.max_columns', None)

```

```

%matplotlib inline
init_notebook_mode(connected=True)
cf.go_offline()

```

```

def missing_values_analysis(df):
    missing_values = df.isnull().sum()
    missing_values_percentage = (missing_values / len(df)) * 100
    missing_df = pd.DataFrame({
        'Missing Values': missing_values,
        'Percentage': missing_values_percentage
    })
    return missing_df

```

```

df = pd.read_csv("amazon.csv")
df.head()

```

```

def check_dataframe(df, head=5, tail=5):
    print("SHAPE".center(82, '~'))
    print('Rows: {}'.format(df.shape[0]))
    print('Columns: {}'.format(df.shape[1]))
    print("TYPES".center(82, '~'))
    print(df.dtypes)
    print("").center(82, '~')
    print(missing_values_analysis(df))
    print('DUPLICATED VALUES'.center(83, '~'))
    print(df.duplicated().sum())
    print("QUANTILES".center(82, '~'))

```

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numeric_columns = df.select_dtypes(include=[np.number]).columns

```

```

quantiles = [0, 0.05, 0.50, 0.95, 0.99, 1]
numeric_quantiles = df[numeric_columns].quantile(quantiles).T
print(numeric_quantiles)

def check_class(dataframe):
    nunique_df = pd.DataFrame({'Variable': dataframe.columns,
                              'classes': [dataframe[i].nunique() \
                                           for i in
dataframe.columns]})
    nunique_df = nunique_df.sort_values('classes', ascending=False)
    nunique_df = nunique_df.reset_index(drop=True)
    return nunique_df

def categorical_variable_summary(df, column_name):
    constraints = ['#B34D22', '#EBE0C0', '#1FEB0C', '#0C92EB',
'#EAC2D5']

    fig = make_subplots(rows=1, cols=2, subplot_titles=('Countplot',
'Percentage'), specs=[[{'type': 'xy'}, {'type': 'domain'}]])

    fig.add_trace(
        go.Bar(
            y=df[column_name].value_counts().values.tolist(),
            x=[str(i) for i in df[column_name].value_counts().index],
            text=df[column_name].value_counts().values.tolist(),
            textfont=dict(size=14),
            name=column_name,
            textposition='auto',
            showlegend=False,

marker=dict(color=constraints[:len(df[column_name].value_counts().inde
x)], line=dict(color='#DBE6EC', width=1))),
            row=1, col=1
        )

    fig.add_trace(
        go.Pie(
            labels=df[column_name].value_counts().keys(),
            values=df[column_name].value_counts().values.tolist(),
            textinfo='label+percent',
            textfont=dict(size=14),
            showlegend=False,

marker=dict(colors=constraints[:len(df[column_name].value_counts().ind
ex)], line=dict(color='#DBE6EC', width=1))),
            row=1, col=2
        )

    fig.update_layout(

```

```

        title={'text': column_name, 'y': 0.9, 'x': 0.5, 'xanchor':
'center'},
        template='plotly_white'
    )

    iplot(fig)

check_dataframe(df)
check_class(df)
categorical_variable_summary(df, 'overall')

review_example = df.reviewText[2031]
review_example = re.sub("[^a-zA-Z]", '', review_example)
df["reviewText"] = df["reviewText"].map(lambda x: re.sub("[a-zA-Z]", '
', str(x)).lower())
df[['polarity', 'subjectivity']] = df['reviewText'].apply(lambda Text:
pd.Series(TextBlob(Text).sentiment))

df['sentiment'] = ""
for index, row in df.iterrows():
    score =
SentimentIntensityAnalyzer().polarity_scores(row['reviewText'])
    neg = score['neg']
    neu = score['neu']
    pos = score['pos']
    if neg > pos:
        df.loc[index, 'sentiment'] = "Negative"
    elif pos > neg:
        df.loc[index, 'sentiment'] = "Positive"
    else:
        df.loc[index, 'sentiment'] = "Neutral"

df[df['sentiment'] == 'Positive'].sort_values("wilson_lower_bound",
ascending=False).head(5)

categorical_variable_summary(df, 'sentiment')

~~~~~SHAPE~~~~~
~~~~~
Rows: 4915
Columns: 12
~~~~~TYPES~~~~~
~~~~~
Unnamed: 0                int64
reviewerName              object
overall                   int64
reviewText                object
reviewTime                object
day_diff                  int64
helpful_yes               int64

```

```
helpful_no          int64
total_vote          int64
score_pos_neg_diff  int64
score_average_rating float64
wilson_lower_bound  float64
dtype: object
```

```
~~~~~
Missing Values Percentage
Unnamed: 0          0    0.000000
reviewerName        1    0.020346
overall             0    0.000000
reviewText          1    0.020346
reviewTime          0    0.000000
day_diff            0    0.000000
helpful_yes         0    0.000000
helpful_no          0    0.000000
total_vote          0    0.000000
score_pos_neg_diff  0    0.000000
score_average_rating 0    0.000000
wilson_lower_bound  0    0.000000
```

```
~~~~~DUPLICATED
```

```
VALUES~~~~~
```

```
0
```

```
~~~~~QUANTILES~~~~~
```

```
~~~~~
0.00    0.05    0.50    0.95    0.99  \
Unnamed: 0    0.0  245.7  2457.0  4668.300000  4864.86000
overall       1.0   2.0    5.0    5.000000    5.00000
day_diff      1.0  98.0   431.0   748.000000   943.00000
helpful_yes    0.0   0.0    0.0    1.000000    3.00000
helpful_no     0.0   0.0    0.0    0.000000    2.00000
total_vote     0.0   0.0    0.0    1.000000    4.00000
score_pos_neg_diff -130.0  0.0   0.0    1.000000    2.00000
score_average_rating 0.0   0.0   0.0    1.000000    1.00000
wilson_lower_bound 0.0   0.0   0.0    0.206549    0.34238
```

```
1.00
Unnamed: 0    4914.000000
overall       5.000000
day_diff      1064.000000
helpful_yes    1952.000000
helpful_no     183.000000
total_vote     2020.000000
score_pos_neg_diff 1884.000000
score_average_rating 1.000000
wilson_lower_bound 0.957544
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