MALIGNANT COMMENTS CLASSIFICATION

Problem Statement

The proliferation of social media enables people to express their opinions widely online. However, at the same time, this has resulted in the emergence of conflict and hate, making online environments uninviting for users. Although researchers have found that hate is a problem across multiple platforms, there is a lack of models for online hate detection.

Online hate, described as abusive language, aggression, cyberbullying, hatefulness and many others has been identified as a major threat on online social media platforms. Social media platforms are the most prominent grounds for such toxic behaviour.

There has been a remarkable increase in the cases of cyberbullying and trolls on various social media platforms. Many celebrities and influences are facing backlashes from people and have to come across hateful and offensive comments. This can take a toll on anyone and affect them mentally leading to depression, mental illness, self-hatred and suicidal thoughts.

Data Set Description

The data set contains the training set, which has approximately 1,59,000 samples and the test set which contains nearly 1,53,000 samples. All the data samples contain 8 fields which includes ‘Id’, ‘Comments’, ‘Malignant’, ‘Highly malignant’, ‘Rude’, ‘Threat’, ‘Abuse’ and ‘Loathe’.

The label can be either 0 or 1, where 0 denotes a NO while 1 denotes a YES. There are various comments which have multiple labels. The first attribute is a unique ID associated with each comment.

The data set includes:

Malignant: It is the Label column, which includes values 0 and 1, denoting if the comment is malignant or not.

Highly Malignant: It denotes comments that are highly malignant and hurtful.

Rude: It denotes comments that are very rude and offensive.

Threat: It contains indication of the comments that are giving any threat to someone.

Abuse: It is for comments that are abusive in nature.

Loathe: It describes the comments which are hateful and loathing in nature.

ID: It includes unique Ids associated with each comment text given.

Comment text: This column contains the comments extracted from various social media platforms.

This project is more about exploration, feature engineering and classification that can be done on this data. Since the data set is huge and includes many categories of comments, we can do good amount of data exploration and derive some interesting features using the comments text column available.

You need to build a model that can differentiate between comments and its categories.

Refer to the data set file provided along with this.

Python library

The “Python library” contains several different kinds of components. It **contains data types that would normally be considered part of the “core” of a language**, such as numbers and lists. ... Some modules are written in C and built in to the Python interpreter; others are written in Python and imported in source form.

```
#import all the library file
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import sklearn
from sklearn.linear_model import LinearRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix,classification_report
from sklearn.model_selection import train_test_split
from scipy.stats import zscore
```

```
import warnings
warnings.filterwarnings('ignore')
```

Importing data from csv file

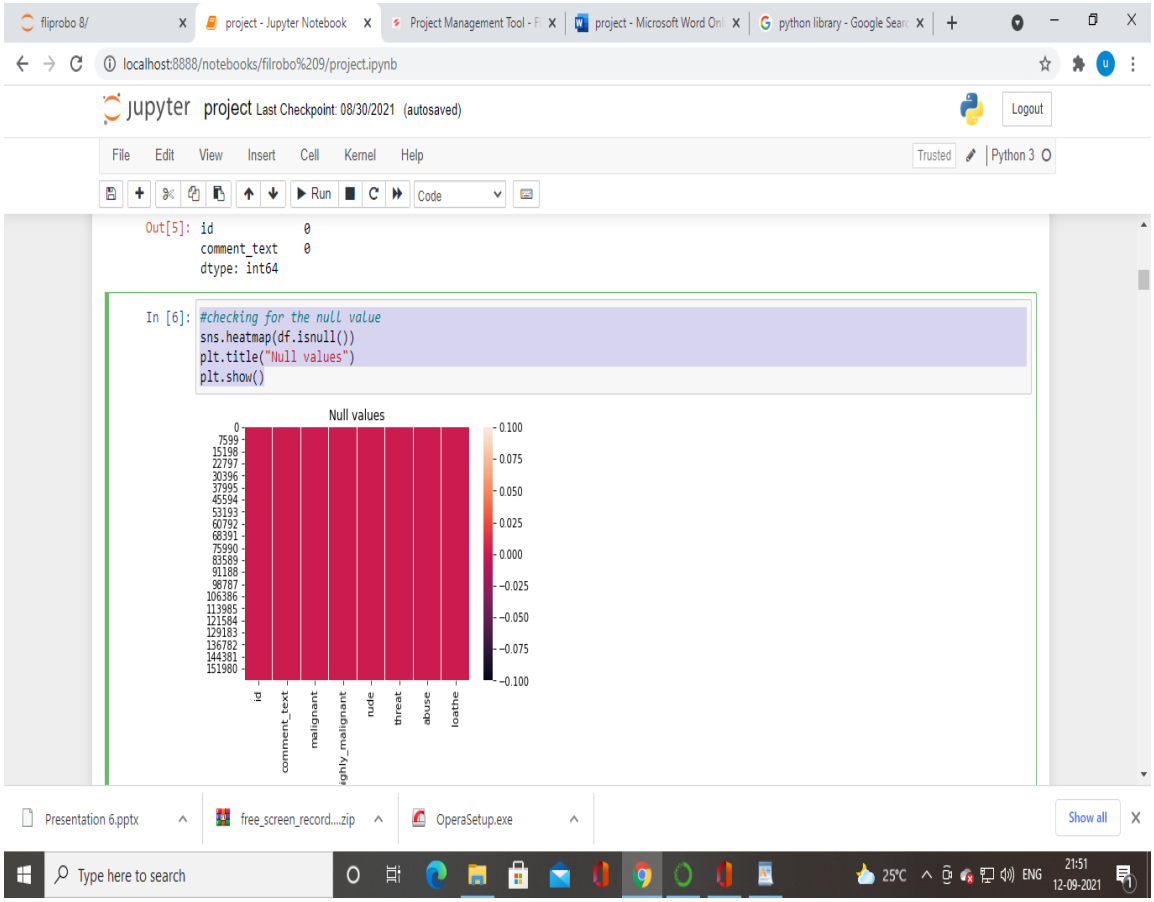
```
#getting the data from train and test
import pandas as pd
df=pd.read_csv('train.csv')
df1=pd.read_csv('test.csv')
Df1
```

Checking for the data type

- Whether integer or float

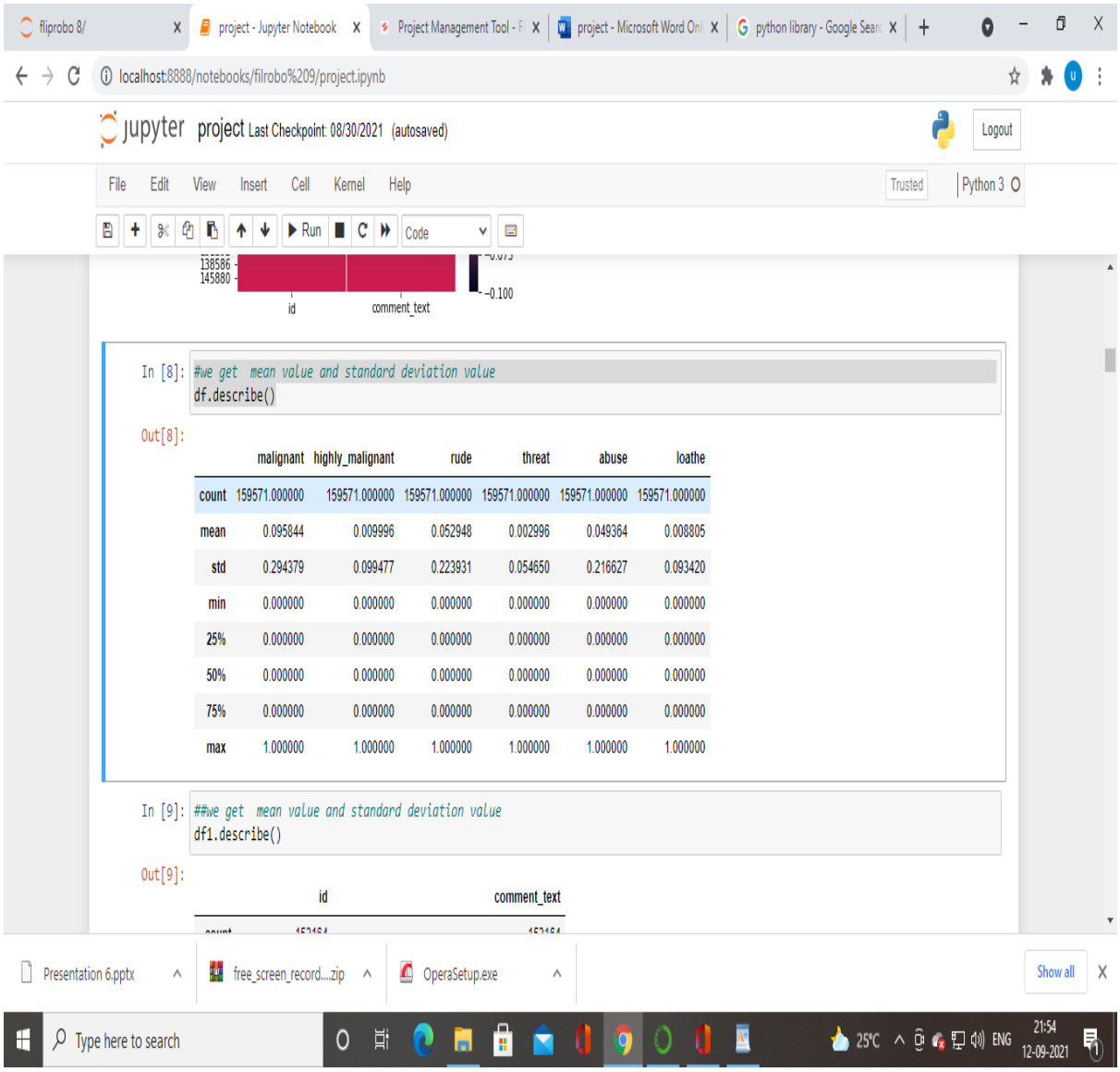
checking for the null value

- sns.heatmap(df.isnull())
- plt.title("Null values")
- plt.show()



#we get mean value and standard deviation value

df.describe()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In [8]:
#we get mean value and standard deviation value
df.describe()
Out[8]:
malignant highly_malignant rude threat abuse loathe
count 159571.000000 159571.000000 159571.000000 159571.000000 159571.000000 159571.000000
mean 0.095844 0.009996 0.052948 0.002996 0.049364 0.008805
std 0.294379 0.099477 0.223931 0.054650 0.216627 0.093420
min 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
25% 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
50% 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
75% 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
max 1.000000 1.000000 1.000000 1.000000 1.000000 1.000000
In [9]:
##we get mean value and standard deviation value
df1.describe()
Out[9]:
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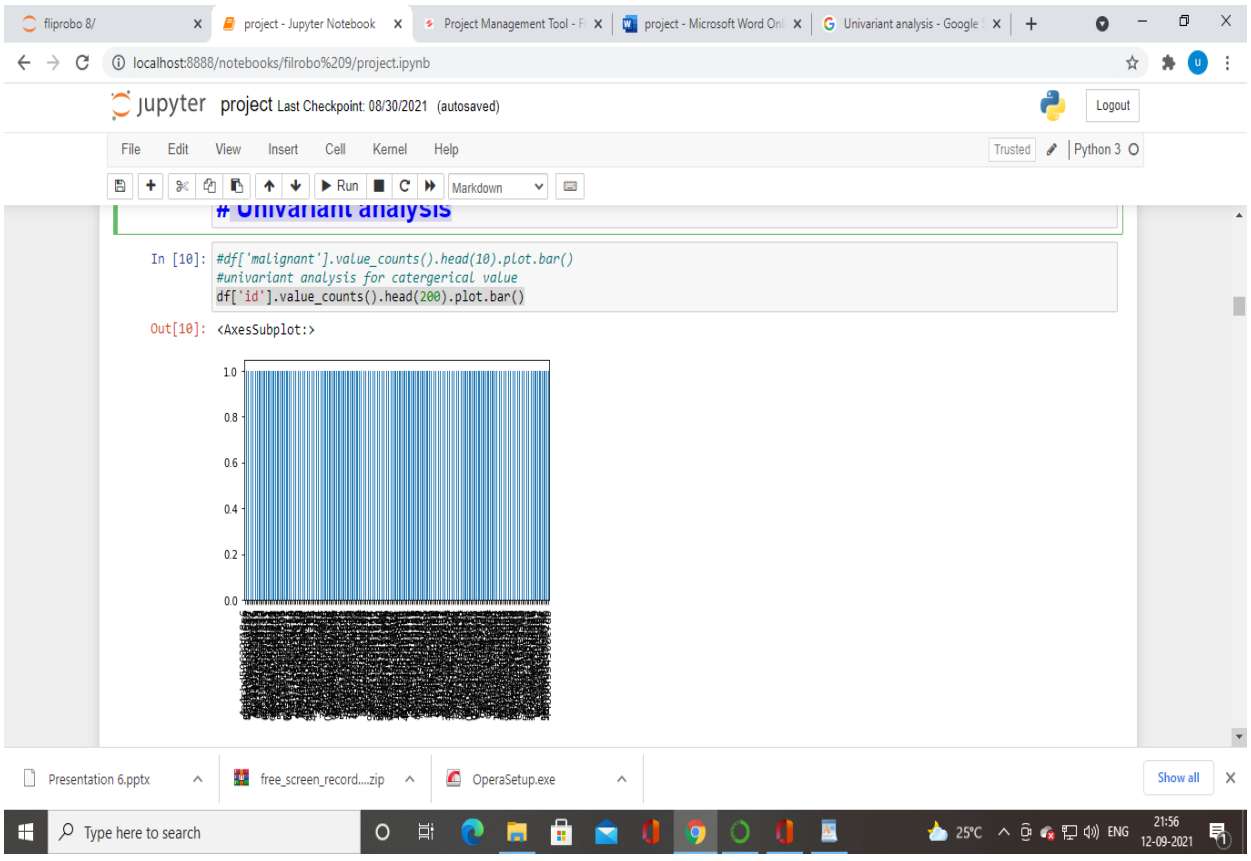
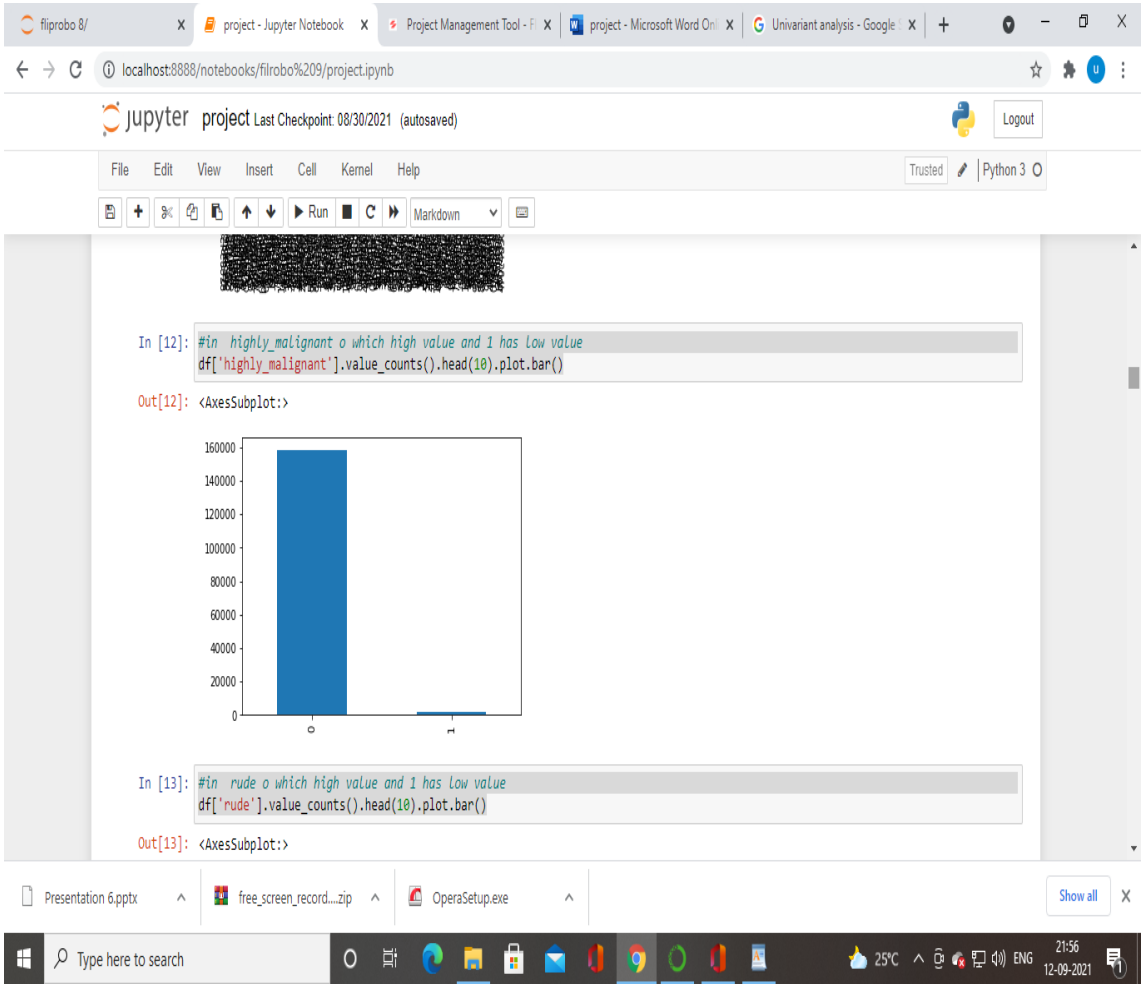
Univariant analysis

Univariate analysis is **the simplest form of analyzing data**. “Uni” means “one”, so in other words your data has only one variable. It doesn't deal with causes or relationships (unlike regression) and it's major purpose is to describe; It takes data, summarizes that data and finds patterns in the data.





#getting value of numerical data and categorical

numeric_data = df.select_dtypes(include=[np.number])

categorical_data = df.select_dtypes(exclude=[np.number])

#numerical data

numeric_data.columns

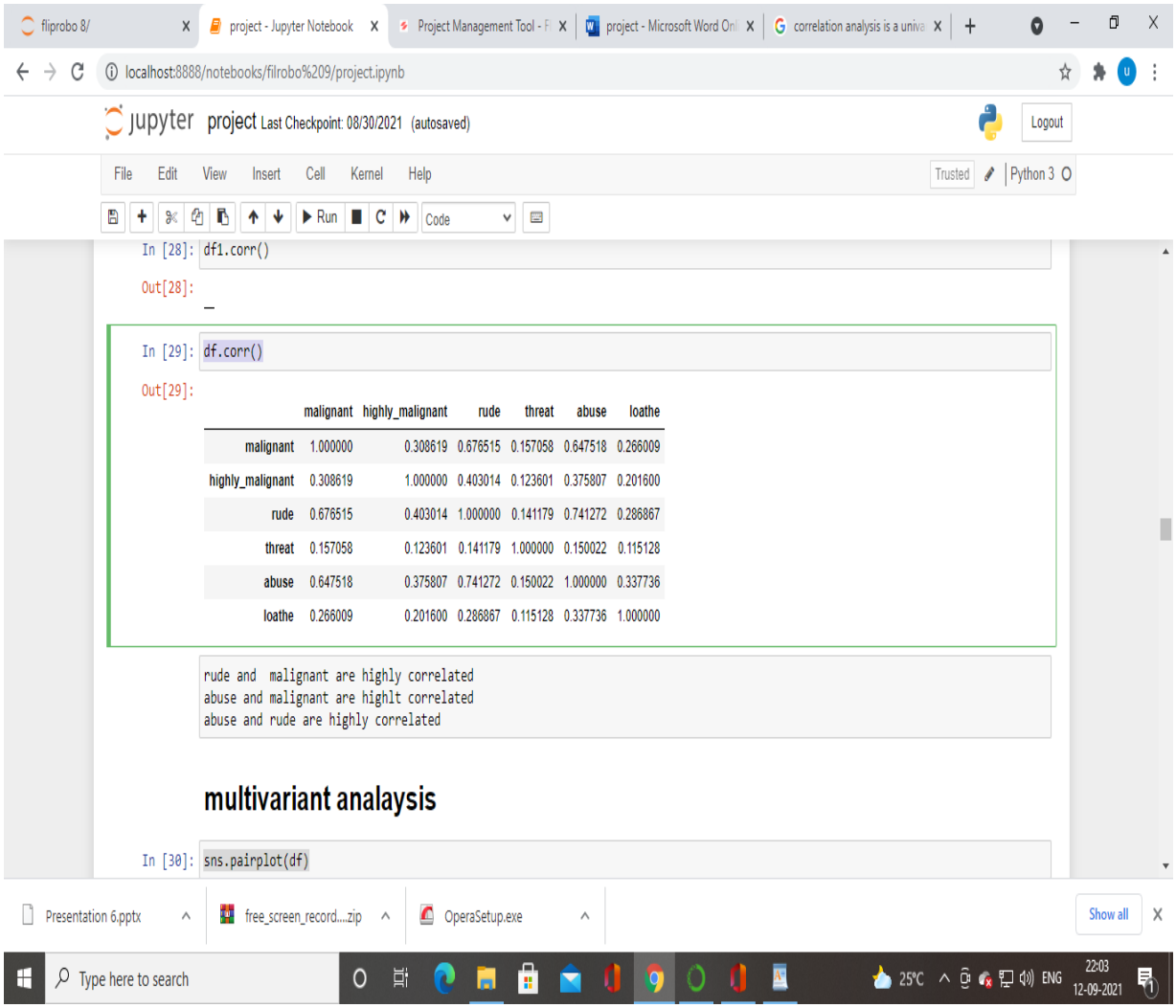
```
Index(['malignant', 'highly_malignant',
'rude', 'threat', 'abuse', 'loathe'],
dtype='object')
```

#counting the value data from train.csv

df.stack().value_counts()

df.corr()

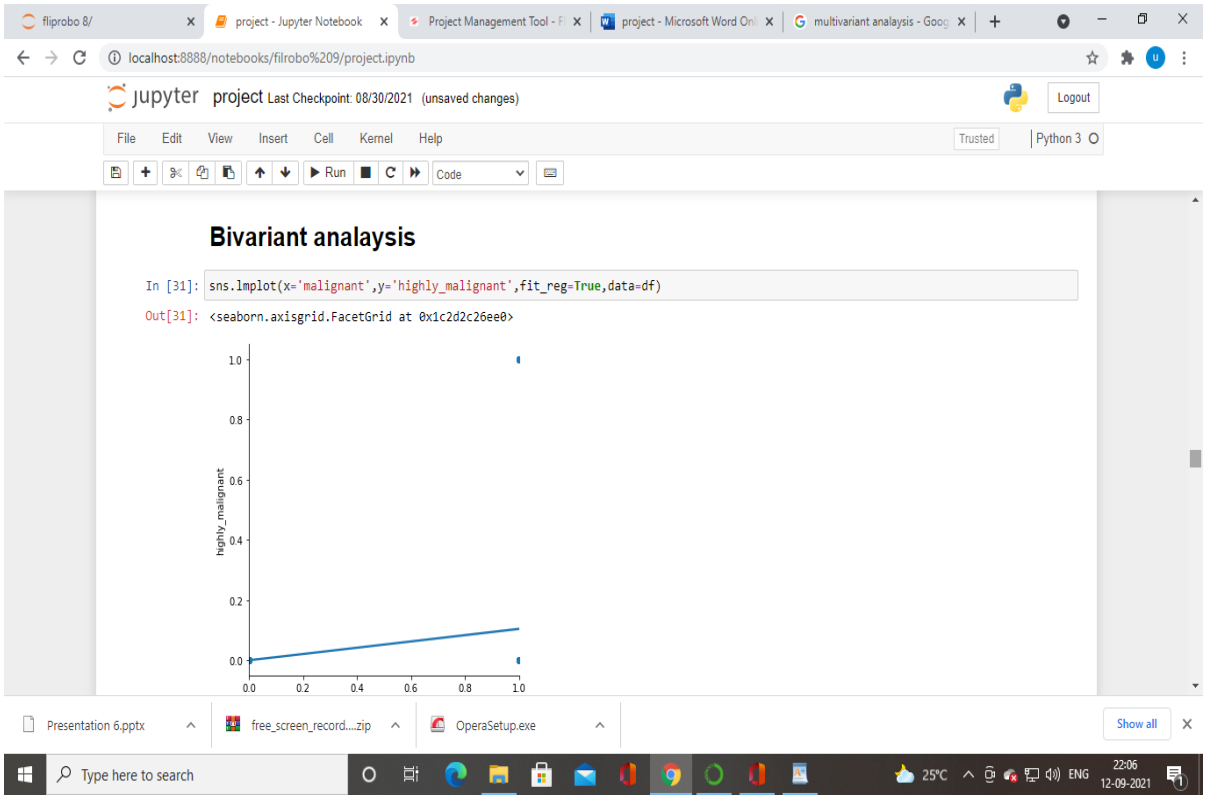
When the data contains only one variable and doesn't deal with a causes or effect relationships then a Univariate analysis technique is used. ... The key objective of Univariate analysis is to simply describe the data to find patterns **within** the data.



multivariant analaysis

Multivariate analysis is **a set of techniques used for analysis of data sets that contain more than one variable**, and the techniques are especially valuable when working with correlated variables.

Bivariant analysis



Label Encoding refers to converting the labels into a numeric form so as to convert them into the machine-readable form.

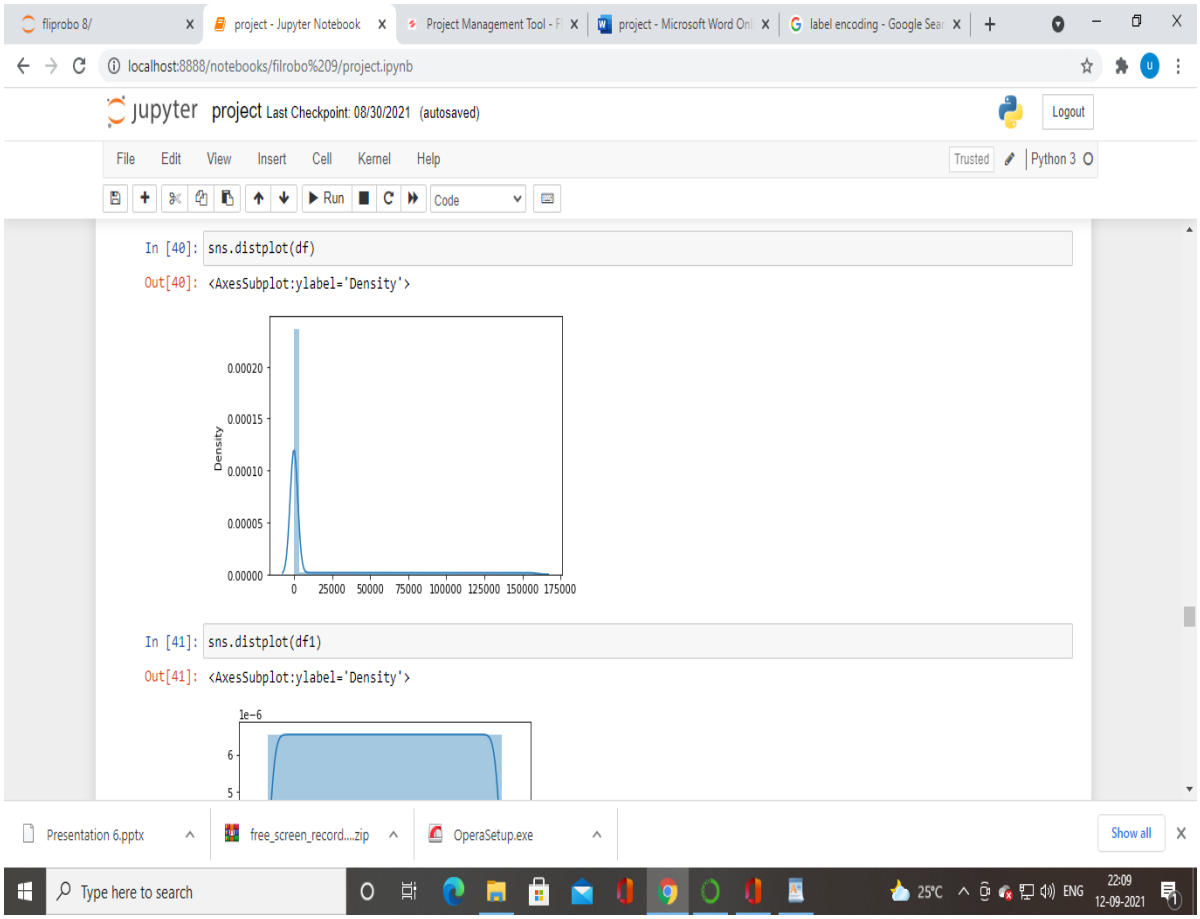
#coverting catagerical value to numerical value

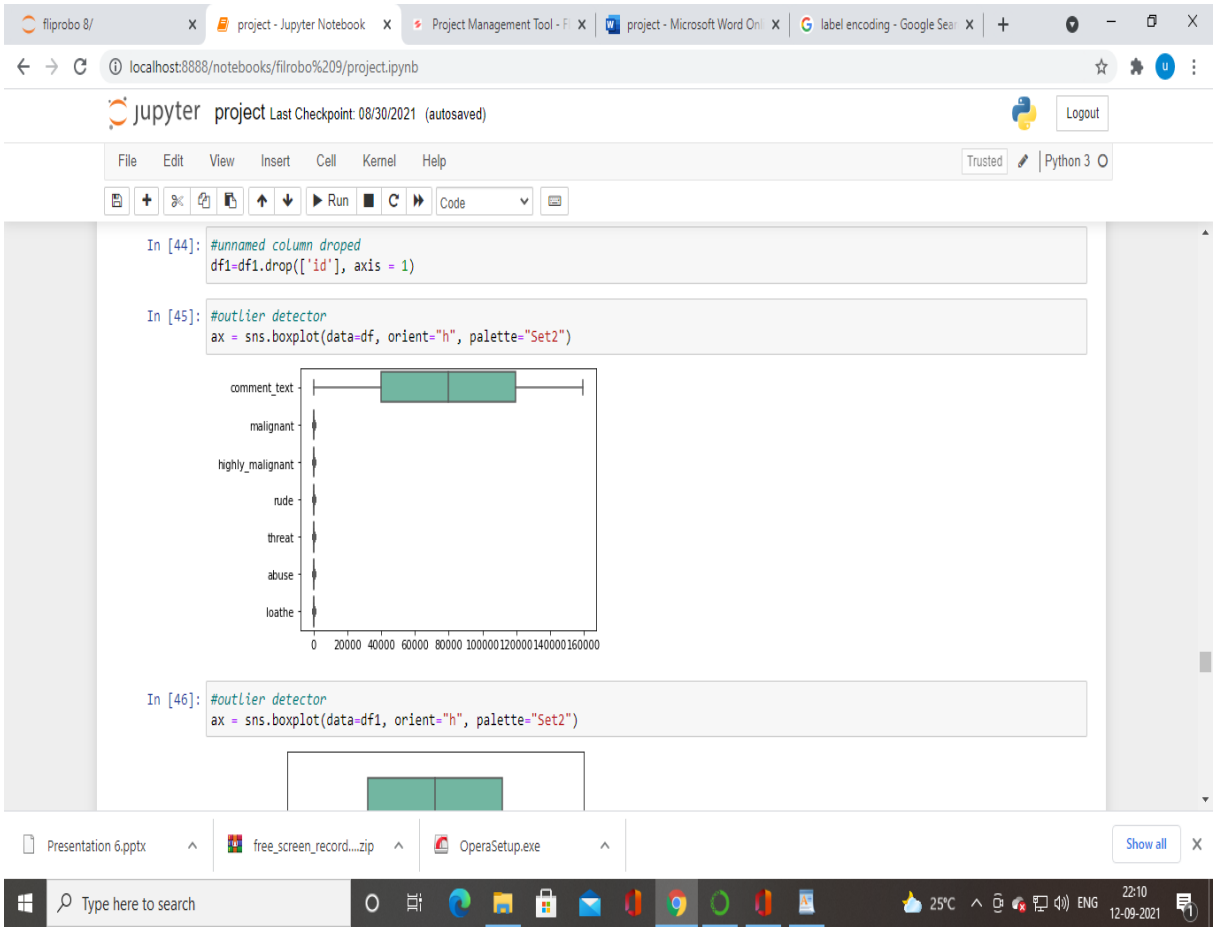
from sklearn.preprocessing import LabelEncoder

le=LabelEncoder()

list1=['id', 'comment_text']

```
for val in list1:
    df[val]=le.fit_transform(df[val].astype(str))
```





removing outliers

```
from scipy.stats import zscore
z_score=abs(zscore(df))
print(df.shape)
df=df.loc[(z_score<3).all(axis=1)]
print(df.shape)
```

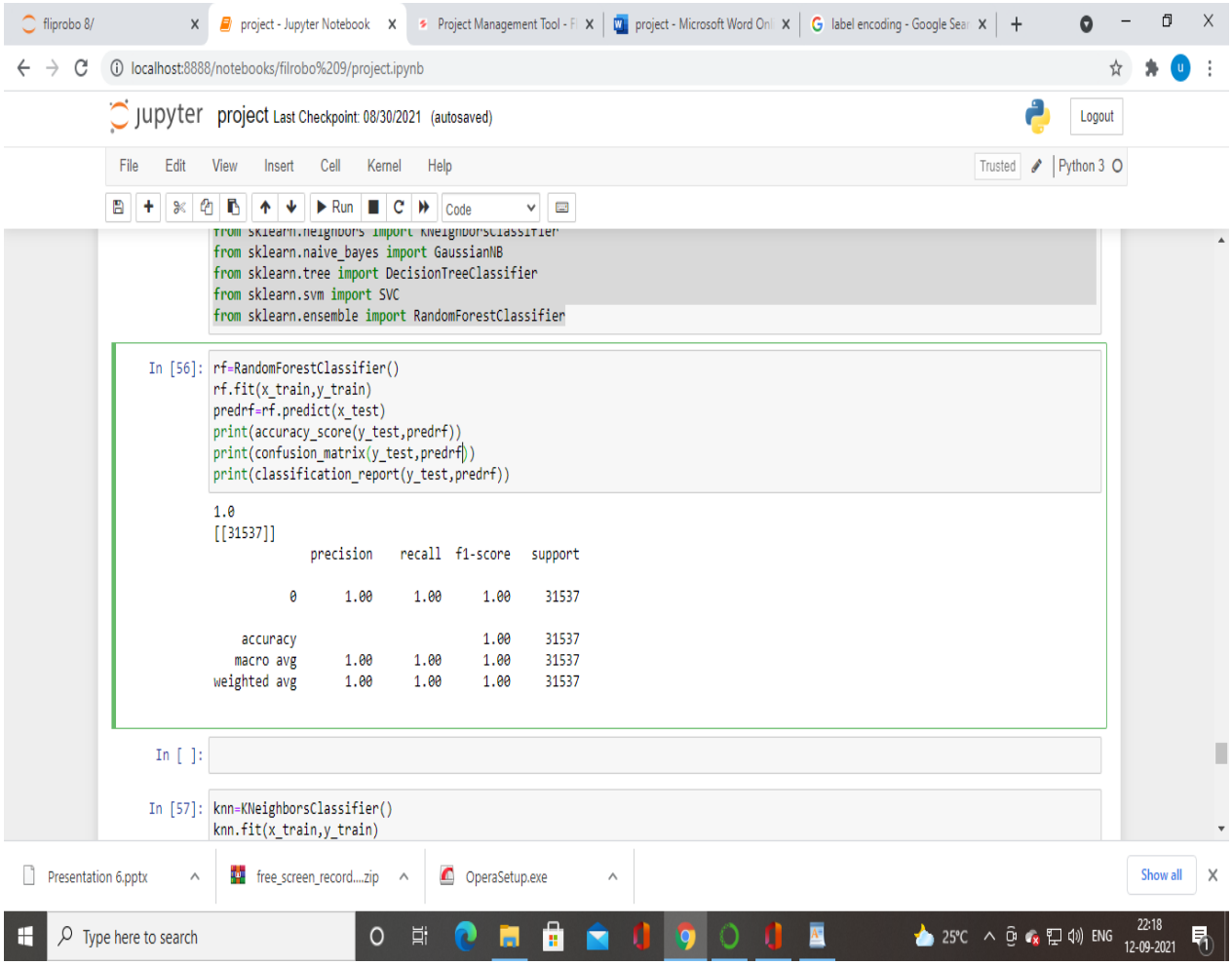
StandardScaler uses to reduce the rows

```
from sklearn.preprocessing import StandardScaler
import numpy as np
scaler = StandardScaler()
scaled_data = scaler.fit_transform(df)
print(df)
```

1. from sklearn.linear_model import LogisticRegression
2. from sklearn.neighbors import KNeighborsClassifier
3. from sklearn.naive_bayes import GaussianNB
4. from sklearn.tree import DecisionTreeClassifier
5. from sklearn.svm import SVC
6. from sklearn.ensemble import RandomForestClassifier

- Seperating independent variable

```
X=df.drop('loathe',axis=1)
y=df['loathe']
```



Cross-Validation is **a statistical method of evaluating and comparing learning algorithms by dividing data into two segments**: one used to learn or train a model and the other used to validate the model.

```
[1. 1. 1. 1. 1.]1.0
```

Cross-validation is a **method for robustly estimating test-set performance (generalization)** of a model. Grid-search is a way to select the best of a family of models, parametrized by a grid of parameters

GCV_pred=GCV.best_estimator_.predict(x_test)

accuracy_score(y_test,GCV_pred)

```
1.0
```