```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import warnings
from six.moves import urllib

warnings.filterwarnings("ignore")

%matplotlib inline
```

IMPORT DATASET

```
df = pd.read_csv('D:\ineuron Datasets\
Algerian_forest_fires_dataset_UPDATE.csv')

df
```

```
    day month  year Temperature  RH  Ws Rain   FFMC  DMC    DC  ISI
BUI  \
0     1     6  2012          29  57  18     0  65.7  3.4   7.6  1.3
3.4
1     2     6  2012          29  61  13   1.3  64.4  4.1   7.6    1
3.9
2     3     6  2012          26  82  22  13.1  47.1  2.5   7.1  0.3
2.7
3     4     6  2012          25  89  13   2.5  28.6  1.3   6.9    0
1.7
4     5     6  2012          27  77  16     0  64.8    3  14.2  1.2
3.9
..   ..   ...   ...         ...  ..  ..   ...   ...  ...   ...  ...
...
242  26     9  2012          30  65  14     0  85.4   16  44.5  4.5
16.9
243  27     9  2012          28  87  15   4.4  41.1  6.5     8  0.1
6.2
244  28     9  2012          27  87  29   0.5  45.9  3.5   7.9  0.4
3.4
245  29     9  2012          24  54  18   0.1  79.7  4.3  15.2  1.7
5.1
246  30     9  2012          24  64  15   0.2  67.3  3.8  16.5  1.2
4.8

     FWI      Classes   Region
0    0.5   not fire         0
1    0.4   not fire         0
2    0.1   not fire         0
3      0   not fire         0
4    0.5   not fire         0
```

```
..   ...            ...    ...
242  6.5       fire         1
243    0   not fire         1
244  0.2   not fire         1
245  0.7   not fire         1
246  0.5  not fire          1

[247 rows x 15 columns]
```

Algerian Forest Fire Dataset

```
df.head()
```

```
  day month  year Temperature  RH  Ws Rain   FFMC  DMC    DC  ISI  BUI
FWI  \
0   1     6  2012          29  57  18     0  65.7  3.4   7.6  1.3  3.4
0.5
1   2     6  2012          29  61  13   1.3  64.4  4.1   7.6    1  3.9
0.4
2   3     6  2012          26  82  22  13.1  47.1  2.5   7.1  0.3  2.7
0.1
3   4     6  2012          25  89  13   2.5  28.6  1.3   6.9    0  1.7
0
4   5     6  2012          27  77  16     0  64.8    3  14.2  1.2  3.9
0.5

     Classes   Region
0  not fire        0
1  not fire        0
2  not fire        0
3  not fire        0
4  not fire        0
```

FINDING ANOMALIES/NULL VALUES

```
df.describe()
```

```
        day month  year Temperature   RH   Ws Rain   FFMC  DMC   DC
ISI  BUI  \
count   245   245   245         245  245  245   245   245  245  245
245  245
unique   32     5     2          20   63   19    40   174  167  199
107  175
top       9     8  2012          35   64   14     0  88.9  7.9    8
1.1    3
freq      8    62   244          29   10   43   133     8    5    5
8    5

        FWI Classes   Region
count   245       244    245
```

```
unique  127          9      3
top     0.4   fire         1
freq     12       131    122
```

```
df.tail()
```

```
    day month  year Temperature  RH  Ws Rain   FFMC  DMC    DC  ISI
BUI  \
242  26     9  2012           30  65  14     0  85.4   16  44.5  4.5
16.9
243  27     9  2012           28  87  15   4.4  41.1  6.5     8  0.1
6.2
244  28     9  2012           27  87  29   0.5  45.9  3.5   7.9  0.4
3.4
245  29     9  2012           24  54  18   0.1  79.7  4.3  15.2  1.7
5.1
246  30     9  2012           24  64  15   0.2  67.3  3.8  16.5  1.2
4.8

     FWI     Classes   Region
242  6.5       fire         1
243    0   not fire         1
244  0.2   not fire         1
245  0.7   not fire         1
246  0.5  not fire          1
```

```
df['day'] = df['day'].str.strip()
df['month'] = df['month'].str.strip()
df['year'] = df['year'].str.strip()
df['Temperature'] = df['Temperature'].str.strip()
df['RH'] = df[' RH'].str.strip()
df['Ws'] = df[' Ws'].str.strip()
df['Rain '] = df['Rain '].str.strip()
df['FFMC'] = df['FFMC'].str.strip()
df['DMC'] = df['DMC'].str.strip()
df['DC'] = df['DC'].str.strip()
df['ISI'] = df['ISI'].str.strip()
df['BUI'] = df['BUI'].str.strip()
df['FWI'] = df['FWI'].str.strip()
df['Region'] = df['Region'].str.strip()
```

```
df.dropna(inplace = True)
df = df[df['day'] != 'day']
```

```
df['day'] = df['day'].astype('float').astype('Int64')
df['month'] = df['month'].astype('float').astype('Int64')
df['year'] = df['year'].astype('float').astype('Int64')
df['Temperature'] = df['Temperature'].astype('float').astype('Int64')
df['RH'] = df['RH'].astype('float').astype('Int64')
df['Ws'] = df['Ws'].astype('float').astype('Int64')
df['Ws'] = df['Ws'].astype('float').astype('Int64')
```

```
df['Ws'] = df['Ws'].astype('float').astype('Int64')
df['Rain '] = df['Rain '].astype('float').astype('int64')
df['FFMC'] = df['FFMC'].astype('float').astype('int64')
df['DMC'] = df['DMC'].astype('float').astype('int64')
df['DC'] = df['DC'].astype('float').astype('int64')
df['ISI'] = df['ISI'].astype('float').astype('int64')
df['BUI'] = df['BUI'].astype('float').astype('int64')
df['FWI'] = df['FWI'].astype('float').astype('int64')
df['Region'] = df['Region'].astype('float').astype('int64')

df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 243 entries, 0 to 246
Data columns (total 17 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   day          243 non-null    Int64
 1   month        243 non-null    Int64
 2   year         243 non-null    Int64
 3   Temperature  243 non-null    Int64
 4    RH          243 non-null    object
 5    Ws          243 non-null    object
 6   Rain         243 non-null    int64
 7   FFMC         243 non-null    int64
 8   DMC          243 non-null    int64
 9   DC           243 non-null    int64
 10  ISI          243 non-null    int64
 11  BUI          243 non-null    int64
 12  FWI          243 non-null    int64
 13  Classes      243 non-null    object
 14  Region       243 non-null    int64
 15  RH           243 non-null    Int64
 16  Ws           243 non-null    Int64
dtypes: Int64(6), int64(8), object(3)
memory usage: 35.6+ KB
```

DIVIDING CODE INTO NUMERIC AND CATEGORICAL FEATURES

```
numeric_features = [feature for feature in df.columns if
df[feature].dtype != 'O']
categorical_features = [feature for feature in df.columns if
df[feature].dtype == 'O']


print('We have {} numerical features :
{}'.format(len(numeric_features), numeric_features))
print('\nWe have {} categorical features :
{}'.format(len(categorical_features), categorical_features))
```

```
We have 14 numerical features : ['day', 'month', 'year',
'Temperature', 'Rain ', 'FFMC', 'DMC', 'DC', 'ISI', 'BUI', 'FWI',
'Region', 'RH', 'Ws']

We have 3 categorical features : [' RH', ' Ws', 'Classes  ']
```

```
print(df.columns.tolist())
```

```
['day', 'month', 'year', 'Temperature', ' RH', ' Ws', 'Rain ', 'FFMC',
'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'Classes  ', 'Region', 'RH', 'Ws']
```

```
#df['day'] = df['day'].str.strip()
#df['month'] = df['month'].str.strip()
#df['year'] = df['year'].str.strip()
#df['Temperature'] = df['Temperature'].str.strip()
#df['RH'] = df[' RH'].str.strip()
#df['Ws'] = df[' Ws'].str.strip()
#df['Rain '] = df['Rain '].str.strip()
#df['FFMC'] = df['FFMC'].str.strip()
#df['DMC'] = df['DMC'].str.strip()
#df['DC'] = df['DC'].str.strip()
#df['ISI'] = df['ISI'].str.strip()
#df['BUI'] = df['BUI'].str.strip()
#df['FWI'] = df['FWI'].str.strip()
#df['Region'] = df['Region'].str.strip()
```

```
numeric_features
```

```
['day',
 'month',
 'year',
 'Temperature',
 'Rain ',
 'FFMC',
 'DMC',
 'DC',
 'ISI',
 'BUI',
 'FWI',
 'Region',
 'RH',
 'Ws']
```

```
df.dropna(inplace = True)
df = df[df['day'] != 'day']
```

```
#df['day'] = df['day'].astype('float').astype('Int64')
#df['month'] = df['month'].astype('float').astype('Int64')
#df['year'] = df['year'].astype('float').astype('Int64')
#df['Temperature'] = df['Temperature'].astype('float').astype('Int64')
```

```
##df['RH'] = df['RH'].astype('float').astype('Int64')
#df['Ws'] = df['Ws'].astype('float').astype('Int64')
#df['Ws'] = df['Ws'].astype('float').astype('Int64')
#df['Ws'] = df['Ws'].astype('float').astype('Int64')
#df['Rain '] = df['Rain '].astype('float').astype('int64')
##df['FFMC'] = df['FFMC'].astype('float').astype('int64')
#df['DMC'] = df['DMC'].astype('float').astype('int64')
#df['DC'] = df['DC'].astype('float').astype('int64')
#df['ISI'] = df['ISI'].astype('float').astype('int64')
#df['BUI'] = df['BUI'].astype('float').astype('int64')
#df['FWI'] = df['FWI'].astype('float').astype('int64')
#df['Region'] = df['Region'].astype('float').astype('int64')
```

```
df.isnull().any()
```

```
day            False
month          False
year           False
Temperature    False
 RH            False
 Ws            False
Rain           False
FFMC           False
DMC            False
DC             False
ISI            False
BUI            False
FWI            False
Classes        False
Region         False
RH             False
Ws             False
dtype: bool
```

```
df.dtypes
```

```
day             Int64
month           Int64
year            Int64
Temperature     Int64
 RH            object
 Ws            object
Rain            int64
FFMC            int64
DMC             int64
DC              int64
ISI             int64
BUI             int64
FWI             int64
Classes        object
Region          int64
```

```
RH              Int64
Ws              Int64
dtype: object
```

```
for col in categorical_features:
    print(df[col].value_counts(normalize=True) * 100)
    print('---------------------------')
```

```
64    4.115226
55    4.115226
78    3.292181
58    3.292181
54    3.292181
        ...
26    0.411523
31    0.411523
83    0.411523
24    0.411523
90    0.411523
Name:  RH, Length: 62, dtype: float64
---------------------------
14    17.695473
15    16.460905
13    12.345679
17    11.522634
16    11.111111
18    10.288066
19     6.172840
21     3.292181
12     2.880658
11     2.880658
10     1.234568
20     0.823045
9      0.823045
22     0.823045
8      0.411523
26     0.411523
29     0.411523
6      0.411523
Name:  Ws, dtype: float64
---------------------------
fire             53.909465
not fire         41.563786
fire              1.646091
fire              0.823045
not fire          0.823045
not fire          0.411523
not fire          0.411523
not fire          0.411523
Name: Classes  , dtype: float64
---------------------------
```

```
#plt.figure(figsize=(15, 15))
#plt.suptitle('Univariate Analysis of Numerical Features',
fontsize=20, fontweight='bold', alpha=0.8, y=1.)
#
#for i in range(0, len(numeric_features)):
#    plt.subplot(5, 3, i+1)
#    sns.kdeplot(x=df[numeric_features[i]],shade=True, color='b')
#    plt.xlabel(numeric_features[i])
#    plt.tight_layout()
#    plt.show()
```

```
import matplotlib.pyplot as plt
%matplotlib.inline
```

```
UsageError: Line magic function `%matplotlib.inline` not found.
```

```
#sns.kdeplot(df['day'])
#plt.xlabel('day')
#plt.ylabel('count')
#plt.title('Numerical feature')
#plt.show()
```

```
#for i in numeric_features:
#    sns.kdeplot(df[i])
##    plt.xlabel(i)
#    plt.ylabel('count')
#    plt.title('Numerical feature')
#    plt.show()
```

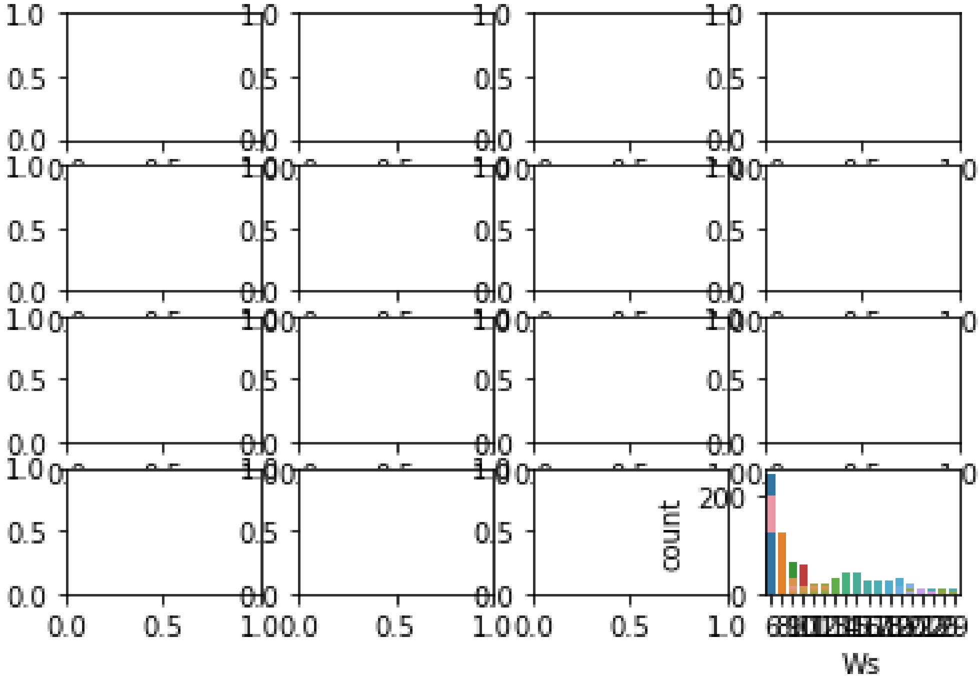
```
df.head()
```

```
   day  month  year  Temperature  RH  Ws  Rain   FFMC  DMC  DC  ISI
BUI  FWI  \
0    1      6  2012           29  57  18      0    65    3   7    1
3    0
1    2      6  2012           29  61  13      1    64    4   7    1
3    0
2    3      6  2012           26  82  22     13    47    2   7    0
2    0
3    4      6  2012           25  89  13      2    28    1   6    0
1    0
4    5      6  2012           27  77  16      0    64    3  14    1
3    0

     Classes    Region  RH  Ws
0  not fire          0  57  18
1  not fire          0  61  13
2  not fire          0  82  22
3  not fire          0  89  13
4  not fire          0  77  16
```

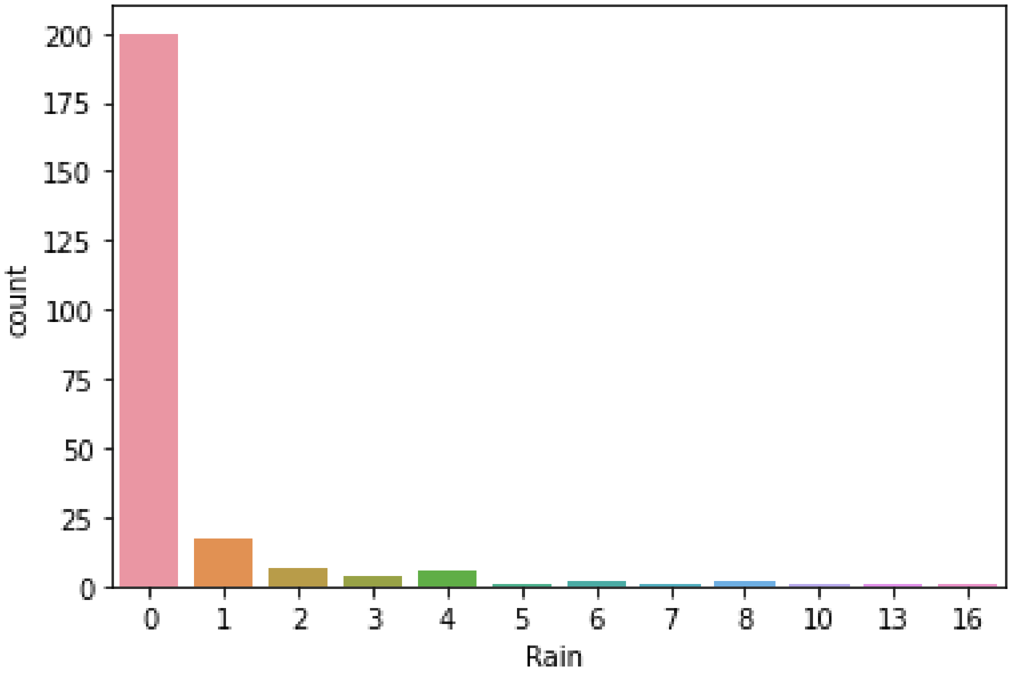
```
plt.figure(figsize=(15, 15))
plt.subplots(4,4)
for i in numeric_features:
    sns.countplot(i,data=df)
```

```
<Figure size 1080x1080 with 0 Axes>
```

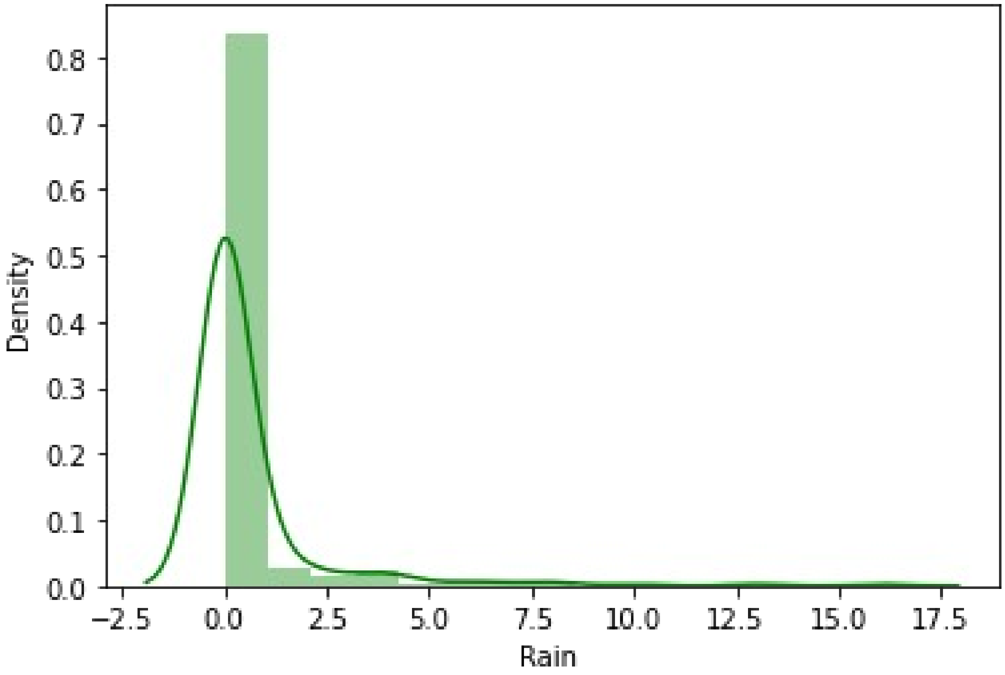


SOLO ANALYSIS

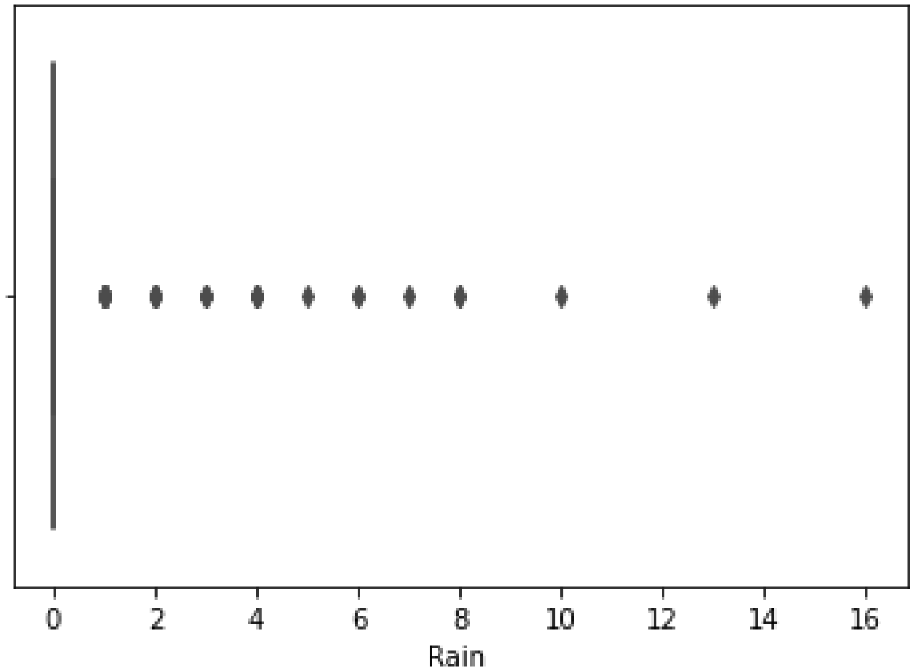
```
sns.countplot(df['Rain '])
plt.show()
```



```
sns.distplot(df['Rain '],hist = True,kde=True,color='g')
plt.show()
```



```
sns.boxplot(df['Rain '],color='r')
plt.show()
```



```
df[(list(df.columns)[1:])].corr()
```

```
                 month  year  Temperature     Rain      FFMC       DMC  \
month         1.000000   NaN    -0.056781  0.036179  0.016199  0.066828

year               NaN   NaN          NaN       NaN       NaN       NaN

Temperature -0.056781   NaN     1.000000 -0.322351  0.677443  0.485904

Rain          0.036179   NaN    -0.322351  1.000000 -0.496339 -0.253027

FFMC          0.016199   NaN     0.677443 -0.496339  1.000000  0.604157

DMC           0.066828   NaN     0.485904 -0.253027  0.604157  1.000000

DC            0.127069   NaN     0.376003 -0.268250  0.507689  0.875447

ISI           0.068762   NaN     0.601893 -0.294768  0.729235  0.680604

BUI           0.087670   NaN     0.457610 -0.265361  0.592232  0.981594

FWI           0.079515   NaN     0.561140 -0.270804  0.679905  0.875854

Region        0.001857   NaN     0.269555 -0.033145  0.222804  0.191430

RH           -0.041252   NaN    -0.651400  0.212946 -0.644674 -0.409140
```

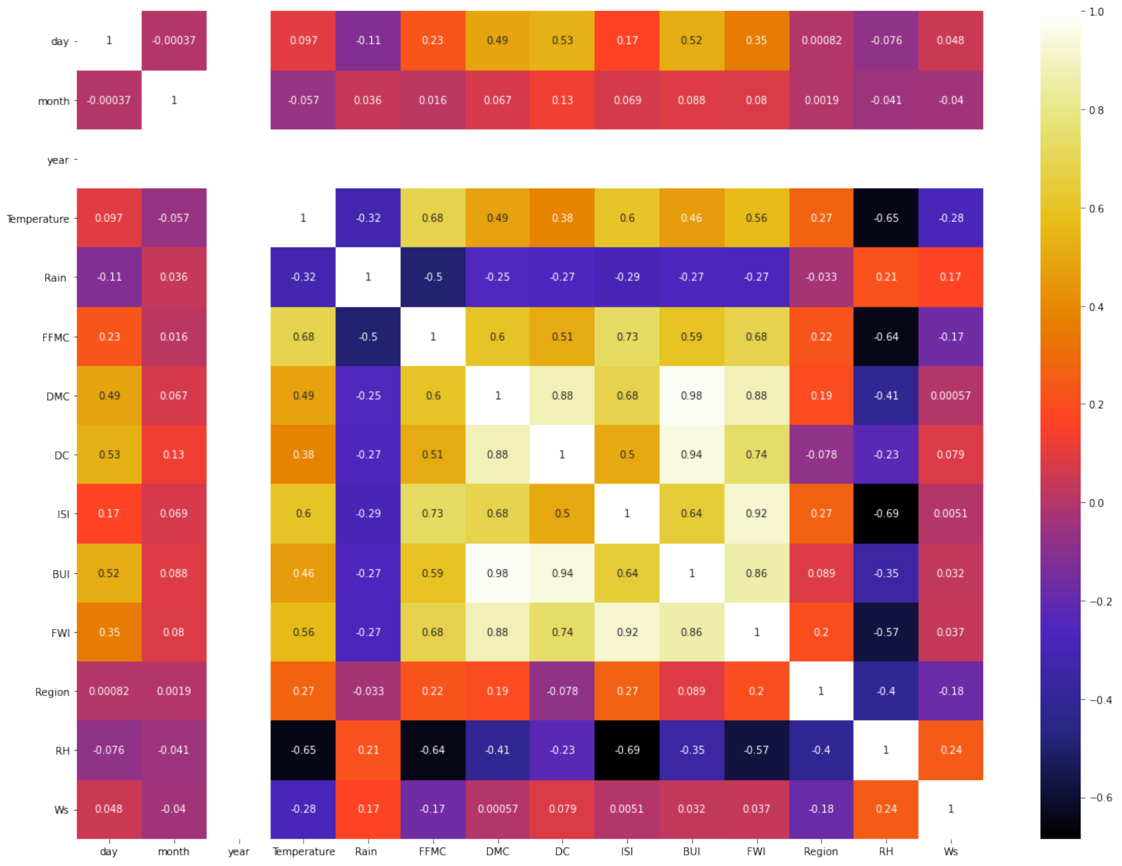
```
Ws          -0.039880   NaN    -0.284510  0.170238 -0.166354  0.000571


                   DC       ISI       BUI       FWI    Region
RH  \
month        0.127069  0.068762  0.087670  0.079515  0.001857 -
0.041252
year              NaN       NaN       NaN       NaN       NaN
NaN
Temperature  0.376003  0.601893  0.457610  0.561140  0.269555 -
0.651400
Rain        -0.268250 -0.294768 -0.265361 -0.270804 -0.033145
0.212946
FFMC         0.507689  0.729235  0.592232  0.679905  0.222804 -
0.644674
DMC          0.875447  0.680604  0.981594  0.875854  0.191430 -
0.409140
DC           1.000000  0.502481  0.941716  0.738373 -0.078271 -
0.226695
ISI          0.502481  1.000000  0.640407  0.918229  0.269143 -
0.685212
BUI          0.941716  0.640407  1.000000  0.856439  0.089234 -
0.350936
FWI          0.738373  0.918229  0.856439  1.000000  0.197529 -
0.573959
Region      -0.078271  0.269143  0.089234  0.197529  1.000000 -
0.402682
RH          -0.226695 -0.685212 -0.350936 -0.573959 -0.402682
1.000000
Ws           0.078934  0.005143  0.031714  0.037493 -0.181160
0.244048

                   Ws
month       -0.039880
year              NaN
Temperature -0.284510
Rain         0.170238
FFMC        -0.166354
DMC          0.000571
DC           0.078934
ISI          0.005143
BUI          0.031714
FWI          0.037493
Region      -0.181160
RH           0.244048
Ws           1.000000
```

HEATMAP FOR CORRELATION

```
plt.figure(figsize = (20,15))
sns.heatmap(df.corr(), cmap="CMRmap", annot=True)
plt.show()
```

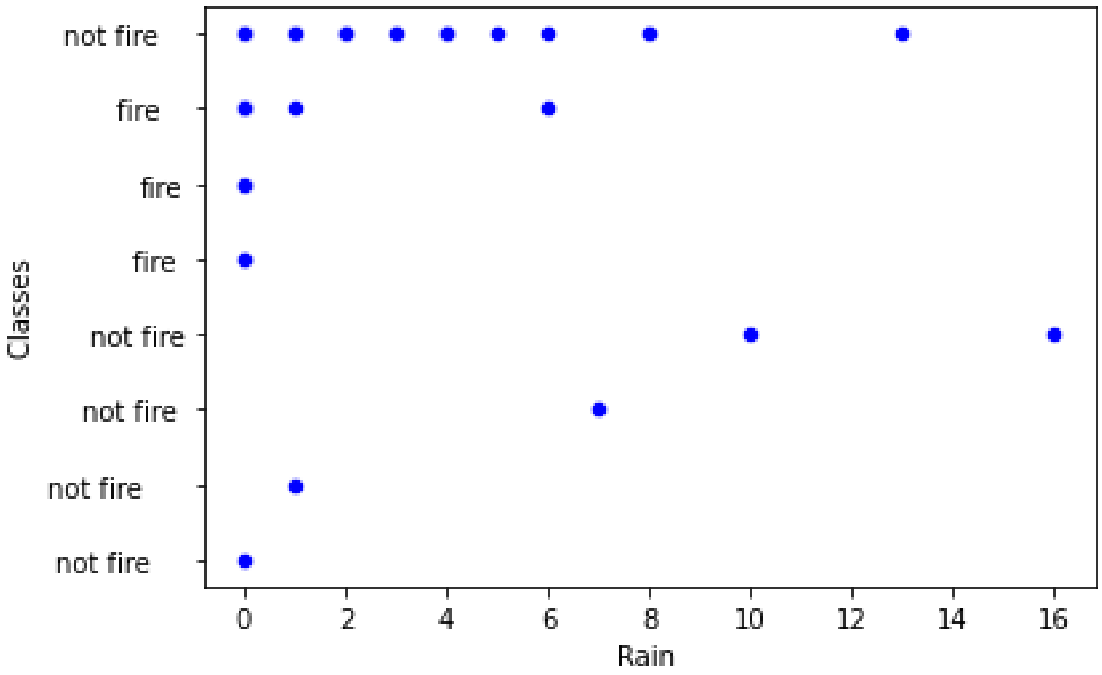


```
continues_features=[feature for feature in numeric_features if
len(df[feature].unique())>=10]
print('Num of continues features :',continues_features)
```

```
Num of continues features : ['day', 'Temperature', 'Rain ', 'FFMC',
'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'RH', 'Ws']
```

```
sns.scatterplot(data= df ,x=df['Rain '], y=df['Classes  '] ,
color='b')
```

```
<AxesSubplot:xlabel='Rain ', ylabel='Classes  '>
```



```
df['Classes  '] =df['Classes  '].apply(lambda x:x.strip())#important
```

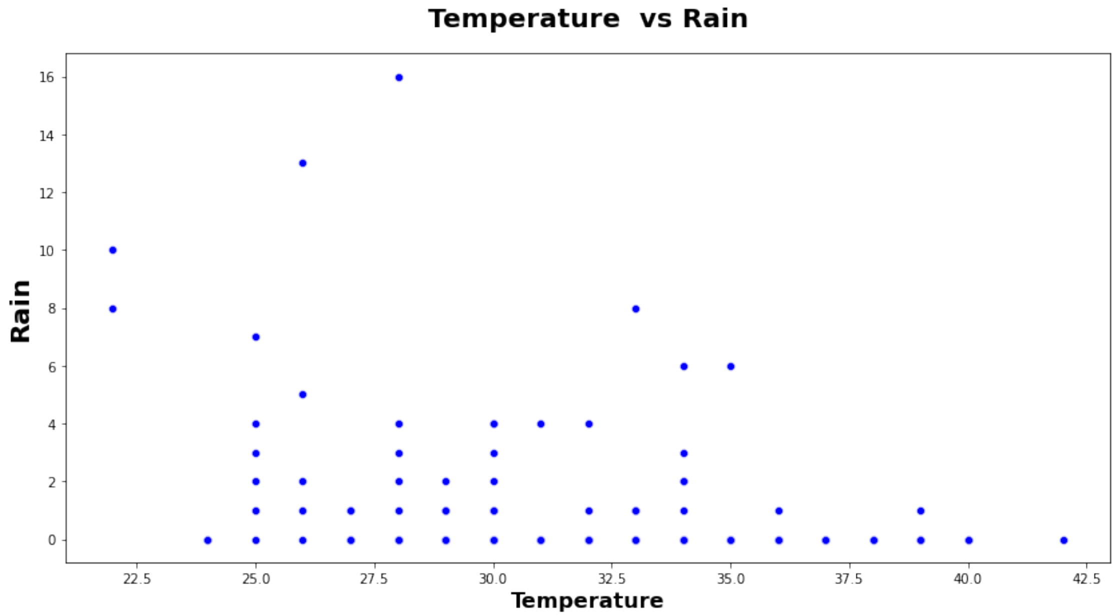
```
#mileage= df.groupby('brand')
['mileage'].mean().sort_values(ascending=False).head(15)
#mileage.to_frame()
```

```
#sns.barplot(x=df.Temperature.index, y=df.Temperature.values, ec =
"black", palette="Set2")
```

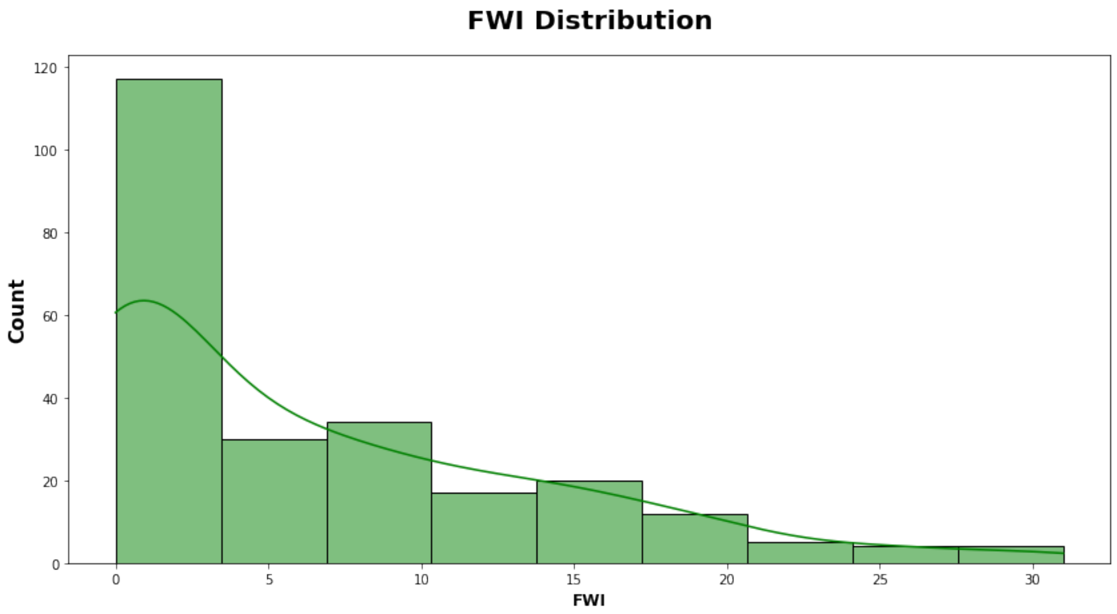
COMPARING DIFFERENT COLUMNS USING HISTPLOTS

```
plt.subplots(figsize=(14,7))
sns.scatterplot(x="Temperature", y='Rain ', data=df,ec =
"white",color='b')
plt.title("Temperature  vs Rain", weight="bold",fontsize=20, pad=20)
plt.ylabel("Rain", weight="bold", fontsize=20)

plt.xlabel("Temperature", weight="bold", fontsize=16)
plt.show()
```



```
plt.subplots(figsize=(14,7))
sns.histplot(x=df.FWI, ec = "black", color='g', kde=True)
plt.title("FWI Distribution", weight="bold",fontsize=20, pad=20)
plt.ylabel("Count", weight="bold", fontsize=15)
plt.xlabel("FWI", weight="bold", fontsize=12)
plt.show()
```



```
for i in numerical_features:
```

```
  File "<ipython-input-40-915e4eda3b92>", line 2

    ^
```

```
SyntaxError: unexpected EOF while parsing
```

```
df.dtypes
```

```
day             Int64
month           Int64
year            Int64
Temperature     Int64
 RH            object
 Ws            object
Rain            int64
FFMC            int64
DMC             int64
DC              int64
ISI             int64
BUI             int64
FWI             int64
Classes        object
Region          int64
RH              Int64
Ws              Int64
dtype: object
```

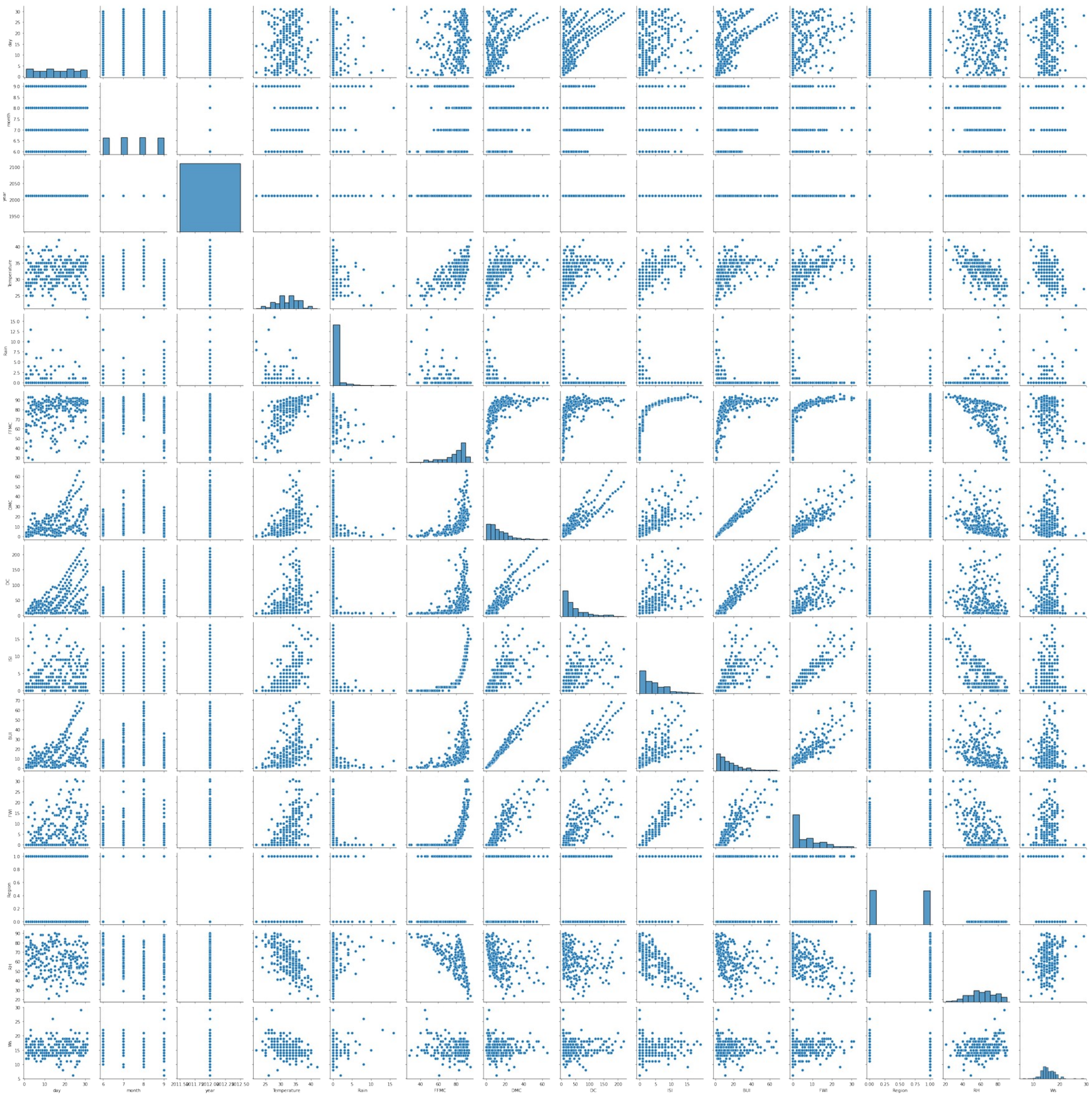
```
from sklearn.preprocessing import OneHotEncoder
encoder = OneHotEncoder()
# apply on df
color_1hot = encoder.fit_transform(df['Classes  '].values.reshape(-
1,1))
```

```
print(color_1hot)
```

```
  (0, 1)	1.0
  (1, 1)	1.0
  (2, 1)	1.0
  (3, 1)	1.0
  (4, 1)	1.0
  (5, 0)	1.0
  (6, 0)	1.0
  (7, 0)	1.0
  (8, 1)	1.0
  (9, 1)	1.0
  (10, 0)	1.0
  (11, 0)	1.0
  (12, 1)	1.0
  (13, 1)	1.0
  (14, 1)	1.0
  (15, 1)	1.0
  (16, 1)	1.0
  (17, 1)  1.0
  (18, 1)  1.0
  (19, 1)  1.0
  (20, 0)  1.0
  (21, 1)  1.0
  (22, 0)  1.0
  (23, 0)  1.0
  (24, 0)  1.0
  :   :
  (218, 1) 1.0
  (219, 0) 1.0
  (220, 0) 1.0
  (221, 0) 1.0
  (222, 1) 1.0
  (223, 1) 1.0
  (224, 0) 1.0
  (225, 0) 1.0
  (226, 0) 1.0
  (227, 0) 1.0
  (228, 0) 1.0
  (229, 0) 1.0
  (230, 0) 1.0
  (231, 0) 1.0
  (232, 1) 1.0
  (233, 0) 1.0
  (234, 0) 1.0
  (235, 0) 1.0
  (236, 1) 1.0
  (237, 1) 1.0
  (238, 0) 1.0
  (239, 1) 1.0
  (240, 1) 1.0
  (241, 1) 1.0
  (242, 1) 1.0
```

```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x26c3c3f64f0>
```



```
df.columns
```

```
Index(['day', 'month', 'year', 'Temperature', ' RH', ' Ws', 'Rain ',
'FFMC',
       'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'Classes  ', 'Region', 'RH',
'Ws'],
      dtype='object')
```

```
X=df.drop(columns=['Temperature','Classes  '],axis=1)
```

```
X
```

```
     day  month  year  RH  Ws  Rain   FFMC  DMC  DC  ISI  BUI  FWI
Region  \
0      1      6  2012  57  18      0     65    3   7    1    3    0
0
```

```
1      2      6  2012  61  13       1    64     4    7    1    3    0
0
2      3      6  2012  82  22      13    47     2    7    0    2    0
0
3      4      6  2012  89  13       2    28     1    6    0    1    0
0
4      5      6  2012  77  16       0    64     3   14    1    3    0
0
..   ...    ...   ...  ..  ..     ...   ...   ...   ..  ...  ...  ...
...
242   26      9  2012  65  14       0    85    16   44    4   16    6
1
243   27      9  2012  87  15       4    41     6    8    0    6    0
1
244   28      9  2012  87  29       0    45     3    7    0    3    0
1
245   29      9  2012  54  18       0    79     4   15    1    5    0
1
246   30      9  2012  64  15       0    67     3   16    1    4    0
1

     RH  Ws
0    57  18
1    61  13
2    82  22
3    89  13
4    77  16
..   ..  ..
242  65  14
243  87  15
244  87  29
245  54  18
246  64  15

[243 rows x 15 columns]
```

```
Y = df['Temperature']
```

```
Y
```

```
0      29
1      29
2      26
3      25
4      27
       ..
242    30
243    28
244    27
245    24
```

```
246    24
Name: Temperature, Length: 243, dtype: Int64
```

```
#sns.regplot(x = X, y = Y, data = df)
#plt.show()
```

PERFORM REGRESSION

```
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split

X_train, X_test, Y_train, Y_test = train_test_split(
    X, Y, test_size=0.33, random_state=10)

## Standardize or feature scaling the datasets
from sklearn.preprocessing import StandardScaler
scaler=StandardScaler()
scaler
```

```
StandardScaler()
```

```
X_train=scaler.fit_transform(X_train)
X_test=scaler.transform(X_test)#To prevent data leakage with mean and standard deviation

X_train
```

```
array([[ 1.30705791, -1.39305207,  0.        , ..., -1.01242284,
         0.06835876,  0.89673457],
       [ 1.77217242,  1.29354835,  0.        , ..., -1.01242284,
         0.99672801, -0.58185068],
       [ 0.95822202, -0.4975186 ,  0.        , ...,  0.9877296 ,
         0.53254338,  0.52708826],
       ...,
       [ 0.14427163,  1.29354835,  0.        , ...,  0.9877296 ,
        -2.45150064, -0.95149699],
       [-1.2510719 , -1.39305207,  0.        , ...,  0.9877296 ,
         0.06835876, -0.58185068],
       [-0.55340014, -1.39305207,  0.        , ..., -1.01242284,
         1.0630401 , -1.3211433 ]])
```

```
X_test
```

```
array([[ 0.26055026, -0.4975186 ,  0.        , ..., -1.01242284,
         0.46623129, -0.58185068],
       [-0.20456425,  1.29354835,  0.        , ...,  0.9877296 ,
        -0.92632258,  1.26638088],
       [ 1.77217242, -0.4975186 ,  0.        , ...,  0.9877296 ,
        -0.46213796,  0.15744195],
       ...,
       [ 1.30705791,  0.39801488,  0.        , ...,  0.9877296 ,
        -1.72206765,  0.15744195],
       [-0.43712151,  1.29354835,  0.        , ..., -1.01242284,
         0.93041592,  2.0056735 ],
       [ 0.37682889,  0.39801488,  0.        , ..., -1.01242284,
        -0.59476213,  0.89673457]])
```

```
from sklearn.linear_model import LinearRegression
```

```
regression=LinearRegression()
```

```
regression
```

```
LinearRegression()
```

```
regression.fit(X_train,Y_train)
```

```
LinearRegression()
```

```
## print the coefficients and the intercept
print(regression.coef_)
```

```
[-3.79932446e-01 -2.16874129e-01 -6.66133815e-16 -7.19299128e-01
 -3.54128707e-01 -3.28763626e-01  9.51198621e-01  1.31236513e-01
  7.18749447e-01 -2.91342579e-02 -6.61184028e-02 -2.79556437e-02
  2.45622474e-01 -7.19299128e-01 -3.54128707e-01]
```

```
print(regression.intercept_)
```

```
32.074074074074076
```

```
## PRediction for the test data
reg_pred=regression.predict(X_test)
```

PREDICTED VALUES USING REGRESSION

```
reg_pred
```

```
array([31.80316725, 33.08721357, 33.28153675, 24.62219251,
29.19946195,
       33.66959058, 31.81449108, 34.60485072, 31.72983211,
32.44276484,
       33.64827876, 33.29717421, 35.72502843, 31.89258258,
34.0508012 ,
       33.24368488, 26.58890308, 36.0288929 , 33.16708926,
22.70928388,
       32.1824273 , 32.42327248, 32.99836697, 32.81415054,
30.08581741,
       32.64750653, 33.06195449, 32.30836837, 32.16501788,
33.93250017,
       34.51210792, 33.73761507, 34.38998929, 32.63324354,
30.97356406,
       28.83058412, 32.61333876, 31.88069156, 33.06211842,
34.08284617,
       33.83649368, 35.53375209, 34.21853837, 37.08915384,
32.87101999,
       36.73886908, 32.37323961, 35.32079826, 30.8079389 ,
30.9411369 ,
       32.2748118 , 39.28971515, 32.56654099, 34.54752035,
27.28042624,
       37.02870724, 33.80143997, 33.85320773, 29.12183754,
32.25903936,
       32.41228107, 32.0459186 , 24.1244169 , 36.32275478,
36.12537969,
       29.20279256, 29.51491791, 29.33271232, 36.09827144,
28.69233027,
       29.19107669, 32.15313875, 30.41974491, 31.10697871,
34.81927462,
       32.74884415, 35.22667119, 31.37782693, 37.11734576,
27.05433239,
       33.58660075])
```

```
X1 = df.drop(['Classes  '],axis=1)
```

```
X1
```

```
     day  month  year  Temperature  RH  Ws  Rain   FFMC  DMC  DC  ISI
BUI  \
0      1      6  2012           29  57  18      0    65    3   7    1
3
1      2      6  2012           29  61  13      1    64    4   7    1
3
2      3      6  2012           26  82  22     13    47    2   7    0
2
3      4      6  2012           25  89  13      2    28    1   6    0
1
4      5      6  2012           27  77  16      0    64    3  14    1
3
..   ...    ...   ...          ...  ..  ..    ...   ...  ...  ..  ...
...
242   26      9  2012           30  65  14      0    85   16  44    4
16
243   27      9  2012           28  87  15      4    41    6   8    0
6
244   28      9  2012           27  87  29      0    45    3   7    0
3
245   29      9  2012           24  54  18      0    79    4  15    1
5
246   30      9  2012           24  64  15      0    67    3  16    1
4

     FWI  Region  RH  Ws
0      0       0  57  18
1      0       0  61  13
2      0       0  82  22
```

```
3      0       0  89  13
4      0       0  77  16
..   ...     ...  ..  ..
242    6       1  65  14
243    0       1  87  15
244    0       1  87  29
245    0       1  54  18
246    0       1  64  15

[243 rows x 16 columns]
```

```
df.columns
```

```
Index(['day', 'month', 'year', 'Temperature', ' RH', ' Ws', 'Rain ',
'FFMC',
       'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'Classes  ', 'Region', 'RH',
'Ws'],
      dtype='object')
```

```
Y1=df['Classes  ']
```

```
Y1
```

```
0      not fire
1      not fire
2      not fire
3      not fire
4      not fire
         ...
242        fire
243    not fire
244    not fire
245    not fire
246    not fire
Name: Classes  , Length: 243, dtype: object
```

```
from sklearn.model_selection import train_test_split
X1_train, X1_test, Y1_train, Y1_test = train_test_split(
 X1, Y1, test_size=0.33, random_state=42)
```

```
from sklearn.linear_model import LogisticRegression
```

```
logreg = LogisticRegression()
```

```
# fit the model with data
logreg.fit(X1_train,Y1_train)
```

```
#
y_pred=logreg.predict(X1_test)
```

```
y_pred
```

```
array(['fire', 'fire', 'not fire', 'not fire', 'fire', 'not fire',
'fire',
       'fire', 'not fire', 'not fire', 'not fire', 'not fire', 'fire',
       'fire', 'fire', 'not fire', 'not fire', 'not fire', 'fire',
'fire',
       'not fire', 'not fire', 'fire', 'not fire', 'fire', 'fire',
'fire',
       'fire', 'not fire', 'fire', 'fire', 'not fire', 'fire', 'fire',
       'not fire', 'not fire', 'not fire', 'fire', 'not fire', 'not
fire',
       'fire', 'fire', 'fire', 'not fire', 'fire', 'fire', 'fire',
       'not fire', 'fire', 'not fire', 'fire', 'fire', 'fire', 'fire',
       'fire', 'fire', 'not fire', 'fire', 'fire', 'fire', 'fire',
       'not fire', 'not fire', 'fire', 'not fire', 'not fire', 'fire',
       'fire', 'fire', 'not fire', 'fire', 'fire', 'fire', 'fire',
       'not fire', 'not fire', 'not fire', 'fire', 'fire', 'not fire',
       'fire'], dtype=object)
```