In [3]: # import libaries

import numpy as np
import pandas as pd

import matplotlib.pyplot as plt

In [51]: x=pd.read_csv(r"C:\Users\user\Downloads\11_winequality-red - 11_winequality-re

Out[51]:

fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	рН	sulphates	alcc
7.4	0.700	0.00	1.9	0.076	11.0	34.0	0.99780	3.51	0.56	_
7.8	0.880	0.00	2.6	0.098	25.0	67.0	0.99680	3.20	0.68	
7.8	0.760	0.04	2.3	0.092	15.0	54.0	0.99700	3.26	0.65	
11.2	0.280	0.56	1.9	0.075	17.0	60.0	0.99800	3.16	0.58	
7.4	0.700	0.00	1.9	0.076	11.0	34.0	0.99780	3.51	0.56	
6.2	0.600	0.08	2.0	0.090	32.0	44.0	0.99490	3.45	0.58	•
5.9	0.550	0.10	2.2	0.062	39.0	51.0	0.99512	3.52	0.76	
6.3	0.510	0.13	2.3	0.076	29.0	40.0	0.99574	3.42	0.75	
5.9	0.645	0.12	2.0	0.075	32.0	44.0	0.99547	3.57	0.71	
6.0	0.310	0.47	3.6	0.067	18.0	42.0	0.99549	3.39	0.66	•
	7.4 7.8 7.8 11.2 7.4 6.2 5.9 6.3 5.9	acidity acidity 7.4 0.700 7.8 0.880 7.8 0.760 11.2 0.280 7.4 0.700 6.2 0.600 5.9 0.550 6.3 0.510 5.9 0.645	acidity acidity acid 7.4 0.700 0.00 7.8 0.880 0.00 7.8 0.760 0.04 11.2 0.280 0.56 7.4 0.700 0.00 6.2 0.600 0.08 5.9 0.550 0.10 6.3 0.510 0.13 5.9 0.645 0.12	acidity acidity acid sugar 7.4 0.700 0.00 1.9 7.8 0.880 0.00 2.6 7.8 0.760 0.04 2.3 11.2 0.280 0.56 1.9 7.4 0.700 0.00 1.9 6.2 0.600 0.08 2.0 5.9 0.550 0.10 2.2 6.3 0.510 0.13 2.3 5.9 0.645 0.12 2.0	acidity acidity acid sugar chlorides 7.4 0.700 0.00 1.9 0.076 7.8 0.880 0.00 2.6 0.098 7.8 0.760 0.04 2.3 0.092 11.2 0.280 0.56 1.9 0.075 7.4 0.700 0.00 1.9 0.076 6.2 0.600 0.08 2.0 0.090 5.9 0.550 0.10 2.2 0.062 6.3 0.510 0.13 2.3 0.076 5.9 0.645 0.12 2.0 0.075	fixed acidity volatile acidity citric acid residual sugar chlorides sulfur dioxide 7.4 0.700 0.00 1.9 0.076 11.0 7.8 0.880 0.00 2.6 0.098 25.0 7.8 0.760 0.04 2.3 0.092 15.0 11.2 0.280 0.56 1.9 0.075 17.0 7.4 0.700 0.00 1.9 0.076 11.0 6.2 0.600 0.08 2.0 0.090 32.0 5.9 0.550 0.10 2.2 0.062 39.0 6.3 0.510 0.13 2.3 0.076 29.0 5.9 0.645 0.12 2.0 0.075 32.0	fixed acidity volatile acidity citric acid residual sugar chlorides sulfur dioxide sulfur dioxide 7.4 0.700 0.00 1.9 0.076 11.0 34.0 7.8 0.880 0.00 2.6 0.098 25.0 67.0 7.8 0.760 0.04 2.3 0.092 15.0 54.0 11.2 0.280 0.56 1.9 0.075 17.0 60.0 7.4 0.700 0.00 1.9 0.076 11.0 34.0 6.2 0.600 0.08 2.0 0.090 32.0 44.0 5.9 0.550 0.10 2.2 0.062 39.0 51.0 6.3 0.510 0.13 2.3 0.076 29.0 40.0 5.9 0.645 0.12 2.0 0.075 32.0 44.0	fixed acidity volatile acidity citric acidity residual sugar sugar chlorides sulfur dioxide sulfur dioxide density density 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 7.8 0.880 0.00 2.6 0.098 25.0 67.0 0.99680 7.8 0.760 0.04 2.3 0.092 15.0 54.0 0.99700 11.2 0.280 0.56 1.9 0.075 17.0 60.0 0.99800 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 0.99800 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 6.2 0.600 0.08 2.0 0.090 32.0 44.0 0.99512 <	fixed acidity volatile acidity citric acidity residual sugar chlorides sulfur dioxide sulfur dioxide density pH 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 3.51 7.8 0.880 0.00 2.6 0.098 25.0 67.0 0.99680 3.20 7.8 0.760 0.04 2.3 0.092 15.0 54.0 0.99700 3.26 11.2 0.280 0.56 1.9 0.075 17.0 60.0 0.99800 3.16 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 3.51 6.2 0.600 0.08 2.0 0.090 32.0 44.0 0.99490 3.45 5.9 0.550 0.10 2.2 0.062 39.0 51.0 0.99512 3.52 6.3	fixed acidity cliffic acidity residual sugar chlorides dioxide sulfur dioxide sulfur dioxide density pH sulphates 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 3.51 0.56 7.8 0.880 0.00 2.6 0.098 25.0 67.0 0.99680 3.20 0.68 7.8 0.760 0.04 2.3 0.092 15.0 54.0 0.99700 3.26 0.65 11.2 0.280 0.56 1.9 0.075 17.0 60.0 0.99800 3.16 0.58 7.4 0.700 0.00 1.9 0.076 11.0 34.0 0.99780 3.51 0.56 .

1599 rows × 12 columns

In [52]: x=x.head(10)

Out[52]:

	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	рН	sulphates	alcohol
0	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	9.4
1	7.8	0.88	0.00	2.6	0.098	25.0	67.0	0.9968	3.20	0.68	9.8
2	7.8	0.76	0.04	2.3	0.092	15.0	54.0	0.9970	3.26	0.65	9.8
3	11.2	0.28	0.56	1.9	0.075	17.0	60.0	0.9980	3.16	0.58	9.8
4	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	9.4
5	7.4	0.66	0.00	1.8	0.075	13.0	40.0	0.9978	3.51	0.56	9.4
6	7.9	0.60	0.06	1.6	0.069	15.0	59.0	0.9964	3.30	0.46	9.4
7	7.3	0.65	0.00	1.2	0.065	15.0	21.0	0.9946	3.39	0.47	10.0
8	7.8	0.58	0.02	2.0	0.073	9.0	18.0	0.9968	3.36	0.57	9.5
9	7.5	0.50	0.36	6.1	0.071	17.0	102.0	0.9978	3.35	0.80	10.5

In [531:

```
<class 'pandas.core.frame.DataFrame'>
          RangeIndex: 10 entries, 0 to 9
          Data columns (total 12 columns):
                                        Non-Null Count
           #
               Column
                                                         Dtype
           0
                fixed acidity
                                        10 non-null
                                                         float64
           1
               volatile acidity
                                                         float64
                                        10 non-null
           2
                citric acid
                                        10 non-null
                                                         float64
           3
               residual sugar
                                        10 non-null
                                                         float64
           4
               chlorides
                                        10 non-null
                                                         float64
           5
                free sulfur dioxide
                                        10 non-null
                                                         float64
           6
               total sulfur dioxide
                                       10 non-null
                                                         float64
           7
                density
                                        10 non-null
                                                         float64
           8
                                        10 non-null
                                                         float64
                рΗ
           9
                sulphates
                                        10 non-null
                                                         float64
           10
               alcohol
                                        10 non-null
                                                         float64
           11
               quality
                                        10 non-null
                                                         int64
          dtypes: float64(11), int64(1)
          memory usage: 1.1 KB
In [75]:
Out[75]: Index(['fixed acidity', 'volatile acidity', 'citric acid', 'residual sugar',
                  'chlorides', 'free sulfur dioxide', 'total sulfur dioxide', 'density',
                  'pH', 'sulphates'],
                 dtype='object')
'pH']]
Out[77]:
                 fixed
                         volatile
                                  citric
                                                             free sulfur
                                                                        total sulfur
                                          residual
                                                  chlorides
                                                                                   density
                                                                                           pН
               acidity
                         acidity
                                   acid
                                            sugar
                                                               dioxide
                                                                           dioxide
           0
                  7.4
                            0.70
                                   0.00
                                              1.9
                                                      0.076
                                                                  11.0
                                                                              34.0
                                                                                   0.9978
                                                                                         3.51
           1
                  7.8
                            0.88
                                   0.00
                                              2.6
                                                      0.098
                                                                  25.0
                                                                                   0.9968 3.20
                                                                             67.0
           2
                  7.8
                            0.76
                                                      0.092
                                   0.04
                                              2.3
                                                                  15.0
                                                                              54.0
                                                                                   0.9970 3.26
           3
                  11.2
                            0.28
                                   0.56
                                              1.9
                                                      0.075
                                                                  17.0
                                                                             60.0
                                                                                   0.9980 3.16
           4
                  7.4
                            0.70
                                   0.00
                                              1.9
                                                      0.076
                                                                  11.0
                                                                             34.0
                                                                                   0.9978 3.51
           5
                  7.4
                            0.66
                                   0.00
                                              1.8
                                                      0.075
                                                                  13.0
                                                                              40.0
                                                                                   0.9978 3.51
           6
                  7.9
                            0.60
                                   0.06
                                              1.6
                                                      0.069
                                                                  15.0
                                                                              59.0
                                                                                   0.9964
                                                                                          3.30
           7
                                                                                   0.9946 3.39
                  7.3
                            0.65
                                   0.00
                                              1.2
                                                      0.065
                                                                  15.0
                                                                             21.0
           8
                  7.8
                            0.58
                                   0.02
                                              2.0
                                                      0.073
                                                                   9.0
                                                                              18.0
                                                                                   0.9968
                                                                                          3.36
           9
                            0.50
                                                      0.071
                  7.5
                                   0.36
                                              6.1
                                                                  17.0
                                                                             102.0
                                                                                   0.9978 3.35
```

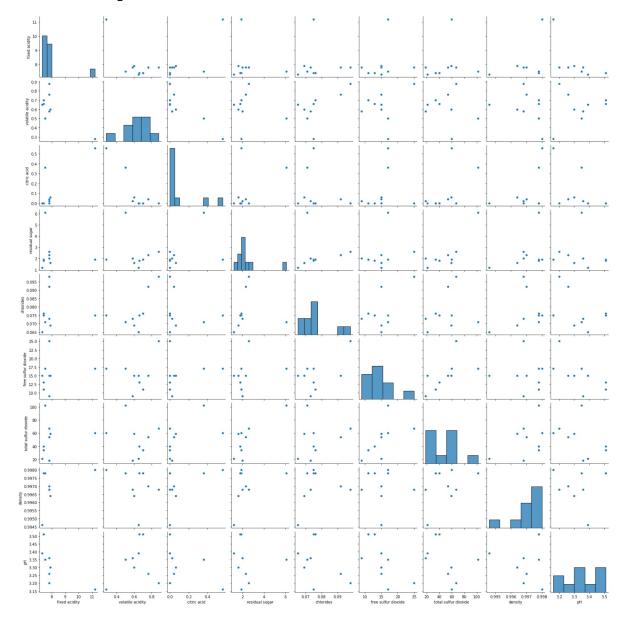
In [78]:

Out[78]:

	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	
count	10.000000	10.000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	1(
mean	7.950000	0.631	0.104000	2.330000	0.077000	14.800000	48.900000	0.997080	;
std	1.162612	0.161	0.194548	1.376025	0.010198	4.467164	25.066356	0.001038	(
min	7.300000	0.280	0.000000	1.200000	0.065000	9.000000	18.000000	0.994600	;
25%	7.400000	0.585	0.000000	1.825000	0.071500	11.500000	34.000000	0.996800	;
50%	7.650000	0.655	0.010000	1.900000	0.075000	15.000000	47.000000	0.997400	;
75%	7.800000	0.700	0.055000	2.225000	0.076000	16.500000	59.750000	0.997800	;
max	11.200000	0.880	0.560000	6.100000	0.098000	25.000000	102.000000	0.998000	(

In [79]:

Out[79]: <seaborn.axisgrid.PairGrid at 0x1e647eebc40>

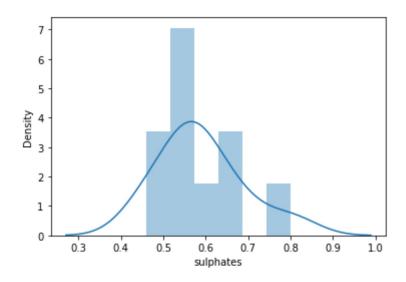


In [81]:

C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut ureWarning: `distplot` is a deprecated function and will be removed in a futu re version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for hi stograms).

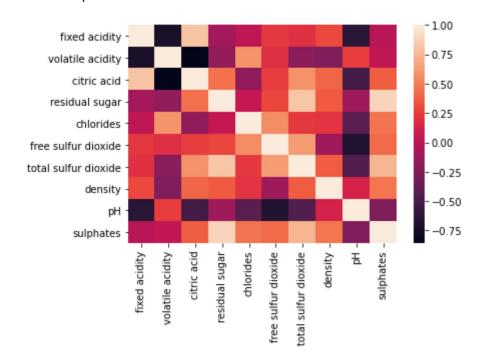
warnings.warn(msg, FutureWarning)

Out[81]: <AxesSubplot:xlabel='sulphates', ylabel='Density'>



In [83]: (**)

Out[83]: <AxesSubplot:>



```
'pH', 'sulphates', ]]
In [86]: # to split my dataset into traning and test date
         from sklearn.model_selection import train_test_split
In [87]: from sklearn.linear_model import LinearRegression
         lr=LinearRegression()
Out[87]: LinearRegression()
In [88]:
         -0.9703780205212952
         coeff=pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
Out[89]:
                        Co-efficient
              fixed acidity
                          0.141824
             volatile acidity
                          0.098129
                citric acid
                          -0.078670
             residual sugar
                          0.037998
                chlorides
                          0.010764
          free sulfur dioxide
                          -0.001724
          total sulfur dioxide
                          0.001851
                          0.002353
                  density
                     рΗ
                          0.076197
                sulphates
                          0.045368
```

```
In [90]: prediction=lr.predict(x_test)
Out[90]: <matplotlib.collections.PathCollection at 0x1e65c254940>
         1.0
         0.9
         0.8
         0.7
         0.6
                   0.48
                         0.50
                               0.52
                                     0.54
             0.46
                                                  0.58
In [91]:
Out[91]: -26.270529520100197
In [92]:
Out[92]: 1.0
In [93]:
In [94]: rr=Ridge(alpha=10)
        rr.fit(x_train,y_train)
Out[94]: -4.562504032997997
In [95]: la=Lasso(alpha=10)
Out[95]: Lasso(alpha=10)
In [96]:
Out[96]: -2.2950131665569473
In [ ]:
```

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