

25-07-2023

```
In [1]: import numpy as np
import pandas as pd
```

```
In [110]: a=pd.read_csv(r"C:\Users\user\Downloads\8_BreastCancerPrediction (1).csv")
a
```

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	
...	
564	926424	M	21.56	22.39	142.00	1479.0	
565	926682	M	20.13	28.25	131.20	1261.0	
566	926954	M	16.60	28.08	108.30	858.1	
567	927241	M	20.60	29.33	140.10	1265.0	
568	92751	B	7.76	24.54	47.92	181.0	

```
In [111]: a=a.head(35)
a
```

13	846381	M	15.850	23.95	103.70	782.7	
14	84667401	M	13.730	22.61	93.60	578.3	
15	84799002	M	14.540	27.54	96.73	658.8	
16	848406	M	14.680	20.13	94.74	684.5	
17	84862001	M	16.130	20.68	108.10	798.8	
18	849014	M	19.810	22.15	130.00	1260.0	
19	8510426	B	13.540	14.36	87.46	566.3	
20	8510653	B	13.080	15.71	85.63	520.0	
21	8510824	B	9.504	12.44	60.34	273.9	
22	8511133	M	15.340	14.26	102.50	704.4	
23	851509	M	21.160	23.04	137.20	1404.0	
24	852552	M	16.650	21.38	110.00	904.6	


```
In [113]: a.mean()
```

```
Out[113]: id                2.566194e+07
radius_mean            1.602583e+01
texture_mean           2.003743e+01
perimeter_mean         1.061217e+02
area_mean              8.250857e+02
smoothness_mean        1.064506e-01
compactness_mean        1.564411e-01
concavity_mean          1.514300e-01
concave points_mean     8.328171e-02
symmetry_mean           2.047714e-01
fractal_dimension_mean  6.684343e-02
radius_se              5.399457e-01
texture_se              1.098134e+00
perimeter_se            3.926629e+00
area_se                 5.936257e+01
smoothness_se           6.541514e-03
compactness_se           3.306740e-02
concavity_se            3.852257e-02
concave points_se       1.453546e-02
symmetry_se             2.108657e-02
fractal_dimension_se    4.590914e-03
radius_worst            1.985257e+01
texture_worst           2.781886e+01
perimeter_worst         1.337697e+02
area_worst              1.267786e+03
smoothness_worst        1.507171e-01
compactness_worst       4.370171e-01
concavity_worst         4.646134e-01
concave points_worst    1.844957e-01
symmetry_worst          3.595429e-01
fractal_dimension_worst  1.038249e-01
Unnamed: 32              NaN
dtype: float64
```

```
In [114]: a.median()
```

```
Out[114]: id                853401.000000
radius_mean              16.020000
texture_mean             20.680000
perimeter_mean          103.700000
area_mean                797.800000
smoothness_mean          0.106400
compactness_mean         0.155900
concavity_mean           0.152500
concave points_mean      0.080890
symmetry_mean            0.199800
fractal_dimension_mean   0.065150
radius_se                 0.495600
texture_se                1.002000
perimeter_se             3.475000
area_se                  50.960000
smoothness_se            0.006150
compactness_se           0.030570
concavity_se             0.035530
concave points_se        0.013150
symmetry_se              0.019250
fractal_dimension_se     0.003896
radius_worst             20.210000
texture_worst            28.120000
perimeter_worst          134.900000
area_worst               1261.000000
smoothness_worst         0.149100
compactness_worst        0.394900
concavity_worst          0.469500
concave points_worst     0.184800
symmetry_worst           0.359600
fractal_dimension_worst  0.098760
Unnamed: 32              NaN
dtype: float64
```

In [115]: `a.mode()`

Out[115]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_r
0	842302	M	16.13	10.38	130.0	273.9	0.
1	842517	NaN	NaN	12.44	NaN	386.1	
2	843786	NaN	NaN	14.26	NaN	440.6	
3	844359	NaN	NaN	14.34	NaN	475.9	
4	844981	NaN	NaN	14.36	NaN	477.1	
5	845636	NaN	NaN	15.05	NaN	519.8	
6	846226	NaN	NaN	15.70	NaN	520.0	
7	846381	NaN	NaN	15.71	NaN	566.3	
8	848406	NaN	NaN	16.40	NaN	577.9	
9	849014	NaN	NaN	17.77	NaN	578.3	
10	851509	NaN	NaN	17.88	NaN	644.8	
11	852552	NaN	NaN	17.89	NaN	658.8	
12	852631	NaN	NaN	18.70	NaN	684.5	
13	852763	NaN	NaN	19.98	NaN	704.4	
14	852781	NaN	NaN	20.13	NaN	732.4	
15	852973	NaN	NaN	20.25	NaN	781.0	
16	853201	NaN	NaN	20.38	NaN	782.7	
17	853401	NaN	NaN	20.68	NaN	797.8	
18	853612	NaN	NaN	20.83	NaN	798.8	
19	854002	NaN	NaN	21.25	NaN	807.2	
20	854039	NaN	NaN	21.38	NaN	899.3	
21	8510426	NaN	NaN	21.53	NaN	904.6	
22	8510653	NaN	NaN	21.82	NaN	912.7	
23	8510824	NaN	NaN	22.15	NaN	955.1	
24	8511133	NaN	NaN	22.61	NaN	1001.0	
25	84300903	NaN	NaN	23.04	NaN	1040.0	
26	84348301	NaN	NaN	23.24	NaN	1088.0	
27	84358402	NaN	NaN	23.95	NaN	1094.0	
28	84458202	NaN	NaN	23.98	NaN	1123.0	
29	84501001	NaN	NaN	24.04	NaN	1162.0	
30	84610002	NaN	NaN	24.80	NaN	1203.0	
31	84667401	NaN	NaN	25.11	NaN	1260.0	
32	84799002	NaN	NaN	25.27	NaN	1297.0	
33	84862001	NaN	NaN	26.47	NaN	1326.0	
34	85382601	NaN	NaN	27.54	NaN	1404.0	

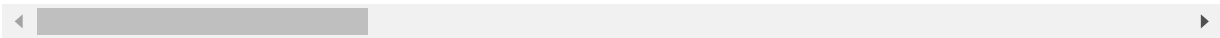
35 rows × 33 columns

```
In [116]: a.describe()
```

Out[116]:

	id	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean
count	3.500000e+01	35.000000	35.000000	35.000000	35.000000	35.000000
mean	2.566194e+07	16.025829	20.037429	106.121714	825.085714	0.106450
std	3.791531e+07	2.916759	4.206016	19.367295	295.513759	0.013160
min	8.423020e+05	9.504000	10.380000	60.340000	273.900000	0.082060
25%	8.487100e+05	13.720000	17.085000	91.900000	578.100000	0.097590
50%	8.534010e+05	16.020000	20.680000	103.700000	797.800000	0.106400
75%	8.432460e+07	18.430000	23.140000	122.450000	1064.000000	0.115450
max	8.538260e+07	21.160000	27.540000	137.200000	1404.000000	0.142500

8 rows × 32 columns



In [117]: `a.cumsum()`

Out[117]:

	id	diagnosis	radius_mean	texture_m
0	842302	M	17.990	10
1	1684819	MM	38.560	28
2	85985722	MMM	58.250	49
3	170334023	MMMM	69.670	69
4	254692425	MMMMM	89.960	84
5	255536211	MMMMMM	102.410	99
6	256380570	MMMMMMM	120.660	119
7	340838772	MMMMMMMM	134.370	140
8	341683753	MMMMMMMMM	147.370	162
9	426184754	MMMMMMMMMM	159.830	186
10	427030390	MMMMMMMMMMM	175.850	209
11	511640392	MMMMMMMMMMMM	191.630	227
12	512486618	MMMMMMMMMMMMM	210.800	252
13	513332999	MMMMMMMMMMMMMM	226.650	276
14	598000400	MMMMMMMMMMMMMMM	240.380	298
15	682799402	MMMMMMMMMMMMMMM	254.920	326
16	683647808	MMMMMMMMMMMMMMMM	269.600	346
17	768509809	MMMMMMMMMMMMMMMM	285.730	367
18	769358823	MMMMMMMMMMMMMMMM	305.540	389
19	777869249	MMMMMMMMMMMMMMMMMB	319.080	407
20	786379902	MMMMMMMMMMMMMMMMMBB	332.160	419
21	794890726	MMMMMMMMMMMMMMMMMBBB	341.664	437
22	803401859	MMMMMMMMMMMMMMMMMBBBM	357.004	446
23	804253368	MMMMMMMMMMMMMMMMMBBBMM	378.164	469
24	805105920	MMMMMMMMMMMMMMMMMBBBMMM	394.814	490
25	805958551	MMMMMMMMMMMMMMMMMBBBMMMM	411.954	507
26	806811314	MMMMMMMMMMMMMMMMMBBBMMMMM	426.534	528
27	807664095	MMMMMMMMMMMMMMMMMBBBMMMMMM	445.144	548
28	808517068	MMMMMMMMMMMMMMMMMBBBMMMMMMM	460.444	574
29	809370269	MMMMMMMMMMMMMMMMMBBBMMMMMMMM	478.014	589
30	810223670	MMMMMMMMMMMMMMMMMBBBMMMMMMMMM	496.644	614
31	811077282	MMMMMMMMMMMMMMMMMBBBMMMMMMMMMM	508.484	632
32	896459883	MMMMMMMMMMMMMMMMMBBBMMMMMMMMMMM	525.504	656
33	897313885	MMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMM	544.774	683
34	898167924	MMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMM	560.904	707

35 rows × 33 columns

```
In [118]: a.count()
```

```
Out[118]: id          35
          diagnosis    35
          radius_mean  35
          texture_mean 35
          perimeter_mean 35
          area_mean    35
          smoothness_mean 35
          compactness_mean 35
          concavity_mean 35
          concave points_mean 35
          symmetry_mean 35
          fractal_dimension_mean 35
          radius_se     35
          texture_se    35
          perimeter_se  35
          area_se       35
          smoothness_se 35
          compactness_se 35
          concavity_se  35
          concave points_se 35
          symmetry_se   35
          fractal_dimension_se 35
          radius_worst  35
          texture_worst 35
          perimeter_worst 35
          area_worst    35
          smoothness_worst 35
          compactness_worst 35
          concavity_worst 35
          concave points_worst 35
          symmetry_worst 35
          fractal_dimension_worst 35
          Unnamed: 32    0
          dtype: int64
```

```
In [119]: a.min()
```

```
Out[119]: id            842302
          diagnosis      B
          radius_mean    9.504
          texture_mean   10.38
          perimeter_mean 60.34
          area_mean      273.9
          smoothness_mean 0.08206
          compactness_mean 0.06492
          concavity_mean 0.02956
          concave points_mean 0.02076
          symmetry_mean   0.1528
          fractal_dimension_mean 0.05278
          radius_se       0.1852
          texture_se      0.6062
          perimeter_se    1.383
          area_se         14.67
          smoothness_se   0.003139
          compactness_se  0.009269
          concavity_se    0.01101
          concave points_se 0.00649
          symmetry_se      0.01083
          fractal_dimension_se 0.001987
          radius_worst    10.23
          texture_worst   15.66
          perimeter_worst 65.13
          area_worst      314.9
          smoothness_worst 0.1037
          compactness_worst 0.1148
          concavity_worst 0.08867
          concave points_worst 0.06227
          symmetry_worst   0.2341
          fractal_dimension_worst 0.06287
          Unnamed: 32      NaN
          dtype: object
```

```
In [120]: a.max()
```

```
Out[120]: id                        85382601
diagnosis                          M
radius_mean                       21.16
texture_mean                       27.54
perimeter_mean                    137.2
area_mean                         1404.0
smoothness_mean                   0.1425
compactness_mean                   0.2839
concavity_mean                     0.3001
concave points_mean                0.1471
symmetry_mean                      0.304
fractal_dimension_mean             0.09744
radius_se                          1.095
texture_se                         3.568
perimeter_se                       11.07
area_se                           153.4
smoothness_se                      0.01149
compactness_se                     0.08297
concavity_se                       0.0889
concave points_se                  0.0409
symmetry_se                        0.05963
fractal_dimension_se               0.01284
radius_worst                       29.17
texture_worst                      40.68
perimeter_worst                    188.0
area_worst                        2615.0
smoothness_worst                   0.2098
compactness_worst                   1.058
concavity_worst                     1.105
concave points_worst               0.2701
symmetry_worst                     0.6638
fractal_dimension_worst            0.2075
Unnamed: 32                        NaN
dtype: object
```

```
In [121]: from numpy import cov
```

```
In [122]: cov(a['smoothness_se'])
```

```
Out[122]: array(4.0341329e-06)
```

```
In [123]: from scipy.stats import pearsonr
pearsonr(a['id'],a['area_mean'])
```

```
Out[123]: (-0.15572714293709977, 0.3716952303748376)
```

```
In [124]: from scipy.stats import spearmanr
spearmanr(a['symmetry_mean'],a['concavity_mean'])
```

```
Out[124]: SpearmanrResult(correlation=0.6482246671824731, pvalue=2.547136554645391e-05)
```

