

```

1 Enter # of Target Variables: 1
2     pelvic_incidence  pelvic_tilt  lumbar_lordosis_angle  sacral_slope \
3 0          63.028      22.553           39.609        40.475
4 1          39.057      10.061           25.015        28.996
5 2          68.832      22.218           50.092        46.614
6 3          69.297      24.653           44.311        44.644
7 4          49.713      9.652            28.317        40.061
8
9     pelvic_radius  degree_spondylolisthesis  pelvic_slope  Direct_tilt \
10 0         98.673          -0.254        0.745       12.566
11 1        114.405          4.564        0.415       12.887
12 2        105.985          -3.530        0.475       26.834
13 3        101.868          11.212        0.369       23.560
14 4        108.169          7.919        0.543       35.494
15
16     thoracic_slope  cervical_tilt  sacrum_angle  scoliosis_slope Class_att
17 0        14.539        15.305       -28.659       43.512  Abnormal
18 1        17.532        16.785       -25.531       16.110  Abnormal
19 2        17.486        16.659       -29.032       19.222  Abnormal
20 3        12.707        11.424       -30.470       18.833  Abnormal
21 4        15.955        8.872       -16.378       24.917  Abnormal
22
23 List of Features:
24 ['pelvic_incidence', 'pelvic_tilt', 'lumbar_lordosis_angle', 'sacral_slope',
25 'pelvic_radius', 'degree_spondylolisthesis', 'pelvic_slope', 'Direct_tilt',
26 'thoracic_slope', 'cervical_tilt', 'sacrum_angle', 'scoliosis_slope']
27
28 List of Targets:
29 ['Class_att']
30
31     pelvic_incidence  pelvic_tilt  lumbar_lordosis_angle  sacral_slope \
32 count    310.000000  310.000000  310.000000  310.000000
33 mean     60.496677  17.542813   51.930919  42.953826
34 std      17.236536  10.008321   18.554046  13.423121
35 min      26.148000  -6.555000   14.000000  13.367000
36 25%     46.430000  10.667250   37.000000  33.347250
37 50%     58.691500  16.357500   49.562500  42.405000
38 75%     72.878000  22.120500   63.000000  52.696000
39 max     129.834000  49.432000   125.742000 121.430000
40
41     pelvic_radius  degree_spondylolisthesis  pelvic_slope  Direct_tilt \
42 count    310.000000          310.000000  310.000000  310.000000
43 mean     117.920674          26.296694  0.47299   21.321500
44 std      13.317389          37.559017  0.28582   8.639435
45 min      70.083000          -11.058000  0.00300   7.027000
46 25%     110.709250          1.604000   0.22475   13.054250
47 50%     118.268000          11.768000  0.47600   21.907000
48 75%     125.467500          41.287500  0.70500   28.953750
49 max     163.071000          418.543000  0.99900   36.744000
50
51     thoracic_slope  cervical_tilt  sacrum_angle  scoliosis_slope
52 count    310.000000  310.000000  310.000000  310.000000
53 mean     13.064513  11.933332  -14.053177  25.645987
54 std      3.399699  2.893275   12.225595  10.450537
55 min      7.038000  7.031000  -35.287000  7.008000
56 25%     10.417750  9.541250  -24.289500  17.188750
57 50%     12.938500  11.954000  -14.623000  24.932000
58 75%     15.889500  14.371500  -3.496750  33.979500
59 max     19.324000  16.821000   6.972000  44.341000
60
61 Training set score: 0.839
62 Test set score: 0.882
63 Warning: Maximum number of iterations has been exceeded.
64 Current function value: 7.886647
65 Iterations: 35
66 Results: Logit
67 =====
68 Model:          Logit          Pseudo R-squared: -11.178
69 Dependent Variable: y          AIC:            3446.8049
70 Date:          2021-03-21 10:59  BIC:            3487.3636
71 No. Observations: 217          Log-Likelihood: -1711.4
72 Df Model:        11           LL-Null:        -140.53
73 Df Residuals:    205          LLR p-value:     1.0000

```

```

74 Converged: 0.0000 Scale: 1.0000
75 No. Iterations: 35.0000
76 -----
77 Coef. Std.Err. z P>|z| [0.025 0.975]
78 -----
79 x1 -1142573.4329 509613.9569 -2.2420 0.0250 -2141398.4344 -143748.4315
80 x2 642974.2455 286781.0504 2.2420 0.0250 80893.7153 1205054.7757
81 x3 3.5160 2.1709 1.6195 0.1053 -0.7390 7.7709
82 x4 926554.3134 413264.0998 2.2420 0.0250 116571.5617 1736537.0651
83 x5 -22.2673 9.9289 -2.2427 0.0249 -41.7276 -2.8069
84 x6 33.9472 15.5980 2.1764 0.0295 3.3757 64.5186
85 x7 -1.2469 0.7419 -1.6807 0.0928 -2.7011 0.2072
86 x8 -3.3025 1.4878 -2.2198 0.0264 -6.2184 -0.3865
87 x9 3.9210 2.0228 1.9384 0.0526 -0.0437 7.8857
88 x10 5.9020 2.4801 2.3797 0.0173 1.0411 10.7630
89 x11 -0.1529 0.5684 -0.2690 0.7879 -1.2670 0.9612
90 x12 -3.5706 1.6937 -2.1082 0.0350 -6.8901 -0.2511
91 =====
92
93 Training set score: 0.853
94 Test set score: 0.882
95 Optimization terminated successfully.
96 Current function value: 0.464756
97 Iterations 7
98 Results: Logit
99 -----
100 Model: Logit Pseudo R-squared: 0.282
101 Dependent Variable: y AIC: 221.7040
102 Date: 2021-03-21 10:59 BIC: 255.5030
103 No. Observations: 217 Log-Likelihood: -100.85
104 Df Model: 9 LL-Null: -140.53
105 Df Residuals: 207 LLR p-value: 2.1758e-13
106 Converged: 1.0000 Scale: 1.0000
107 No. Iterations: 7.0000
108 -----
109 Coef. Std.Err. z P>|z| [0.025 0.975]
110 -----
111 x1 0.2312 0.2309 1.0013 0.3167 -0.2214 0.6839
112 x2 -0.8025 0.2559 -3.1365 0.0017 -1.3040 -0.3010
113 x3 -1.0456 0.2348 -4.4524 0.0000 -1.5058 -0.5853
114 x4 2.2779 0.4185 5.4427 0.0000 1.4576 3.0981
115 x5 0.0907 0.1759 0.5157 0.6061 -0.2540 0.4354
116 x6 -0.0040 0.1758 -0.0227 0.9819 -0.3486 0.3406
117 x7 -0.0005 0.1748 -0.0030 0.9976 -0.3431 0.3420
118 x8 0.3346 0.1754 1.9076 0.0564 -0.0092 0.6784
119 x9 -0.0620 0.1781 -0.3483 0.7276 -0.4110 0.2870
120 x10 -0.0431 0.1770 -0.2435 0.8076 -0.3899 0.3037
121 =====
122
123   pelvic_radius degree_spondylolisthesis
124 0 98.673 -0.254
125 1 114.405 4.564
126 2 105.985 -3.530
127 3 101.868 11.212
128 4 108.169 7.919
129 Training set score: 0.793
130 Test set score: 0.839
131 Optimization terminated successfully.
132 Current function value: 0.510586
133 Iterations 6
134 Results: Logit
135 -----
136 Model: Logit Pseudo R-squared: 0.212
137 Dependent Variable: y AIC: 225.5945
138 Date: 2021-03-21 10:59 BIC: 232.3543
139 No. Observations: 217 Log-Likelihood: -110.80
140 Df Model: 1 LL-Null: -140.53
141 Df Residuals: 215 LLR p-value: 1.2485e-14
142 Converged: 1.0000 Scale: 1.0000
143 No. Iterations: 6.0000
144 -----
145 Coef. Std.Err. z P>|z| [0.025 0.975]
146 -----

```

```
147 x1 -0.7484 0.1957 -3.8245 0.0001 -1.1320 -0.3649
148 x2 1.6879 0.2672 6.3173 0.0000 1.1642 2.2116
149 =====
150
151
152         precision    recall   f1-score   support
153
154     Abnormal      0.68      0.71      0.69       24
155     Normal       0.90      0.88      0.89       69
156
157     accuracy          0.84
158     macro avg      0.79      0.80      0.79       93
159     weighted avg    0.84      0.84      0.84       93
```