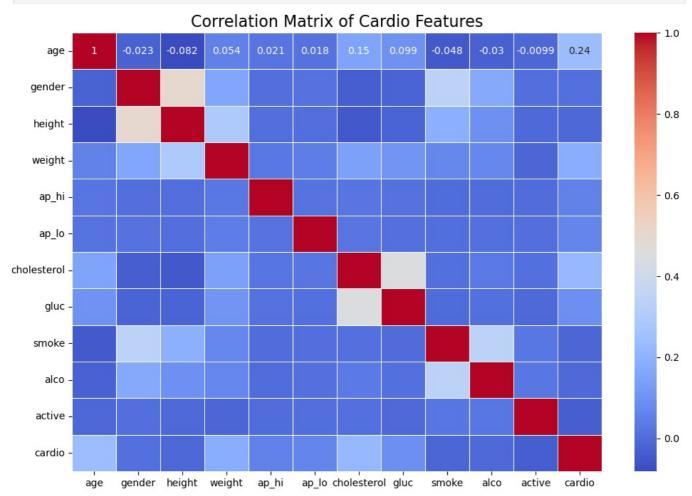
## CORRELATION MATRIX

```
In [2]:
          import pandas as pd
          import matplotlib.pyplot as plt
          import seaborn as sns
 In [4]:
          # Load the dataset
          df1=pd.read_csv(r"C:\Users\bhava\Downloads\cardio_train.csv")
          df1
 Out[4]:
                  id;age;gender;height;weight;ap hi;ap lo;cholesterol;gluc;smoke;alco;active;cardio
               0
                                                             0;18393;2;168;62.0;110;80;1;1;0;0;1;0
                                                              1;20228;1;156;85.0;140;90;3;1;0;0;1;1
               2
                                                             2;18857;1;165;64.0;130;70;3;1;0;0;0;1
               3
                                                             3;17623;2;169;82.0;150;100;1;1;0;0;1;1
               4
                                                             4;17474;1;156;56.0;100;60;1;1;0;0;0;0
          69995
                                                         99993;19240;2;168;76.0;120;80;1;1;1;0;1;0
          69996
                                                        99995;22601;1;158;126.0;140;90;2;2;0;0;1;1
          69997
                                                        99996;19066;2;183;105.0;180;90;3;1;0;1;0;1
           69998
                                                         99998;22431;1;163;72.0;135;80;1;2;0;0;0;1
                                                         99999;20540;1;170;72.0;120;80;2;1;0;0;1;0
          69999
          70000 rows × 1 columns
 In [8]:
         df1=pd.read_csv(r"C:\Users\bhava\Downloads\cardio_train.csv",delimiter=';')
 Out[8]:
                      id
                                gender height weight ap_hi ap_lo cholesterol
                                                                                  gluc
                                                                                       smoke
                                                                                                alco
                                                                                                      active
                           age
               0
                      0
                        18393
                                      2
                                            168
                                                   62.0
                                                          110
                                                                  80
                                                                                             0
                                                                                                   0
                                                                                                                  0
                                                                                             0
                                                                                                   0
               1
                         20228
                                           156
                                                   85.0
                                                          140
                                                                  90
                                                                                3
               2
                                                                                             0
                                                                                                   0
                                                                                                          0
                      2 18857
                                      1
                                           165
                                                                  70
                                                                               3
                                                                                     1
                                                                                                                  1
                                                   64 0
                                                          130
               3
                        17623
                                           169
                                                   82.0
                                                          150
                                                                 100
                                                                                                   0
               4
                      4 17474
                                      1
                                            156
                                                   56.0
                                                          100
                                                                  60
                                                                                1
                                                                                     1
                                                                                             0
                                                                                                   0
                                                                                                          0
                                                                                                                  0
           69995 99993
                         19240
                                      2
                                           168
                                                                  80
                                                                                     1
                                                                                                   0
                                                                                                          1
                                                                                                                  0
                                                   76.0
                                                          120
                                                                                1
                                                                                             1
           69996 99995
                         22601
                                           158
                                                  126.0
                                                          140
                                                                  90
                                                                               2
                                                                                     2
                                                                                             0
                                                                                                   0
           69997 99996
                         19066
                                      2
                                            183
                                                  105.0
                                                          180
                                                                  90
                                                                               3
                                                                                     1
                                                                                             0
                                                                                                   1
                                                                                                          0
                                                                                                                  1
                                                                                     2
                                                                                                          0
           69998
                  99998
                         22431
                                            163
                                                   72.0
                                                          135
                                                                  80
                                                                                             0
                                                                                                   0
                                                                                                                  1
          69999 99999 20540
                                                   72.0
                                                                               2
                                                                                             0
                                                                                                   0
                                                                                                          1
                                                                                                                  0
                                           170
                                                          120
                                                                  80
                                                                                     1
          70000 rows × 13 columns
In [16]: # Select relevant features for the correlation matrix
          features = ['age','gender', 'height', 'weight', 'ap_hi', 'ap_lo', 'cholesterol', 'gluc', 'smoke', 'alco', 'activ
          features
Out[16]: ['age',
            'gender',
            'height',
            'weight',
            'ap hi',
            'ap_lo',
            'cholesterol',
            'gluc',
            'smoke',
            'alco',
            'active'
            'cardio']
In [18]: # Calculate the correlation matrix
          correlation_matrix = df1[features].corr()
          correlation_matrix
```

	: [			

0.004545								
-0.081515	0.053684	0.020764	0.017647	0.154424	0.098703	-0.047633	-0.029723	-0.009927
0.499033	0.155406	0.006005	0.015254	-0.035821	-0.020491	0.338135	0.170966	0.005866
1.000000	0.290968	0.005488	0.006150	-0.050226	-0.018595	0.187989	0.094419	-0.006570
0.290968	1.000000	0.030702	0.043710	0.141768	0.106857	0.067780	0.067113	-0.016867
0.005488	0.030702	1.000000	0.016086	0.023778	0.011841	-0.000922	0.001408	-0.000033
0.006150	0.043710	0.016086	1.000000	0.024019	0.010806	0.005186	0.010601	0.004780
-0.050226	0.141768	0.023778	0.024019	1.000000	0.451578	0.010354	0.035760	0.009911
-0.018595	0.106857	0.011841	0.010806	0.451578	1.000000	-0.004756	0.011246	-0.006770
0.187989	0.067780	-0.000922	0.005186	0.010354	-0.004756	1.000000	0.340094	0.025858
0.094419	0.067113	0.001408	0.010601	0.035760	0.011246	0.340094	1.000000	0.025476
-0.006570	-0.016867	-0.000033	0.004780	0.009911	-0.006770	0.025858	0.025476	1.000000
-0.010821	0.181660	0.054475	0.065719	0.221147	0.089307	-0.015486	-0.007330	-0.035653
1 1 5	3 1.000000 6 0.290968 5 0.005488 4 0.006150 1 -0.050226 1 -0.018595 5 0.187989 6 0.094419 6 -0.006570	0 0.499033 0.155406 3 1.000000 0.290968 6 0.290968 1.000000 5 0.005488 0.030702 4 0.006150 0.043710 1 -0.050226 0.141768 1 -0.018595 0.106857 5 0.187989 0.067780 6 0.094419 0.067113 6 -0.006570 -0.016867	0       0.499033       0.155406       0.006005         3       1.000000       0.290968       0.005488         6       0.290968       1.000000       0.030702         5       0.005488       0.030702       1.000000         4       0.006150       0.043710       0.016086         1       -0.050226       0.141768       0.023778         1       -0.018595       0.106857       0.011841         5       0.187989       0.067780       -0.000922         6       0.094419       0.067113       0.001408         6       -0.006570       -0.016867       -0.000033	0         0.499033         0.155406         0.006005         0.015254           3         1.000000         0.290968         0.005488         0.006150           6         0.290968         1.000000         0.030702         0.043710           5         0.005488         0.030702         1.000000         0.016086           4         0.006150         0.043710         0.016086         1.000000           1         -0.050226         0.141768         0.023778         0.024019           1         -0.018595         0.106857         0.011841         0.010806           5         0.187989         0.067780         -0.000922         0.005186           6         0.094419         0.067113         0.001408         0.010601           6         -0.006570         -0.016867         -0.000033         0.004780	0         0.499033         0.155406         0.006005         0.015254         -0.035821           3         1.000000         0.290968         0.005488         0.006150         -0.050226           6         0.290968         1.000000         0.030702         0.043710         0.141768           5         0.005488         0.030702         1.000000         0.016086         0.023778           4         0.006150         0.043710         0.016086         1.000000         0.024019           1         -0.050226         0.141768         0.023778         0.024019         1.000000           1         -0.018595         0.106857         0.011841         0.010806         0.451578           5         0.187989         0.067780         -0.000922         0.005186         0.010354           6         0.094419         0.067113         0.001408         0.010601         0.035760           6         -0.006570         -0.016867         -0.000033         0.004780         0.009911	0       0.499033       0.155406       0.006005       0.015254       -0.035821       -0.020491         3       1.000000       0.290968       0.005488       0.006150       -0.050226       -0.018595         6       0.290968       1.000000       0.030702       0.043710       0.141768       0.106857         5       0.005488       0.030702       1.000000       0.016086       0.023778       0.011841         4       0.006150       0.043710       0.016086       1.000000       0.024019       0.010806         1       -0.050226       0.141768       0.023778       0.024019       1.000000       0.451578         1       -0.018595       0.106857       0.011841       0.010806       0.451578       1.000000         5       0.187989       0.067780       -0.000922       0.005186       0.010354       -0.004756         6       0.094419       0.067113       0.001408       0.010601       0.035760       0.011246         6       -0.006570       -0.016867       -0.000033       0.004780       0.009911       -0.006770	0         0.499033         0.155406         0.006005         0.015254         -0.035821         -0.020491         0.338135           3         1.000000         0.290968         0.005488         0.006150         -0.050226         -0.018595         0.187989           6         0.290968         1.000000         0.043710         0.141768         0.106857         0.067780           5         0.005488         0.030702         1.000000         0.016086         0.023778         0.011841         -0.000922           4         0.006150         0.043710         0.016086         1.000000         0.024019         0.010806         0.005186           1         -0.050226         0.141768         0.023778         0.024019         1.000000         0.451578         0.010354           1         -0.018595         0.106857         0.011841         0.010806         0.451578         1.000000         -0.004756           5         0.187989         0.067780         -0.000922         0.005186         0.010354         -0.004756         1.000000           6         0.094419         0.067113         0.001408         0.010601         0.035760         0.011246         0.340094           6         -0.006570         -0.016867 <th>0         0.499033         0.155406         0.006005         0.015254         -0.035821         -0.020491         0.338135         0.170966           3         1.000000         0.290968         0.005488         0.006150         -0.050226         -0.018595         0.187989         0.094419           6         0.290968         1.000000         0.043710         0.141768         0.106857         0.067780         0.067113           5         0.005488         0.030702         1.000000         0.016086         0.023778         0.011841         -0.000922         0.001408           4         0.006150         0.043710         0.016086         1.000000         0.024019         0.010806         0.005186         0.010601           1         -0.050226         0.141768         0.023778         0.024019         1.000000         0.451578         0.010354         0.035760           1         -0.018595         0.106857         0.011841         0.010806         0.451578         1.000000         -0.004756         0.011246           5         0.187989         0.067780         -0.00922         0.005186         0.010354         -0.004756         1.000000         0.340094           6         0.094419         0.066570         -</th>	0         0.499033         0.155406         0.006005         0.015254         -0.035821         -0.020491         0.338135         0.170966           3         1.000000         0.290968         0.005488         0.006150         -0.050226         -0.018595         0.187989         0.094419           6         0.290968         1.000000         0.043710         0.141768         0.106857         0.067780         0.067113           5         0.005488         0.030702         1.000000         0.016086         0.023778         0.011841         -0.000922         0.001408           4         0.006150         0.043710         0.016086         1.000000         0.024019         0.010806         0.005186         0.010601           1         -0.050226         0.141768         0.023778         0.024019         1.000000         0.451578         0.010354         0.035760           1         -0.018595         0.106857         0.011841         0.010806         0.451578         1.000000         -0.004756         0.011246           5         0.187989         0.067780         -0.00922         0.005186         0.010354         -0.004756         1.000000         0.340094           6         0.094419         0.066570         -

In [20]: # Plotting the correlation heatmap
 plt.figure(figsize=(12, 8))
 sns.heatmap(correlation\_matrix, annot=True, cmap='coolwarm', linewidths=0.5)
 plt.title('Correlation Matrix of Cardio Features', fontsize=16)
 plt.show()



In [22]: # Display the correlation matrix
 print(correlation\_matrix)

	age	gender	height	weight	ap_hi	ap_lo \
age		•	-0.081515	0.053684	0.020764	0.017647
gender	-0.022811	1.000000	0.499033	0.155406	0.006005	0.015254
height	-0.081515	0.499033	1.000000	0.290968	0.005488	0.006150
weight	0.053684	0.155406	0.290968	1.000000	0.030702	0.043710
ap ĥi	0.020764	0.006005	0.005488	0.030702	1.000000	0.016086
ap_lo	0.017647	0.015254	0.006150	0.043710	0.016086	1.000000
cholesterol	0.154424	-0.035821	-0.050226	0.141768	0.023778	0.024019
gluc	0.098703	-0.020491	-0.018595	0.106857	0.011841	0.010806
smoke	-0.047633	0.338135	0.187989	0.067780	-0.000922	0.005186
alco	-0.029723	0.170966	0.094419	0.067113	0.001408	0.010601
active	-0.009927	0.005866	-0.006570	-0.016867	-0.000033	0.004780
cardio	0.238159	0.008109	-0.010821	0.181660	0.054475	0.065719
	cholester					
age	0.1544					
gender	-0.0358					
height	-0.0502					
weight	0.1417					
ap_hi	0.0237				08 -0.0000	33 0.054475
ap_lo	0.0240					
cholesterol	1.0000					
gluc	0.4515					
smoke	0.0103					
alco	0.0357					
active	0.0099					
cardio	0.2211	47 0.0893	07 -0.0154	86 -0.0073	30 -0.0356	53 1.000000

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