labeling-2

February 19, 2020

[1]:
```
import pandas as pd
import numpy as np
import scipy
from scipy import stats
import matplotlib.pyplot as plt
```

[2]:
```
df = pd.read_csv("windowing_results.csv")
```

[3]:
```
df
```

[3]:
```
      Unnamed: 0  ECG #           start_time             end_time  acc_count  \
0            svm      1  2019-11-21 09:35:27  2019-11-21 09:35:29     2271.0
1            svm      1  2019-11-21 09:35:28  2019-11-21 09:35:30     2287.0
2            svm      1  2019-11-21 09:35:29  2019-11-21 09:35:31     2288.0
3            svm      1  2019-11-21 09:35:30  2019-11-21 09:35:32     2294.0
4            svm      1  2019-11-21 09:35:31  2019-11-21 09:35:33     2283.0
...          ...    ...                  ...                  ...        ...
14192        svm      6  2019-11-21 11:00:35  2019-11-21 11:00:37     2087.0
14193        svm      6  2019-11-21 11:00:36  2019-11-21 11:00:38     2277.0
14194        svm      6  2019-11-21 11:00:37  2019-11-21 11:00:39     2279.0
14195        svm      6  2019-11-21 11:00:38  2019-11-21 11:00:40     2276.0
14196        svm      6  2019-11-21 11:00:39  2019-11-21 11:00:41     1518.0

       acc_mean   acc_std   acc_min   acc_25%   acc_50%  ...  gyro_25%  \
0      1.488039  0.008815  1.464329  1.482331  1.487741  ...  0.595793
1      1.487708  0.008177  1.464329  1.482331  1.487741  ...  0.508012
2      1.484074  0.007623  1.462431  1.478181  1.482889  ...  0.451361
3      1.487552  0.007213  1.462431  1.482889  1.488377  ...  0.449286
4      1.486918  0.006790  1.462431  1.482331  1.488377  ...  0.533525
...         ...       ...       ...       ...       ...  ...       ...
14192  1.601729  0.088580  1.501142  1.531028  1.566651  ...  1.838959
14193  1.584692  0.055840  1.501142  1.532493  1.579270  ...  2.090319
14194  1.634041  0.070983  1.502046  1.565519  1.651781  ...  2.356062
14195  1.701175  0.045277  1.584833  1.675359  1.706349  ...  2.275376
14196  1.727280  0.024522  1.678459  1.706349  1.721291  ...  2.325614

       gyro_50%  gyro_75%   gyro_max      gyro_eng  gyro_entropy  gyro_var  \
```

```
0      0.892834  1.257357   2.802878   2444.644866      7.727976  0.203803
1      0.779196  1.169292   2.802878   2203.410455      7.734996  0.208016
2      0.697942  1.106439   2.802878   2120.945536      7.735433  0.247652
3      0.673428  1.076882   2.895836   2354.323033      7.738052  0.314183
4      0.849516  1.426766   3.649751   3478.688197      7.733246  0.451992
…         …         …          …             …          …         …
14192  2.628791  3.736613  12.023601  25833.234557      7.643483  3.165173
14193  2.962076  3.977001  12.023601  30604.610546      7.730005  2.992684
14194  3.164181  4.072940  12.023601  33008.076912      7.730884  2.628023
14195  3.049675  3.954686  12.413456  29859.735732      7.729566  2.380862
14196  3.011691  3.944505  12.413456  21075.108897      7.325149  2.775818

       gyro_skew  gyro_kurt  gyro_mad
0       0.492299   0.014721  0.370100
1       0.772472   0.362000  0.374022
2       1.072809   0.951265  0.396192
3       1.283556   1.183364  0.433260
4       1.079871   0.786448  0.535704
…          …         …        …
14192   1.786256   4.765928  1.282278
14193   1.558248   4.272371  1.270297
14194   1.724908   5.127654  1.170044
14195   1.807932   6.491142  1.110759
14196   2.050351   6.801323  1.158021

[14197 rows x 32 columns]
```

[4]:
```
df.columns
```

[4]:
```
Index(['Unnamed: 0', 'ECG #', 'start_time', 'end_time', 'acc_count',
       'acc_mean', 'acc_std', 'acc_min', 'acc_25%', 'acc_50%', 'acc_75%',
       'acc_max', 'acc_eng', 'acc_entropy', 'acc_var', 'acc_skew', 'acc_kurt',
       'acc_mad', 'Activity', 'gyro_mean', 'gyro_std', 'gyro_min', 'gyro_25%',
       'gyro_50%', 'gyro_75%', 'gyro_max', 'gyro_eng', 'gyro_entropy',
       'gyro_var', 'gyro_skew', 'gyro_kurt', 'gyro_mad'],
      dtype='object')
```

[73]:
```
df_filtered = df[(df['ECG #'] >= 5) |(df['ECG #'] <= 2)  ]
```

[75]:
```
df1 = df_filtered
df1 = df1.reset_index()
df1
```

[75]:
```
      index Unnamed: 0  ECG #           start_time             end_time  \
0         0        svm      1  2019-11-21 09:35:27  2019-11-21 09:35:29
1         1        svm      1  2019-11-21 09:35:28  2019-11-21 09:35:30
2         2        svm      1  2019-11-21 09:35:29  2019-11-21 09:35:31
```

```
3          3        svm      1  2019-11-21 09:35:30  2019-11-21 09:35:32
4          4        svm      1  2019-11-21 09:35:31  2019-11-21 09:35:33
…        …        …    …                 …                   …
10286  14192        svm      6  2019-11-21 11:00:35  2019-11-21 11:00:37
10287  14193        svm      6  2019-11-21 11:00:36  2019-11-21 11:00:38
10288  14194        svm      6  2019-11-21 11:00:37  2019-11-21 11:00:39
10289  14195        svm      6  2019-11-21 11:00:38  2019-11-21 11:00:40
10290  14196        svm      6  2019-11-21 11:00:39  2019-11-21 11:00:41

       acc_count  acc_mean   acc_std   acc_min   acc_25%  …  gyro_25%  \
0         2271.0  1.488039  0.008815  1.464329  1.482331  …  0.595793
1         2287.0  1.487708  0.008177  1.464329  1.482331  …  0.508012
2         2288.0  1.484074  0.007623  1.462431  1.478181  …  0.451361
3         2294.0  1.487552  0.007213  1.462431  1.482889  …  0.449286
4         2283.0  1.486918  0.006790  1.462431  1.482331  …  0.533525
…           …       …        …         …         …   …        …
10286     2087.0  1.601729  0.088580  1.501142  1.531028  …  1.838959
10287     2277.0  1.584692  0.055840  1.501142  1.532493  …  2.090319
10288     2279.0  1.634041  0.070983  1.502046  1.565519  …  2.356062
10289     2276.0  1.701175  0.045277  1.584833  1.675359  …  2.275376
10290     1518.0  1.727280  0.024522  1.678459  1.706349  …  2.325614

       gyro_50%  gyro_75%   gyro_max      gyro_eng  gyro_entropy  gyro_var  \
0      0.892834  1.257357   2.802878   2444.644866      7.727976  0.203803
1      0.779196  1.169292   2.802878   2203.410455      7.734996  0.208016
2      0.697942  1.106439   2.802878   2120.945536      7.735433  0.247652
3      0.673428  1.076882   2.895836   2354.323033      7.738052  0.314183
4      0.849516  1.426766   3.649751   3478.688197      7.733246  0.451992
…         …       …         …             …          …       …
10286  2.628791  3.736613  12.023601  25833.234557      7.643483  3.165173
10287  2.962076  3.977001  12.023601  30604.610546      7.730005  2.992684
10288  3.164181  4.072940  12.023601  33008.076912      7.730884  2.628023
10289  3.049675  3.954686  12.413456  29859.735732      7.729566  2.380862
10290  3.011691  3.944505  12.413456  21075.108897      7.325149  2.775818

       gyro_skew  gyro_kurt  gyro_mad
0       0.492299   0.014721  0.370100
1       0.772472   0.362000  0.374022
2       1.072809   0.951265  0.396192
3       1.283556   1.183364  0.433260
4       1.079871   0.786448  0.535704
…          …         …       …
10286   1.786256   4.765928  1.282278
10287   1.558248   4.272371  1.270297
10288   1.724908   5.127654  1.170044
10289   1.807932   6.491142  1.110759
10290   2.050351   6.801323  1.158021
```

```
[10291 rows x 33 columns]
```

[ ]:
```
# sc_results.insert(0, 'GSR #', '2')
```

[76]:
```
df2 = pd.read_csv('skin conductance.csv')
```

[77]:
```
df2
```

[77]:

```
                          Unnamed: 0  GSR #           start_time  \
0      GSR1_GSR_Skin_Conductance_CAL      1  2019-11-21 09:35:27
1      GSR1_GSR_Skin_Conductance_CAL      1  2019-11-21 09:35:28
2      GSR1_GSR_Skin_Conductance_CAL      1  2019-11-21 09:35:29
3      GSR1_GSR_Skin_Conductance_CAL      1  2019-11-21 09:35:30
4      GSR1_GSR_Skin_Conductance_CAL      1  2019-11-21 09:35:31
…                                    …    …                  …
10286  GSR6_GSR_Skin_Conductance_CAL      6  2019-11-21 11:00:35
10287  GSR6_GSR_Skin_Conductance_CAL      6  2019-11-21 11:00:36
10288  GSR6_GSR_Skin_Conductance_CAL      6  2019-11-21 11:00:37
10289  GSR6_GSR_Skin_Conductance_CAL      6  2019-11-21 11:00:38
10290  GSR6_GSR_Skin_Conductance_CAL      6  2019-11-21 11:00:39

                    end_time  gsr_mean   gsr_std  gsr_mean.1   gsr_max  \
0      2019-11-21 09:35:29  1.355378  0.015984    1.332223  1.391275
1      2019-11-21 09:35:30  1.339162  0.011172    1.318903  1.358863
2      2019-11-21 09:35:31  1.326166  0.011614    1.306471  1.347763
3      2019-11-21 09:35:32  1.313587  0.010649    1.294483  1.333999
4      2019-11-21 09:35:33  1.302077  0.009201    1.286491  1.321123
…                      …         …         …           …         …
10286  2019-11-21 11:00:37  1.873922  0.004225    1.857143  1.895238
10287  2019-11-21 11:00:38  1.872439  0.004663    1.838095  1.895238
10288  2019-11-21 11:00:39  1.869794  0.004626    1.838095  1.892308
10289  2019-11-21 11:00:40  1.866879  0.004492    1.838095  1.889377
10290  2019-11-21 11:00:41  1.865581  0.004135    1.842491  1.883516

       gsr_variance  gsr_skewness  gsr_kurtosis   gsr_mad  Activity
0          0.000256      0.699293     -0.627312  0.012809         0
1          0.000125     -0.100332     -1.238669  0.009691         0
2          0.000135      0.010484     -1.243451  0.010120         0
3          0.000113      0.140383     -1.149240  0.009224         0
4          0.000085      0.139074     -1.145452  0.007970         0
…               …             …              …         …         …
10286      0.000018      1.241958      5.575090  0.002684        23
10287      0.000022      0.428993      5.263945  0.003213        23
10288      0.000021      0.490440      4.582487  0.003247        23
10289      0.000020      0.256191      3.974350  0.003274        23
10290      0.000017      0.676028      4.517975  0.002796        23
```

```
[10291 rows x 13 columns]
```

[82]:
```
new_df = pd.concat([df1, df2], axis=1)
new_df
```

[82]:

	index	Unnamed: 0	ECG #	start_time	end_time	\
0	0	svm	1	2019-11-21 09:35:27	2019-11-21 09:35:29	
1	1	svm	1	2019-11-21 09:35:28	2019-11-21 09:35:30	
2	2	svm	1	2019-11-21 09:35:29	2019-11-21 09:35:31	
3	3	svm	1	2019-11-21 09:35:30	2019-11-21 09:35:32	
4	4	svm	1	2019-11-21 09:35:31	2019-11-21 09:35:33	
…	…	…	…	…	…	
10286	14192	svm	6	2019-11-21 11:00:35	2019-11-21 11:00:37	
10287	14193	svm	6	2019-11-21 11:00:36	2019-11-21 11:00:38	
10288	14194	svm	6	2019-11-21 11:00:37	2019-11-21 11:00:39	
10289	14195	svm	6	2019-11-21 11:00:38	2019-11-21 11:00:40	
10290	14196	svm	6	2019-11-21 11:00:39	2019-11-21 11:00:41	

	acc_count	acc_mean	acc_std	acc_min	acc_25%	…	\
0	2271.0	1.488039	0.008815	1.464329	1.482331	…	
1	2287.0	1.487708	0.008177	1.464329	1.482331	…	
2	2288.0	1.484074	0.007623	1.462431	1.478181	…	
3	2294.0	1.487552	0.007213	1.462431	1.482889	…	
4	2283.0	1.486918	0.006790	1.462431	1.482331	…	
…	…	…	…	…	…	…	
10286	2087.0	1.601729	0.088580	1.501142	1.531028	…	
10287	2277.0	1.584692	0.055840	1.501142	1.532493	…	
10288	2279.0	1.634041	0.070983	1.502046	1.565519	…	
10289	2276.0	1.701175	0.045277	1.584833	1.675359	…	
10290	1518.0	1.727280	0.024522	1.678459	1.706349	…	

	end_time	gsr_mean	gsr_std	gsr_mean.1	gsr_max	\
0	2019-11-21 09:35:29	1.355378	0.015984	1.332223	1.391275	
1	2019-11-21 09:35:30	1.339162	0.011172	1.318903	1.358863	
2	2019-11-21 09:35:31	1.326166	0.011614	1.306471	1.347763	
3	2019-11-21 09:35:32	1.313587	0.010649	1.294483	1.333999	
4	2019-11-21 09:35:33	1.302077	0.009201	1.286491	1.321123	
…	…	…	…	…	…	
10286	2019-11-21 11:00:37	1.873922	0.004225	1.857143	1.895238	
10287	2019-11-21 11:00:38	1.872439	0.004663	1.838095	1.895238	
10288	2019-11-21 11:00:39	1.869794	0.004626	1.838095	1.892308	
10289	2019-11-21 11:00:40	1.866879	0.004492	1.838095	1.889377	
10290	2019-11-21 11:00:41	1.865581	0.004135	1.842491	1.883516	

	gsr_variance	gsr_skewness	gsr_kurtosis	gsr_mad	Activity
0	0.000256	0.699293	-0.627312	0.012809	0

```
1          0.000125     -0.100332     -1.238669  0.009691         0
2          0.000135      0.010484     -1.243451  0.010120         0
3          0.000113      0.140383     -1.149240  0.009224         0
4          0.000085      0.139074     -1.145452  0.007970         0
…               …             …              …         …         …
10286      0.000018      1.241958      5.575090  0.002684        23
10287      0.000022      0.428993      5.263945  0.003213        23
10288      0.000021      0.490440      4.582487  0.003247        23
10289      0.000020      0.256191      3.974350  0.003274        23
10290      0.000017      0.676028      4.517975  0.002796        23

[10291 rows x 46 columns]
```

[83]:
```
# new_df.columns
result = new_df.copy()
result.drop(columns = ['index','Unnamed: 0','GSR #'],inplace =True)
result.columns
```

[83]:
```
Index(['ECG #', 'start_time', 'end_time', 'acc_count', 'acc_mean', 'acc_std',
       'acc_min', 'acc_25%', 'acc_50%', 'acc_75%', 'acc_max', 'acc_eng',
       'acc_entropy', 'acc_var', 'acc_skew', 'acc_kurt', 'acc_mad', 'Activity',
       'gyro_mean', 'gyro_std', 'gyro_min', 'gyro_25%', 'gyro_50%', 'gyro_75%',
       'gyro_max', 'gyro_eng', 'gyro_entropy', 'gyro_var', 'gyro_skew',
       'gyro_kurt', 'gyro_mad', 'start_time', 'end_time', 'gsr_mean',
       'gsr_std', 'gsr_mean.1', 'gsr_max', 'gsr_variance', 'gsr_skewness',
       'gsr_kurtosis', 'gsr_mad', 'Activity'],
      dtype='object')
```

[84]:
```
result1 = result.copy()
result1 = result1.T.drop_duplicates().T
result1 = result1.iloc[:, :-1]
result1.columns
```

[84]:
```
Index(['ECG #', 'start_time', 'end_time', 'acc_count', 'acc_mean', 'acc_std',
       'acc_min', 'acc_25%', 'acc_50%', 'acc_75%', 'acc_max', 'acc_eng',
       'acc_entropy', 'acc_var', 'acc_skew', 'acc_kurt', 'acc_mad', 'Activity',
       'gyro_mean', 'gyro_std', 'gyro_min', 'gyro_25%', 'gyro_50%', 'gyro_75%',
       'gyro_max', 'gyro_eng', 'gyro_entropy', 'gyro_var', 'gyro_skew',
       'gyro_kurt', 'gyro_mad', 'gsr_mean', 'gsr_std', 'gsr_mean.1', 'gsr_max',
       'gsr_variance', 'gsr_skewness', 'gsr_kurtosis'],
      dtype='object')
```

[85]:
```
df_target = result1.copy()
df_target
```

[85]:
```
      ECG #           start_time             end_time acc_count acc_mean  \
0         1  2019-11-21 09:35:27  2019-11-21 09:35:29      2271  1.48804
```

```
1          1  2019-11-21 09:35:28  2019-11-21 09:35:30      2287  1.48771
2          1  2019-11-21 09:35:29  2019-11-21 09:35:31      2288  1.48407
3          1  2019-11-21 09:35:30  2019-11-21 09:35:32      2294  1.48755
4          1  2019-11-21 09:35:31  2019-11-21 09:35:33      2283  1.48692
…      …                    …                    …       …       …
10286      6  2019-11-21 11:00:35  2019-11-21 11:00:37      2087  1.60173
10287      6  2019-11-21 11:00:36  2019-11-21 11:00:38      2277  1.58469
10288      6  2019-11-21 11:00:37  2019-11-21 11:00:39      2279  1.63404
10289      6  2019-11-21 11:00:38  2019-11-21 11:00:40      2276  1.70117
10290      6  2019-11-21 11:00:39  2019-11-21 11:00:41      1518  1.72728

           acc_std  acc_min  acc_25%  acc_50%  acc_75%  … gyro_skew  \
0       0.00881535  1.46433  1.48233  1.48774  1.49491  …  0.492299
1       0.00817652  1.46433  1.48233  1.48774  1.49345  …  0.772472
2       0.00762258  1.46243  1.47818  1.48289  1.49008  …   1.07281
3       0.00721254  1.46243  1.48289  1.48838  1.49297  …   1.28356
4       0.00678993  1.46243  1.48233  1.48838  1.49183  …   1.07987
…              …        …        …        …        …  …        …
10286    0.0885796  1.50114  1.53103  1.56665  1.65917  …   1.78626
10287    0.0558403  1.50114  1.53249  1.57927  1.62692  …   1.55825
10288    0.0709833  1.50205  1.56552  1.65178  1.70042  …   1.72491
10289    0.0452765  1.58483  1.67536  1.70635  1.73144  …   1.80793
10290    0.0245219  1.67846  1.70635  1.72129  1.74851  …   2.05035

        gyro_kurt  gyro_mad gsr_mean     gsr_std gsr_mean.1  gsr_max  \
0       0.0147212    0.3701  1.35538   0.0159845    1.33222  1.39128
1           0.362  0.374022  1.33916   0.0111716     1.3189  1.35886
2        0.951265  0.396192  1.32617   0.0116139    1.30647  1.34776
3         1.18336   0.43326  1.31359   0.0106492    1.29448    1.334
4        0.786448  0.535704  1.30208   0.0092008    1.28649  1.32112
…              …        …        …           …          …        …
10286     4.76593   1.28228  1.87392   0.0042255    1.85714  1.89524
10287     4.27237    1.2703  1.87244  0.00466292     1.8381  1.89524
10288     5.12765   1.17004  1.86979  0.00462558     1.8381  1.89231
10289     6.49114   1.11076  1.86688  0.00449201     1.8381  1.88938
10290     6.80132   1.15802  1.86558  0.00413547    1.84249  1.88352

       gsr_variance gsr_skewness gsr_kurtosis
0       0.000255504     0.699293    -0.627312
1       0.000124804    -0.100332     -1.23867
2       0.000134884    0.0104838     -1.24345
3       0.000113405     0.140383     -1.14924
4       8.46548e-05     0.139074     -1.14545
…               …            …            …
10286   1.78548e-05      1.24196      5.57509
10287   2.17428e-05     0.428993      5.26394
10288   2.13959e-05      0.49044      4.58249
```

```
10289  2.01781e-05     0.256191      3.97435
10290  1.71021e-05     0.676028      4.51798

[10291 rows x 38 columns]
```

[89]:
```
df_target['score_change'] = ""
df_target
```

[89]:
```
       ECG #           start_time             end_time acc_count acc_mean  \
0          1  2019-11-21 09:35:27  2019-11-21 09:35:29      2271  1.48804
1          1  2019-11-21 09:35:28  2019-11-21 09:35:30      2287  1.48771
2          1  2019-11-21 09:35:29  2019-11-21 09:35:31      2288  1.48407
3          1  2019-11-21 09:35:30  2019-11-21 09:35:32      2294  1.48755
4          1  2019-11-21 09:35:31  2019-11-21 09:35:33      2283  1.48692
…      …                   …                    …       …       …
10286      6  2019-11-21 11:00:35  2019-11-21 11:00:37      2087  1.60173
10287      6  2019-11-21 11:00:36  2019-11-21 11:00:38      2277  1.58469
10288      6  2019-11-21 11:00:37  2019-11-21 11:00:39      2279  1.63404
10289      6  2019-11-21 11:00:38  2019-11-21 11:00:40      2276  1.70117
10290      6  2019-11-21 11:00:39  2019-11-21 11:00:41      1518  1.72728

           acc_std  acc_min  acc_25%  acc_50%  acc_75%  …  gyro_kurt  \
0       0.00881535  1.46433  1.48233  1.48774  1.49491  …  0.0147212
1       0.00817652  1.46433  1.48233  1.48774  1.49345  …      0.362
2       0.00762258  1.46243  1.47818  1.48289  1.49008  …   0.951265
3       0.00721254  1.46243  1.48289  1.48838  1.49297  …    1.18336
4       0.00678993  1.46243  1.48233  1.48838  1.49183  …   0.786448
…              …        …        …        …        …  …          …
10286    0.0885796  1.50114  1.53103  1.56665  1.65917  …    4.76593
10287    0.0558403  1.50114  1.53249  1.57927  1.62692  …    4.27237
10288    0.0709833  1.50205  1.56552  1.65178  1.70042  …    5.12765
10289    0.0452765  1.58483  1.67536  1.70635  1.73144  …    6.49114
10290    0.0245219  1.67846  1.70635  1.72129  1.74851  …    6.80132

        gyro_mad gsr_mean     gsr_std gsr_mean.1  gsr_max gsr_variance  \
0         0.3701  1.35538   0.0159845    1.33222  1.39128  0.000255504
1       0.374022  1.33916   0.0111716     1.3189  1.35886  0.000124804
2       0.396192  1.32617   0.0116139    1.30647  1.34776  0.000134884
3        0.43326  1.31359   0.0106492    1.29448    1.334  0.000113405
4       0.535704  1.30208   0.0092008    1.28649  1.32112  8.46548e-05
…            …        …           …          …        …            …
10286    1.28228  1.87392   0.0042255    1.85714  1.89524  1.78548e-05
10287     1.2703  1.87244  0.00466292     1.8381  1.89524  2.17428e-05
10288    1.17004  1.86979  0.00462558     1.8381  1.89231  2.13959e-05
10289    1.11076  1.86688  0.00449201     1.8381  1.88938  2.01781e-05
10290    1.15802  1.86558  0.00413547    1.84249  1.88352  1.71021e-05
```

```
      gsr_skewness gsr_kurtosis score_change
0         0.699293    -0.627312
1        -0.100332     -1.23867
2        0.0104838     -1.24345
3         0.140383     -1.14924
4         0.139074     -1.14545
…              …            …            …
10286      1.24196      5.57509
10287     0.428993      5.26394
10288      0.49044      4.58249
10289     0.256191      3.97435
10290     0.676028      4.51798

[10291 rows x 39 columns]
```

[118]:
```
x = df_target.copy()
```

[119]:
```
x = x.rename(columns={"ECG #": "Participant"})
x
```

[119]:
```
      Participant           start_time             end_time acc_count  \
0               1  2019-11-21 09:35:27  2019-11-21 09:35:29      2271
1               1  2019-11-21 09:35:28  2019-11-21 09:35:30      2287
2               1  2019-11-21 09:35:29  2019-11-21 09:35:31      2288
3               1  2019-11-21 09:35:30  2019-11-21 09:35:32      2294
4               1  2019-11-21 09:35:31  2019-11-21 09:35:33      2283
…             …                    …                    …       …
10286           6  2019-11-21 11:00:35  2019-11-21 11:00:37      2087
10287           6  2019-11-21 11:00:36  2019-11-21 11:00:38      2277
10288           6  2019-11-21 11:00:37  2019-11-21 11:00:39      2279
10289           6  2019-11-21 11:00:38  2019-11-21 11:00:40      2276
10290           6  2019-11-21 11:00:39  2019-11-21 11:00:41      1518

      acc_mean     acc_std  acc_min  acc_25%  acc_50%  acc_75%  …  \
0      1.48804  0.00881535  1.46433  1.48233  1.48774  1.49491  …
1      1.48771  0.00817652  1.46433  1.48233  1.48774  1.49345  …
2      1.48407  0.00762258  1.46243  1.47818  1.48289  1.49008  …
3      1.48755  0.00721254  1.46243  1.48289  1.48838  1.49297  …
4      1.48692  0.00678993  1.46243  1.48233  1.48838  1.49183  …
…        …          …       …        …        …        …  …
10286  1.60173   0.0885796  1.50114  1.53103  1.56665  1.65917  …
10287  1.58469   0.0558403  1.50114  1.53249  1.57927  1.62692  …
10288  1.63404   0.0709833  1.50205  1.56552  1.65178  1.70042  …
10289  1.70117   0.0452765  1.58483  1.67536  1.70635  1.73144  …
10290  1.72728   0.0245219  1.67846  1.70635  1.72129  1.74851  …

       gyro_kurt  gyro_mad gsr_mean     gsr_std gsr_mean.1  gsr_max  \
```

```
0      0.0147212    0.3701  1.35538   0.0159845    1.33222  1.39128
1          0.362  0.374022  1.33916   0.0111716     1.3189  1.35886
2       0.951265  0.396192  1.32617   0.0116139    1.30647  1.34776
3        1.18336   0.43326  1.31359   0.0106492    1.29448    1.334
4       0.786448  0.535704  1.30208   0.0092008    1.28649  1.32112
…          …        …       …          …          …        …
10286    4.76593   1.28228  1.87392   0.0042255    1.85714  1.89524
10287    4.27237    1.2703  1.87244  0.00466292     1.8381  1.89524
10288    5.12765   1.17004  1.86979  0.00462558     1.8381  1.89231
10289    6.49114   1.11076  1.86688  0.00449201     1.8381  1.88938
10290    6.80132   1.15802  1.86558  0.00413547    1.84249  1.88352

      gsr_variance gsr_skewness gsr_kurtosis score_change
0      0.000255504     0.699293    -0.627312
1      0.000124804    -0.100332     -1.23867
2      0.000134884    0.0104838     -1.24345
3      0.000113405     0.140383     -1.14924
4      8.46548e-05     0.139074     -1.14545
…            …           …           …          …
10286  1.78548e-05      1.24196      5.57509
10287  2.17428e-05     0.428993      5.26394
10288  2.13959e-05      0.49044      4.58249
10289  2.01781e-05     0.256191      3.97435
10290  1.71021e-05     0.676028      4.51798

[10291 rows x 39 columns]
```

[123]:
```
x.loc[(x.Participant == 1) & (x.Activity == 3), 'score_change'] = 1
x.loc[(x.Participant == 1) & (x.Activity == 11), 'score_change'] = 0
x.loc[(x.Participant == 1) & (x.Activity == 12), 'score_change'] = 1
x.loc[(x.Participant == 1) & (x.Activity == 13), 'score_change'] = -1
x.loc[(x.Participant == 1) & (x.Activity == 21), 'score_change'] = 3
x.loc[(x.Participant == 1) & (x.Activity == 22), 'score_change'] = -1
x.loc[(x.Participant == 1) & (x.Activity == 23), 'score_change'] = -1
```

[126]:
```
x.loc[(x.Participant == 2) & (x.Activity == 1), 'score_change'] = 0
x.loc[(x.Participant == 2) & (x.Activity == 11), 'score_change'] = 1
x.loc[(x.Participant == 2) & (x.Activity == 12), 'score_change'] = -1
x.loc[(x.Participant == 2) & (x.Activity == 13), 'score_change'] = 1
x.loc[(x.Participant == 2) & (x.Activity == 21), 'score_change'] = 1
x.loc[(x.Participant == 2) & (x.Activity == 22), 'score_change'] = -2
x.loc[(x.Participant == 2) & (x.Activity == 23), 'score_change'] = 2
```

[128]:
```
x.loc[(x.Participant == 5) & (x.Activity == 1), 'score_change'] = 0
x.loc[(x.Participant == 5) & (x.Activity == 11), 'score_change'] = -2
x.loc[(x.Participant == 5) & (x.Activity == 21), 'score_change'] = 0
x.loc[(x.Participant == 5) & (x.Activity == 22), 'score_change'] = -1
```

```
x.loc[(x.Participant == 5) & (x.Activity == 23), 'score_change'] = -1
```

[130]:
```
x.loc[(x.Participant == 6) & (x.Activity == 1), 'score_change'] = -2
x.loc[(x.Participant == 6) & (x.Activity == 2), 'score_change'] = 1
x.loc[(x.Participant == 6) & (x.Activity == 3), 'score_change'] = -1
x.loc[(x.Participant == 6) & (x.Activity == 11), 'score_change'] = -1
x.loc[(x.Participant == 6) & (x.Activity == 12), 'score_change'] = 0
x.loc[(x.Participant == 6) & (x.Activity == 13), 'score_change'] = 0
x.loc[(x.Participant == 6) & (x.Activity == 21), 'score_change'] = 0
x.loc[(x.Participant == 6) & (x.Activity == 22), 'score_change'] = 0
x.loc[(x.Participant == 6) & (x.Activity == 23), 'score_change'] = 0
```

[131]:
```
y = x.loc[(x.Participant == 6)]
y
```

[131]:

	Participant	start_time	end_time	acc_count	\
7718	6	2019-11-21 09:41:46	2019-11-21 09:41:48	2270	
7719	6	2019-11-21 09:41:47	2019-11-21 09:41:49	2264	
7720	6	2019-11-21 09:41:48	2019-11-21 09:41:50	2274	
7721	6	2019-11-21 09:41:49	2019-11-21 09:41:51	2271	
7722	6	2019-11-21 09:41:50	2019-11-21 09:41:52	2275	
…	…	…	…	…	
10286	6	2019-11-21 11:00:35	2019-11-21 11:00:37	2087	
10287	6	2019-11-21 11:00:36	2019-11-21 11:00:38	2277	
10288	6	2019-11-21 11:00:37	2019-11-21 11:00:39	2279	
10289	6	2019-11-21 11:00:38	2019-11-21 11:00:40	2276	
10290	6	2019-11-21 11:00:39	2019-11-21 11:00:41	1518	

	acc_mean	acc_std	acc_min	acc_25%	acc_50%	acc_75%	…	\
7718	2.99992	0.0085862	2.97773	2.99389	2.99927	3.005	…	
7719	3.00216	0.0091704	2.97773	2.99663	2.99927	3.00767	…	
7720	3.00256	0.00917211	2.97773	2.99468	3.00114	3.00781	…	
7721	3.00541	0.00935355	2.97773	2.99744	3.00584	3.01144	…	
7722	3.00479	0.00875686	2.97773	2.99927	3.00405	3.00971	…	
…	…	…	…	…	…	…	…	
10286	1.60173	0.0885796	1.50114	1.53103	1.56665	1.65917	…	
10287	1.58469	0.0558403	1.50114	1.53249	1.57927	1.62692	…	
10288	1.63404	0.0709833	1.50205	1.56552	1.65178	1.70042	…	
10289	1.70117	0.0452765	1.58483	1.67536	1.70635	1.73144	…	
10290	1.72728	0.0245219	1.67846	1.70635	1.72129	1.74851	…	

	gyro_kurt	gyro_mad	gsr_mean	gsr_std	gsr_mean.1	gsr_max	\
7718	0.0765793	0.177507	1.27079	0.0019118	1.26163	1.28294	
7719	0.00492086	0.174414	1.27117	0.00189859	1.26163	1.28294	
7720	-0.061004	0.178038	1.27133	0.0019141	1.26163	1.28294	
7721	1.12681	0.324406	1.27119	0.00189484	1.26207	1.28205	
7722	-0.412198	0.366646	1.2709	0.00188809	1.26163	1.28116	

```
…           …       …       …          …         …       …
10286     4.76593   1.28228  1.87392   0.0042255    1.85714  1.89524
10287     4.27237    1.2703  1.87244  0.00466292     1.8381  1.89524
10288     5.12765   1.17004  1.86979  0.00462558     1.8381  1.89231
10289     6.49114   1.11076  1.86688  0.00449201     1.8381  1.88938
10290     6.80132   1.15802  1.86558  0.00413547    1.84249  1.88352

      gsr_variance gsr_skewness gsr_kurtosis score_change
7718   3.65499e-06      1.07017      7.65327
7719   3.60465e-06      1.13963      7.99129
7720   3.66379e-06      1.11323      8.75814
7721   3.59042e-06      1.08947      8.02794
7722    3.5649e-06      1.20852      7.93972
…             …           …           …            …
10286  1.78548e-05      1.24196      5.57509            0
10287  2.17428e-05     0.428993      5.26394            0
10288  2.13959e-05      0.49044      4.58249            0
10289  2.01781e-05     0.256191      3.97435            0
10290  1.71021e-05     0.676028      4.51798            0

[2573 rows x 39 columns]
```

[132]:
```
x.to_csv('test.csv', mode='w', header=True)
```

[ ]:
```

```