Drop some files out for test. No shuffle and split the rest data as 80% for training and 20% for validation.

Class weights 1:5 for binary classification(0:others)

Feature: [IEMG,SSI,WL,ZC,ku,SSC,skew,Acti,AR,HIST,MDF,MNF,mDWT]

threshold\_ZC = 0.00

threshold\_SSC = 0.001

bins=5

bound = 4

HIST\_range = (-bound,bound)

level = 3

Feature scale: MinMaxScaler((0,1))

Feature select: VarianceThreshold(threshold=0.01)

## Drop Files[6,30,31,32,33,34,35]:

Class 0 : others

Train (acc 0.957)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 5586 | 272 |
| Actual others | 0 | 562 |

Valid (acc 0.945)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 1454 | 90 |
| Actual others | 2 | 151 |

Test (acc 0.905)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 279 | 47 |
| Actual others | 3 | 198 |

Class 1 : 2 : 6

Train (acc 0.895)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 103 | 4 | 13 |
| Actual 2 | 27 | 246 | 5 |
| Actual 6 | 8 | 2 | 154 |

Valid (acc 0.809)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 14 | 8 | 11 |
| Actual 2 | 4 | 71 | 2 |
| Actual 6 | 3 | 1 | 38 |

Test (acc 0.731)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 41 | 9 | 2 |
| Actual 2 | 23 | 34 | 0 |
| Actual 6 | 18 | 2 | 72 |

Class 2 : 6

Train (acc 0.984)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 271 | 7 |
| Actual 6 | 0 | 164 |

Valid (acc 0.949)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 73 | 4 |
| Actual 6 | 2 | 40 |

Test (acc 0.912)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 52 | 5 |
| Actual 6 | 8 | 84 |

Class 1 : 6

Train (acc 0.933)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 109 | 11 |
| Actual 6 | 8 | 156 |

Valid (acc 0.866)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 25 | 8 |
| Actual 6 | 2 | 40 |

Test (acc 0.826)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 48 | 4 |
| Actual 6 | 21 | 71 |

Class 1 : 2

Train (acc 0.912)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 118 | 2 |
| Actual 2 | 33 | 245 |

Valid (acc 0.900)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 29 | 4 |
| Actual 2 | 7 | 70 |

Test (acc 0.743)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 48 | 4 |
| Actual 2 | 24 | 33 |

## Drop Files[7,30,31,32,33,34,35]:

Class 0 : others

Train (acc 0.966)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 5683 | 215 |
| Actual others | 0 | 467 |

Valid (acc 0.957)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 1489 | 65 |
| Actual others | 7 | 122 |

Test (acc 0.981)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 269 | 7 |
| Actual others | 4 | 316 |

Class 1 : 2 : 6

Train (acc 0.839)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 28 | 14 | 19 |
| Actual 2 | 26 | 217 | 12 |
| Actual 6 | 4 | 0 | 147 |

Valid (acc 0.744)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 4 | 6 | 8 |
| Actual 2 | 7 | 60 | 5 |
| Actual 6 | 6 | 1 | 32 |

Test (acc 0.510)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 39 | 11 | 76 |
| Actual 2 | 45 | 22 | 18 |
| Actual 6 | 6 | 0 | 102 |

Class 2 : 6

Train (acc 0.982)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 252 | 3 |
| Actual 6 | 4 | 147 |

Valid (acc 0.882)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 68 | 4 |
| Actual 6 | 9 | 30 |

Test (acc 0.870)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 63 | 22 |
| Actual 6 | 3 | 105 |

Class 1 : 6

Train (acc 0.896)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 57 | 4 |
| Actual 6 | 18 | 133 |

Valid (acc 0.771)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 13 | 5 |
| Actual 6 | 8 | 31 |

Test (acc 0.799)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 95 | 31 |
| Actual 6 | 16 | 92 |

Class 1 : 2

Train (acc 0.844)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 27 | 34 |
| Actual 2 | 15 | 240 |

Valid (acc 0.833)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 5 | 13 |
| Actual 2 | 2 | 70 |

Test (acc 0.573)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 65 | 61 |
| Actual 2 | 29 | 56 |

## Drop Files[5,30,31,32,33,34,35]:

Class 0 : others

Train (acc 0.978)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 5728 | 142 |
| Actual others | 0 | 629 |

Valid (acc 0.967)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 1496 | 51 |
| Actual others | 5 | 166 |

Test (acc 0.915)

|  |  |  |
| --- | --- | --- |
|  | Predicted 0 | Predicted others |
| Actual 0 | 297 | 14 |
| Actual others | 22 | 94 |

Class 1 : 2 : 6

Train (acc 0.837)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 141 | 2 | 8 |
| Actual 2 | 47 | 268 | 1 |
| Actual 6 | 41 | 3 | 118 |

Valid (acc 0.858)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 28 | 7 | 6 |
| Actual 2 | 7 | 80 | 0 |
| Actual 6 | 2 | 2 | 38 |

Test (acc 0.551)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Predicted 1 | Predicted 2 | Predicted 6 |
| Actual 1 | 8 | 5 | 0 |
| Actual 2 | 1 | 5 | 3 |
| Actual 6 | 21 | 22 | 51 |

Class 2 : 6

Train (acc 0.966)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 307 | 9 |
| Actual 6 | 7 | 155 |

Valid (acc 0.984)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 87 | 0 |
| Actual 6 | 2 | 40 |

Test (acc 0.640)

|  |  |  |
| --- | --- | --- |
|  | Predicted 2 | Predicted 6 |
| Actual 2 | 3 | 3 |
| Actual 6 | 34 | 60 |

Class 1 : 6

Train (acc 0.878)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 145 | 6 |
| Actual 6 | 32 | 130 |

Valid (acc 0.879)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 35 | 6 |
| Actual 6 | 4 | 38 |

Test (acc 0.775)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 6 |
| Actual 1 | 11 | 2 |
| Actual 6 | 22 | 72 |

Class 1 : 2

Train (acc 0.931)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 149 | 2 |
| Actual 2 | 30 | 286 |

Valid (acc 0.890)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 33 | 8 |
| Actual 2 | 6 | 81 |

Test (acc 0.545)

|  |  |  |
| --- | --- | --- |
|  | Predicted 1 | Predicted 2 |
| Actual 1 | 6 | 7 |
| Actual 2 | 3 | 6 |

## Model:

acti = 'relu'

drop = 0.2

init = 'glorot\_normal'

model = models.Sequential()

model.add(layers.Dense(128, kernel\_initializer=init))

model.add(layers.Activation(acti))

model.add(layers.Dropout(drop))

model.add(layers.Dense(64, kernel\_initializer=init ))

model.add(layers.Activation(acti))

model.add(layers.Dropout(drop))

model.add(layers.Dense(32, kernel\_initializer=init))

model.add(layers.Activation(acti))

model.add(layers.Dropout(drop))

model.add(layers.Dense(16, kernel\_initializer=init))

model.add(layers.Activation(acti))

model.add(layers.Dropout(drop))

model.add(layers.Dense(2,activation='softmax'))