Dataset: Apnea 2

Initial Structure: numHiddenNodes=30

MultiLayerConfiguration conf = **new** NeuralNetConfiguration.Builder()  
 .seed(seed)  
 .iterations(iterations)  
 .optimizationAlgo(OptimizationAlgorithm.***LINE\_GRADIENT\_DESCENT***)  
 .learningRate(learningRate)  
 .updater(Updater.***NESTEROVS***)  
 .list()  
 .layer(0, **new** DenseLayer.Builder().nIn(numInputs).nOut(4\*numHiddenNodes)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"relu"**)  
 .momentum(0.9)  
 .build())  
 .layer(1, **new** DenseLayer.Builder().nIn(4\*numHiddenNodes).nOut(3\*numHiddenNodes)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"relu"**)  
 .momentum(0.9)  
 .build())  
 .layer(2, **new** DenseLayer.Builder().nIn(3\*numHiddenNodes).nOut(2\*numHiddenNodes)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"relu"**)  
 .momentum(0.9)  
 .build())  
 .layer(3, **new** DenseLayer.Builder().nIn(2\*numHiddenNodes).nOut(numHiddenNodes)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"relu"**)  
 .momentum(0.9)  
 .build())  
 .layer(4, **new** DenseLayer.Builder().nIn(numHiddenNodes).nOut(numHiddenNodes/2)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"relu"**)  
 .momentum(0.9)  
 .build())  
 .layer(5, **new** OutputLayer.Builder(LossFunctions.LossFunction.***NEGATIVELOGLIKELIHOOD***)  
 .weightInit(WeightInit.***XAVIER***)  
 .activation(**"softmax"**).weightInit(WeightInit.***XAVIER***)  
 .nIn(numHiddenNodes/2).nOut(numOutputs).build())  
 .pretrain(**false**).backprop(**true**).build();

No. of Epochs to be chosen:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No. of Epochs | Final Error Rate | Performance (F1 Score) | Accuracy | Precision | Recall | FNR | FPR |
| 50 | 0.641 | 0.61 | 0.63 | 0.645 | 0.58 | 0.58 | 0.58 |
| 100 | 0.408 | 0.56 | 0.589 | 0.5684 | 0.552 | 0.55 | 0.55 |
| 150 | 0.0797 | 0.5701 | 0.59 | 0.57 | 0.566 | 0.566 | 0.566 |
| 250 | 0.01052 | 0.5753 | 0.59 | 0.57 | 0.573 | 0.573 | 0.573 |
| 300 |  | 0.5738 | 0.587 | 0.573 | 0.571 | 0.571 | 0.571 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Variation in No. of Iterations:

Assuming no. of Epochs to be constant at 100

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. of Iterations | Final Error Rate | Performance (F1 Score) | Precision | Recall | FNR | FPR |
| 500 |  |  |  |  |  |  |
| 1000 |  |  |  |  |  |  |
| 1500 |  |  |  |  |  |  |
| 2000 |  |  |  |  |  |  |
| 3000 |  |  |  |  |  |  |
| 4000 |  |  |  |  |  |  |
| 5000 |  |  |  |  |  |  |