INF3490
Supervised Learning with Multilayer Perceptron

Mandatory Assignment 2

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Introduction

This assignment uses supervised learning with a Multi-layer perceptron (MLP) to classify electromyographic signals to its corresponding hand movement.

Program

The program was coded using python. We use *movements.py* to read the data from the given data files. Then from *movements.py* the data is trained and tested using *mlp.py*.

We use 6, 8, 12 and 18 nodes in the hidden layer to test our program and the result obtained can be seen in the next section.

Result

The following data shown are the results from running the MLP network on the given data sets. The result shown are the confusion table obtained from running the program on the given data sets and the correct percentage.

Hidden Nodes : 6

Iteration:100

Confusion table :

	$class1$	$class2$	$class3$	$class4$	$class5$	$class6$	$class7$	$class8$
$class1$	10	0	0	0	0	0	0	0
$class2$	0	9	0	0	0	2	0	0
$class3$	0	0	8	1	0	0	0	0
$class4$	0	0	0	23	0	0	2	0
$class5$	1	0	0	3	16	1	0	0
$class6$	0	0	0	0	0	8	0	0
$class7$	0	0	0	0	0	1	12	0
$class8$	0	0	0	1	0	0	0	13

Percentage Correct: 89.91

Hidden Nodes : 8

Iteration:100

Confusion table :

	$class1$	$class2$	$class3$	$class4$	$class5$	$class6$	$class7$	$class8$
$class1$	10	0	0	0	0	0	0	0
$class2$	0	9	0	0	0	2	0	0
$class3$	0	0	8	0	0	0	0	0
$class4$	0	0	0	24	0	0	0	0
$class5$	1	0	0	2	16	0	0	0
$class6$	0	0	0	0	0	9	0	0
$class7$	0	0	0	0	0	1	14	0
$class8$	0	0	0	2	0	0	0	13

Percentage Correct: 92.79

Hidden Nodes : 12

Iteration:100

Confusion table :

	$class1$	$class2$	$class3$	$class4$	$class5$	$class6$	$class7$	$class8$
$class1$	10	0	0	0	0	0	0	0
$class2$	0	9	0	0	0	2	0	0
$class3$	0	0	8	1	0	0	0	0
$class4$	0	0	0	24	0	0	0	0
$class5$	1	0	0	3	16	1	0	0
$class6$	0	0	0	0	0	9	0	0
$class7$	0	0	0	0	0	0	14	0
$class8$	0	0	0	0	0	0	0	13

Percentage Correct: 92.79

Hidden Nodes : 18

Iteration:100

Confusion table :

	$class1$	$class2$	$class3$	$class4$	$class5$	$class6$	$class7$	$class8$
$class1$	10	0	0	0	0	0	0	0
$class2$	0	9	0	0	0	2	0	0
$class3$	0	0	8	1	0	0	0	0
$class4$	0	0	0	24	0	0	0	0
$class5$	1	0	0	3	16	1	0	0
$class6$	0	0	0	0	0	7	0	0
$class7$	0	0	0	0	0	2	14	0
$class8$	0	0	0	2	0	0	0	13

Percentage Correct: 90.99

Hidden Layer with the greater no. of nodes that is 12 and 18 have higher correct percentage than with less no. of nodes. By looking at the confusion

tables given above we can say that class 4 and class 5 were likely to mistaken for each other.