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How to run the program

Run the program with

- python movements.py

I use the zip function and i could run the program with python3 when i used zip, so the program needs to run with python2.

What is an iteration

One iteration in my program is going once through a random sampling off half the input data.

How does the program work

After 15 iterations the program checks the error of the neural network. If the error is better then the current best error, the error is saved as best and the program continues. The weigths for this best error are also saved. If the program checks 10 times and no improvement on the error is done, the program ends the training. It also reverts the weights back to the ones with the best error.

The learning rate is 0.1.

If the printInfo variable is set to True, then the program will print out the iteration and error everytime it checks the error.

In the confusion matrix, sometimes the neural network would guess that one set of input belong to two categories. I solved this by adding it to bought categories. This results in the confusion matrix having a couple more inputs then the actual input.

The zeroes are when the program does not categorize the input as belonging to any of the categories, that would mean all zeroes.

I tried getting a percentage output, but the closest i got was a normalized output and i could not really understand those results that good, so i did not put that data in this report, but the program still prints those results when run.

Results with 6 hidden nodes.

Predicted 84 out off 111 inputs right.

(84, ': '	, 11	1)								
Predicted	1	2	3	4	5	6	7	8	All	
Actual										
0	1	0	1	7	2	3	0	0	14	
1	10	0	0	0	1	0	0	0	11	
2	0	17	0	1	0	0	0	0	18	
3	1	0	9	0	0	0	0	0	10	
4	0	0	0	3	0	0	0	0	3	
5	0	0	0	7	9	0	0	0	16	
6	0	0	0	0	0	12	1	0	13	
7	0	0	0	1	0	0	10	0	11	
8	1	0	0	0	0	0	0	16	17	
All	13	17	10	19	12	15	11	16	113	

Results with 8 hidden nodes.

Predicted 90 out of 111 inputs right.

(90, ': '	, 11	1)							
Predicted	1	2	3	4	5	6	7	8	All
Actual									
0	0	1	1	9	1	0	0	0	12
1	12	0	1	0	0	0	0	0	13
2	0	16	0	0	0	2	0	1	19
3	0	0	13	0	0	0	0	0	13
4	0	0	1	4	0	0	0	1	6
5	0	0	0	1	9	0	0	0	10
6	0	0	0	0	0	13	2	0	15
7	0	0	0	0	0	0	13	0	13
8	0	0	0	0	0	0	0	14	14
All	12	17	16	14	10	15	15	16	115

Results with 12 hidden nodes

Predicted 104 out of 111 inputs correct.

(104, ':	', 1	11)							
Predicted	1	2	3	4	5	6	7	8	All
Actual									
0	0	0	0	3	0	0	0	0	3
1	10	0	0	0	0	0	0	0	10
2	0	21	0	0	0	0	0	1	22
3	0	0	9	0	0	0	0	0	9
4	0	0	0	10	0	0	0	0	10
5	0	0	0	0	15	0	0	0	15
6	0	0	0	0	1	12	2	0	15
7	0	0	0	0	0	0	16	0	16
8	0	0	0	0	0	0	0	13	13
All	10	21	9	13	16	12	18	14	113

I feel like the program need 12 nodes in order to classify well. With 6 and 8 nodes there is a lot of input that gets no category and ends up in the 0 row. It would seem my neural network has a hard time classifying category 4 correct. In 6 and 8 nodes, there are more incorrect than correct categories. And there is also always a few 7 that are categorized as 6.