

The Complete Neural Network Code

Here's the complete code of the Neural Network that we have built so far.

We've completed the neural network class. Here it is for reference, and you can always get it from the following link to GitHub, an online place for sharing code:

- https://github.com/makeyourownneuralnetwork/makeyourownneuralnetwork/blob/master/part2_neural_network.ipynb

```
1  # neural network class definition
2  class neuralNetwork:
3
4
5      # initialise the neural network
6      def __init__(self, inputnodes, hiddennodes, outputnodes, learningrate):
7
8          # set number of nodes in each layer
9          self.inodes = inputnodes
10         self.hnodes = hiddennodes
11         self.onodes = outputnodes
12
13         # link weight matrices, wih and who
14         # weights inside the arrays are 0, and by default numpy likes to use zeros
15         # w11 w21
16         # w12 w22 etc
17         self.wih = numpy.random.random((self.inodes, self.hnodes))
18         self.who = numpy.random.random((self.hnodes, self.onodes))
19
20         # learning rate
21         self.lr = learningrate
22
23         # activation function: sigmoid
24         self.activation_function = lambda x: 1 / (1 + numpy.exp(-x))
25
26         pass
27
28
29     # train the neural network
30     def train(self, inputs_list, targets_list):
31         # convert inputs list to a 2d array
```

There's not a lot of code here, especially if you appreciate that this code can be used to create, train and query 3-layer neural networks for almost any task.

Next, we'll work on our specific task of learning to recognize numbers written

by humans.