

faizan.py

```
1 import numpy as np
2
3 class NeuralNetwork:
4     def __init__(self):
5         np.random.seed()
6         self.synaptic_weights = 2 * np.random.random((3, 1)) - 1
7
8     def sigmoid(self, x):
9         return 1 / (1 + np.exp(-x))
10
11    def sigmoid_derivative(self, x):
12        return x * (1 - x)
13
14    def train(self, training_inputs, training_outputs, training_iterations):
15        for iteration in range(training_iterations):
16            output = self.think(training_inputs)
17            error = training_outputs - output
18            adjustments = np.dot(training_inputs.T, error * self.sigmoid_derivative(output))
19            self.synaptic_weights += adjustments
20
21    def think(self, inputs):
22        inputs = inputs.astype(float)
23        output = self.sigmoid(np.dot(inputs, self.synaptic_weights))
24        return output
25
26 if __name__ == "__main__":
27     neural_network = NeuralNetwork()
28     print("Begining Randomly Generated Weights: ")
29     print(neural_network.synaptic_weights)
30
31     training_inputs = np.array([[0, 0, 1],
32                                [1, 1, 1],
33                                [1, 0, 1],
34                                [0, 1, 1]])
35     training_outputs = np.array([[0, 1, 1, 0]]).T
36
37     neural_network.train(training_inputs, training_outputs, 15000)
38     print("Ending Weights After Training: ")
39     print(neural_network.synaptic_weights)
40
41     user_input_one = input("User Input One: ")
42     user_input_two = input("User Input Two: ")
43     user_input_three = input("User Input Three: ")
44
45     print("Considering New Situation: ", user_input_one, user_input_two, user_input_three)
46     print("New Output data: ")
47     print(neural_network.think(np.array([user_input_one, user_input_two, user_input_three])))
48
```