

In [1]:

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import numpy as np

inputNeurons=2
hiddenlayerNeurons=4
outputNeurons=2
iteration=6000

input = np.random.randint(1,5,inputNeurons)
output = np.array([1.0,0.0])
hidden_layer=np.random.rand(1,hiddenlayerNeurons)

hidden_biass=np.random.rand(1,hiddenlayerNeurons)
output_bias=np.random.rand(1,outputNeurons)
hidden_weights=np.random.rand(inputNeurons,hiddenlayerNeurons)
output_weights=np.random.rand(hiddenlayerNeurons,outputNeurons)

def sigmoid (layer):
    return 1/(1 + np.exp(-layer))

def gradient(layer):
    return layer*(1-layer)

for i in range(iteration):

    hidden_layer=np.dot(input,hidden_weights)
    hidden_layer=sigmoid(hidden_layer+hidden_biass)

    output_layer=np.dot(hidden_layer,output_weights)
    output_layer=sigmoid(output_layer+output_bias)

    error = (output-output_layer)
    gradient_outputLayer=gradient(output_layer)
    error_terms_output=gradient_outputLayer * error
    error_terms_hidden=gradient(hidden_layer)*np.dot(error_terms_output,output_weights.T)

    gradient_hidden_weights = np.dot(input.reshape(inputNeurons,1),error_terms_hidden.reshape(1,hiddenlayerNeurons))
    gradient_ouput_weights = np.dot(hidden_layer.reshape(hiddenlayerNeurons,1),error_terms_output.reshape(1,outputNeurons))

    hidden_weights = hidden_weights + 0.05*gradient_hidden_weights
    output_weights = output_weights + 0.05*gradient_ouput_weights
    if i<50 or i>iteration-50:
        print("*****")
        print("iteration:",i,":::",error)
        print("###output#####" ,output_layer)

```

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*****
iteration: 0 ::: [[ 0.26693597 -0.88386356]]
###output##### [[0.73306403 0.88386356]]
*****
iteration: 1 ::: [[ 0.26554057 -0.88251358]]
###output##### [[0.73445943 0.88251358]]
*****
iteration: 2 ::: [[ 0.26416295 -0.88113962]]
###output##### [[0.73583705 0.88113962]]
*****
iteration: 3 ::: [[ 0.26280281 -0.87974118]]
###output##### [[0.73719719 0.87974118]]
*****
iteration: 4 ::: [[ 0.26145985 -0.87831775]]
###output##### [[0.73854015 0.87831775]]
*****
iteration: 5 ::: [[ 0.26013377 -0.87686884]]
###output##### [[0.73986623 0.87686884]]
*****

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