

answer

This is a binary classification problem.

The model has 3 input nodes, namely, Income, Age, YearsOfEducation and 1 output node.

So we could set a threshold, if the output is over 0.5, then the answer should be 'yes', otherwise it should be 'no'.

I picked 2 nodes in the hidden layer for in the last assignment, we could see that with more neurons in the hidden layer, the accuracy of the model might be improved. But considering we do not have too many inputs for the model, so 2 might be adequate.

I picked relu as the activation function for the hidden layer, for it does not saturate for very big or small values.

considering the fact that the value income could be a very big number.

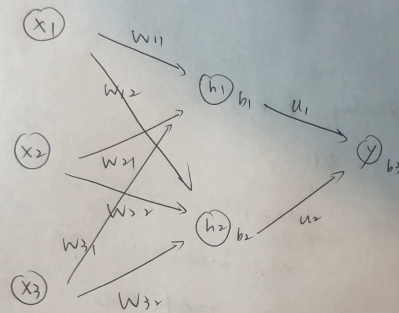
I picked sigmoid function as the activation function for the output layer, for we are required to solve a binary classification problem(to generate an answer, 'yes or no') Then the loss function should be Binary Cross Entropy.

There are 3 bias terms for the model, 2 for the hidden layer, one for each neuron, and another for the output layer.

There will be 8 weights. six between the input layer and 2 for the output layer.

In total, there should be 11 free parameters.

The equation for the output function:



$$y = g(f(x_1 w_{11} + x_2 w_{21} + x_3 w_{31} + b_1) \cdot u_1 + f(x_1 w_{12} + x_2 w_{22} + x_3 w_{32} + b_2) \cdot u_2 + b_3)$$

f is relu and g is sigmoid. then y :

$$y = \frac{1}{1 + e^{-[u_1(w_{11}x_1 + w_{21}x_2 + w_{31}x_3 + b_1) + u_2(w_{12}x_1 + w_{22}x_2 + w_{32}x_3 + b_2) + b_3]}}$$