Evaluation

How do you check the performance of a deep neural network

1. Consider the Indian Liver Patient Diagnosis task

Age	Albumin	T_Bilirubin
65	3.3	0.7
62	3.2	10.9
20	4	1.1
84	3.2	0.7

...... More features

y	ŷ
0	0
0	1
1	1
1	0

2. $Accuracy = \frac{Number\ of\ correct\ predictions}{Total\ number\ of\ predictions}$

3. $Accuracy = \frac{2}{4} = 500\%$

4. The question here is, how do we resolve a probability distribution like [0.45 0.55] to a binary output

5. It is done by picking the class that corresponds to the highest probability, in the above case it is 1.

6. For multiclass classification, the concept remains the same. The label is selected based on the highest value in the probability distribution.

7. The predicted label corresponds to the index of the highest value in the probability distribution (argmax)

Test Data	y	Predicted
0	0	0
1	1	7
3	3	8
5	5	5
1	1	1

8. In addition to accuracy, we can also calculate the per-class accuracy. In this case, the accuracy of the class '**1**' is 50% and of class '**5**' is 100%

9. This allows us to analyse where the model is performing poorly, and enables us to take steps to improve the accuracy for the lagging classes, such as adding more images etc.