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You are building a binary classification model to determine whether a picture shows a hot dog or not.

Which of the following activation functions is a good candidate for the output layer?

1. Rectifier Linear Unit (ReLU)
2. Leaky ReLU
3. Sigmoid
4. Softmax

Think about it.

The answer:

You could use either Sigmoid or Softmax.

I'm sure most of you picked Sigmoid. It's certainly the best way to approach this problem.

But Softmax is also an option —although unconventional for a binary classifier.

How about the other choices?

ReLU returns its input if positive, zero otherwise. Leaky ReLU is based on ReLU but with a slight slope for negative values.

ReLU and Leaky ReLU will always give us the previous layer output with no modifications if the input is always positive.

This doesn't help us.

Sigmoid has the ability to squash its input into a range that goes from 0 to 1.

This is good because we can now set a specific threshold for the output of a binary classifier.

Here is an example.

Any image with an output equal to or under 0.5 doesn't show a hot dog. Any image with an output above 0.5 shows a hot dog.

Sigmoid makes it very easy.

How about Softmax?

Softmax converts a vector of numbers into a vector of probabilities.

We can use softmax in a binary classifier by outputting two different values.

Here they are:

The first value indicates the probability of the image not showing a hot dog.

The second value indicates the probability of the image showing a hot dog.

These two values sum to 1.0.

If we get an output equal to [0.3, 0.7] we know the image shows a hot dog.

If we get an output equal to [0.55, 0.45] we know the image doesn't show a hot dog.

Summary:

Both Sigmoid and Softmax can be used in the output layer of a binary classification network.

Sigmoid is usually more popular for binary classification. Softmax is the one used for multi-class classification.

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