

How do NNs learn?



How do NNs Learn?

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How do Neural Networks learn?

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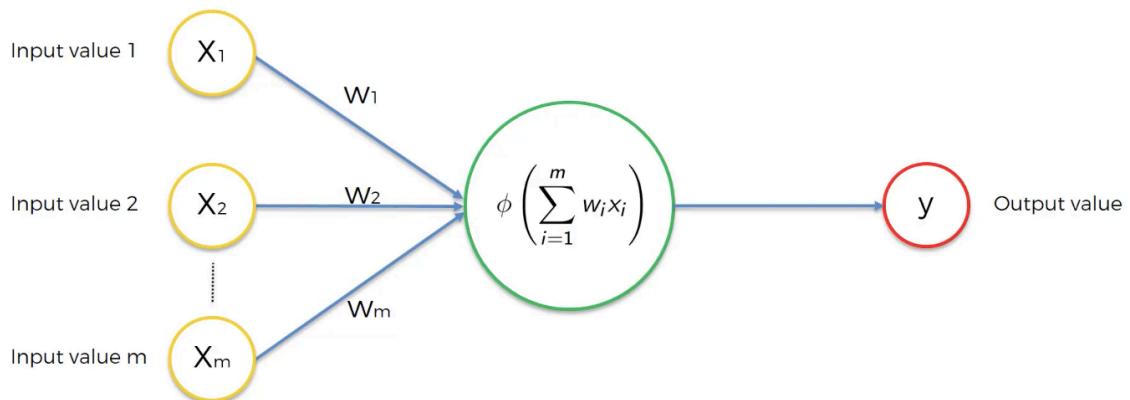


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In general, there are two ways for a task: whether you code every rule and steps it should follow or you build a neural network and made that to find the rules and steps. For example, if you want to build a program that recognize the cats and dogs. On the left side, you should program everything about them: their shape, colour, face, ear and so on. But on the right, you only direct it to the folder full of pictures of them and they will learn by their own.

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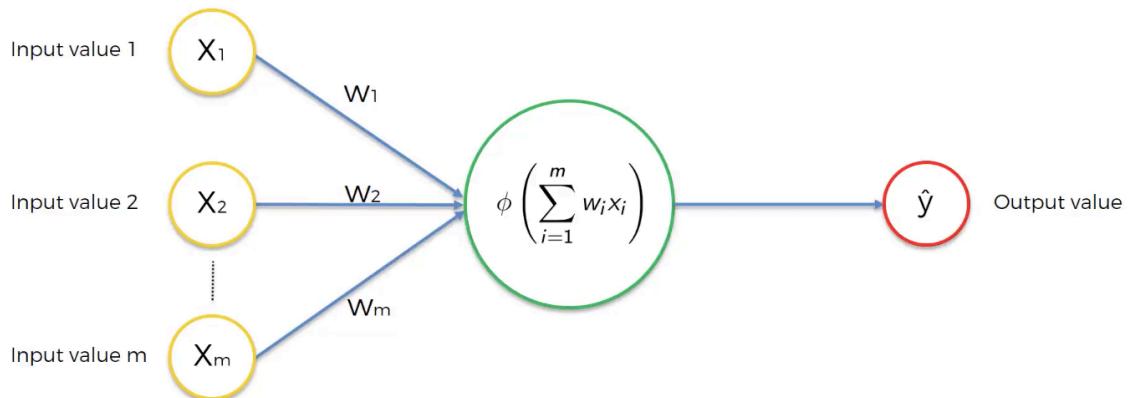


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This also called single layer neural network or perceptron.

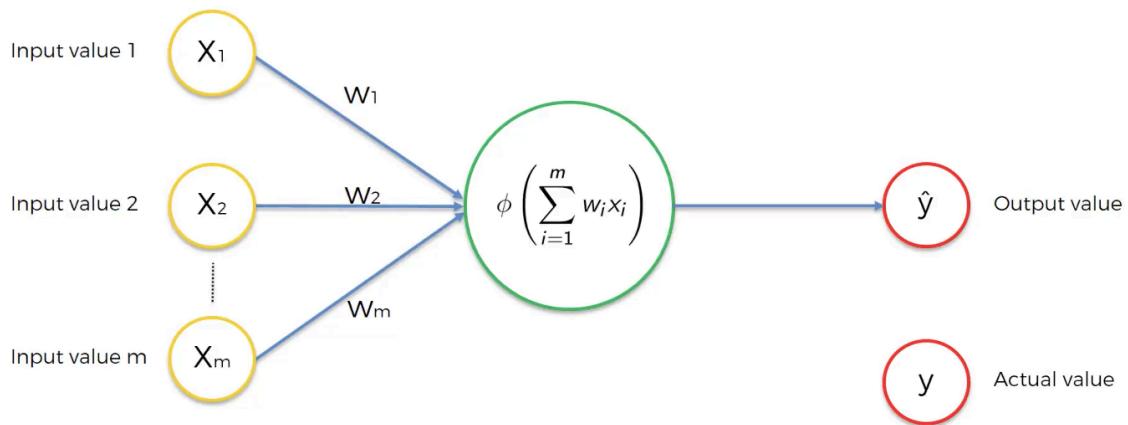
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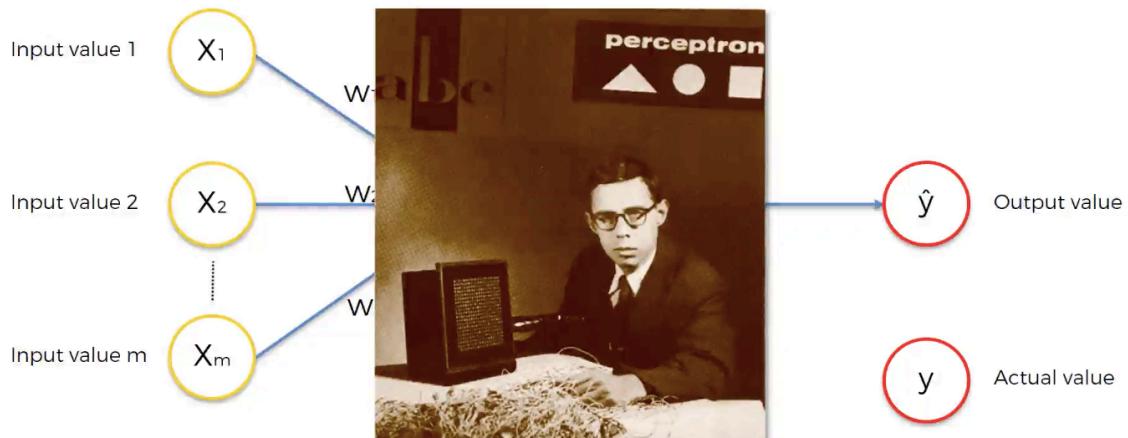
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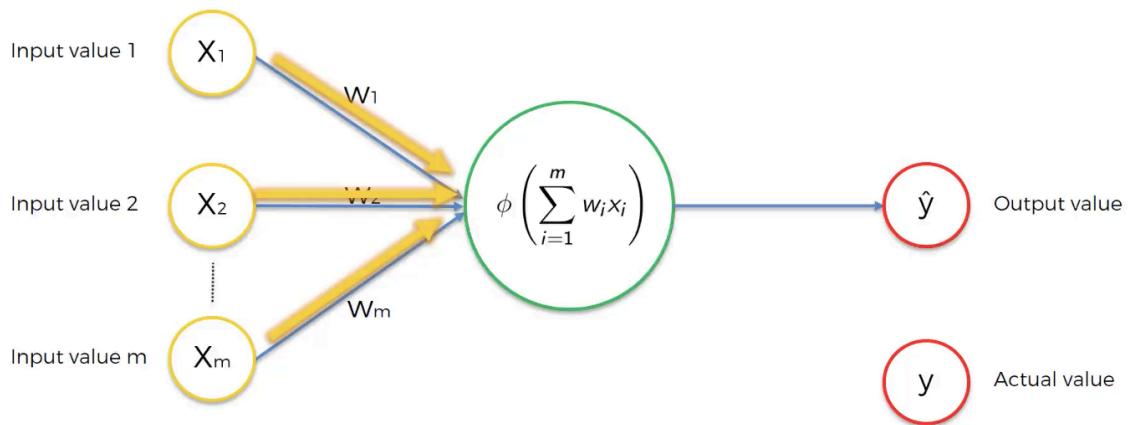
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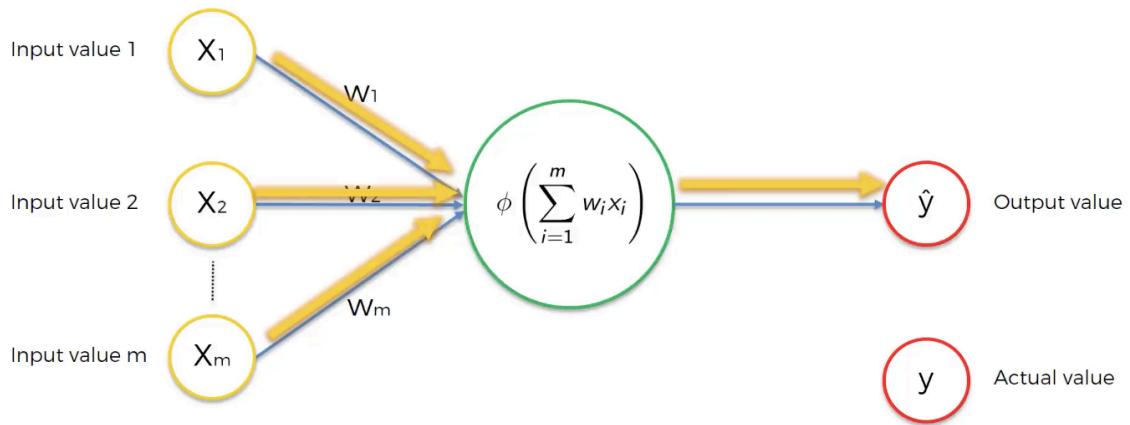
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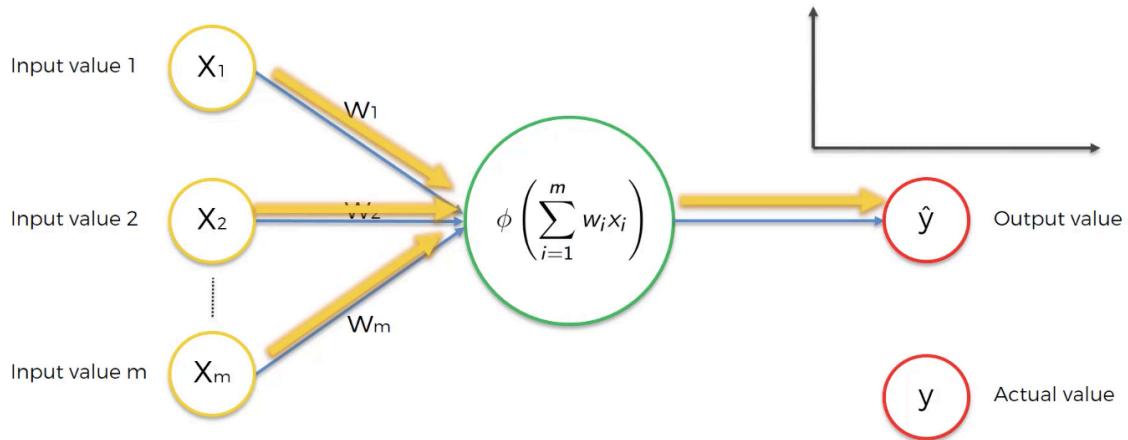
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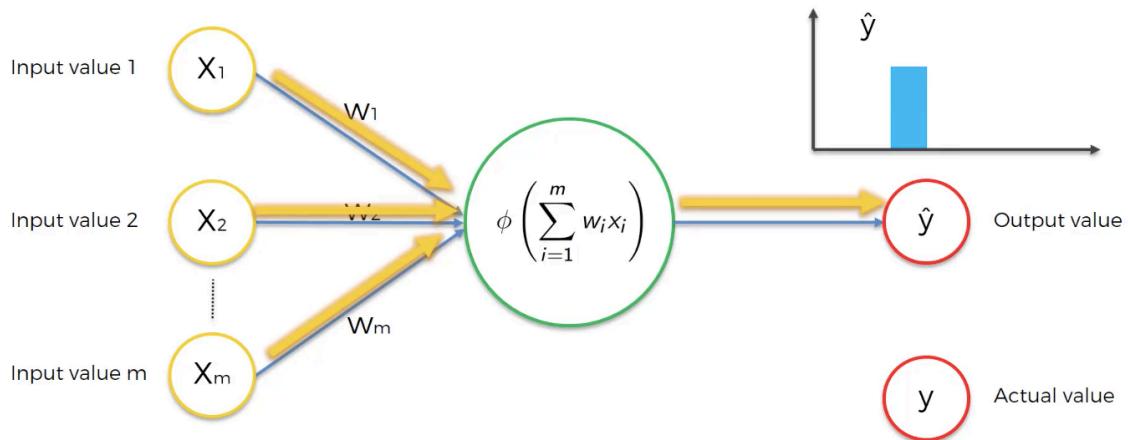
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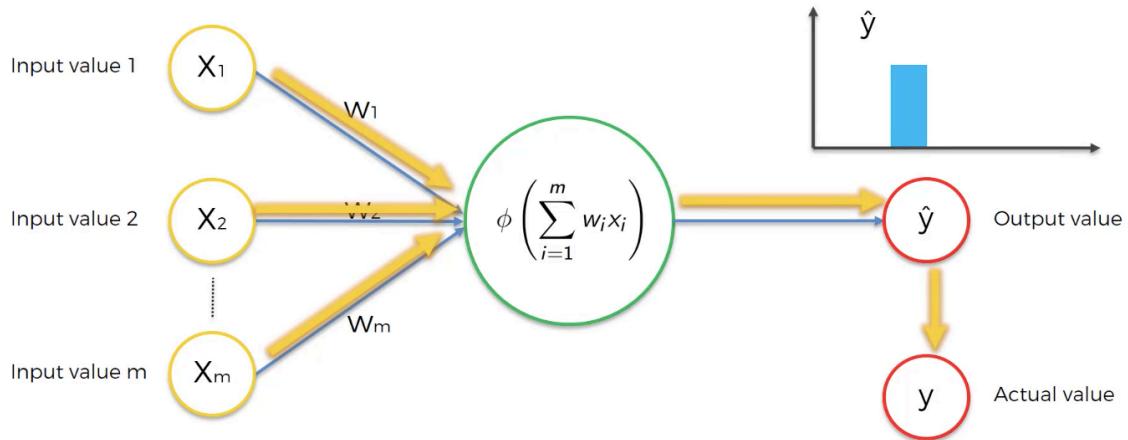
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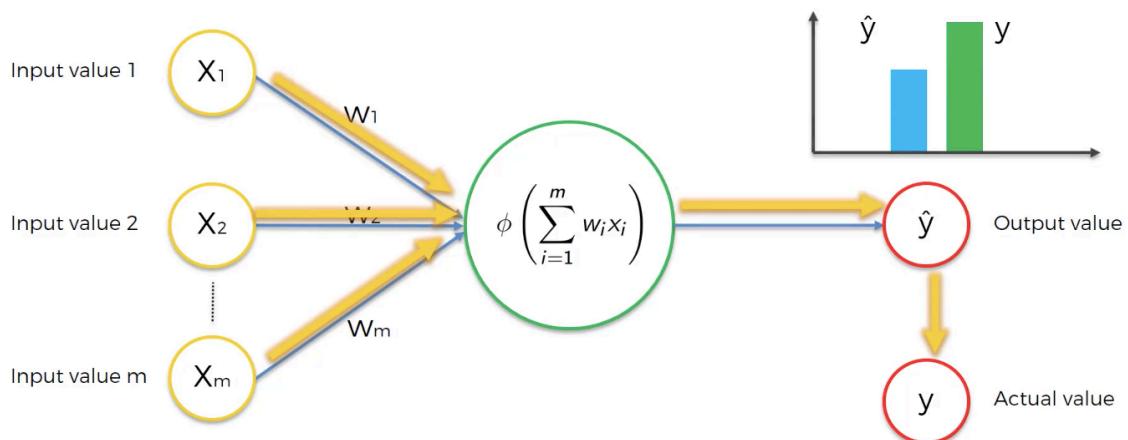


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In order to train it. We have to compare the \hat{y} to actual y .

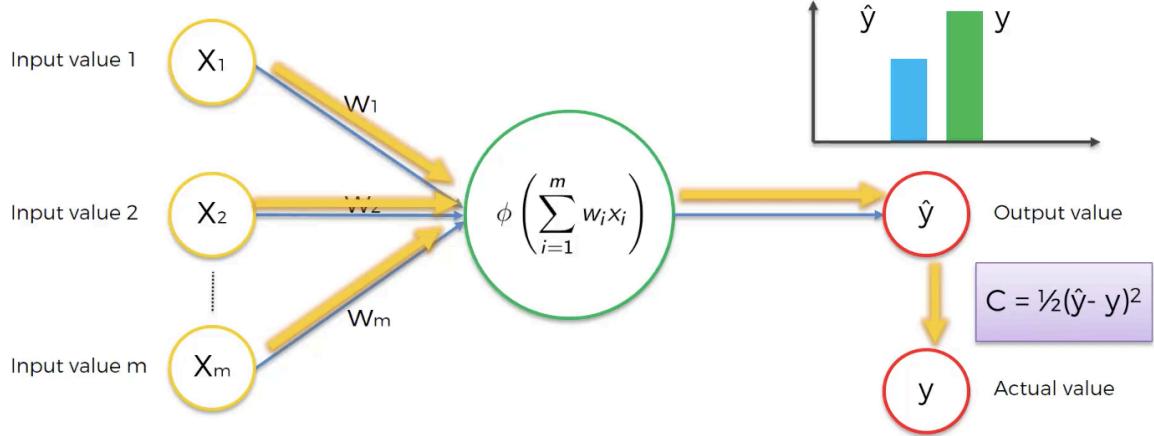
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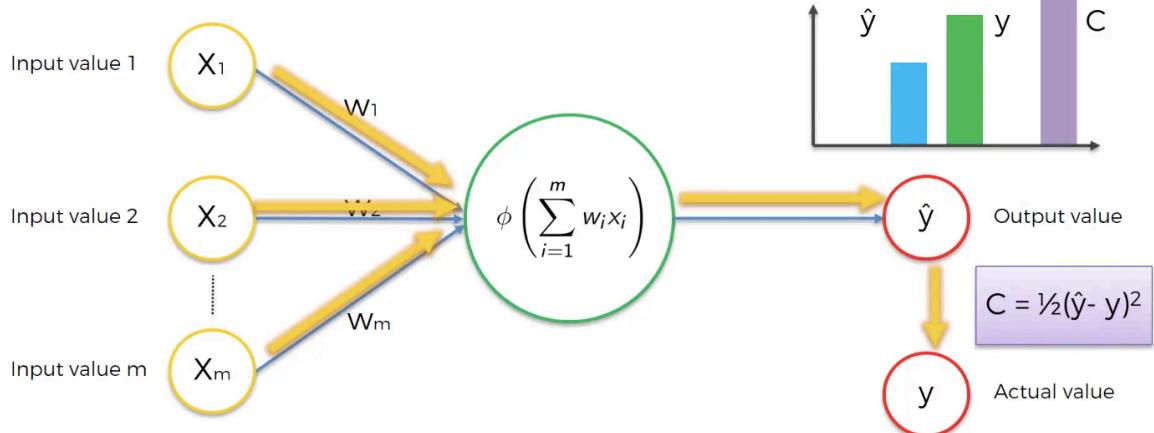


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Cost function

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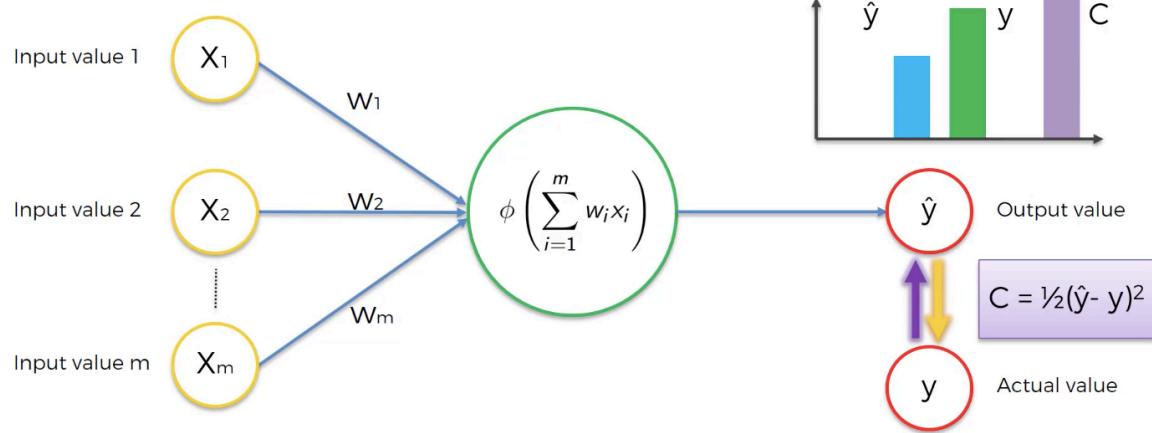


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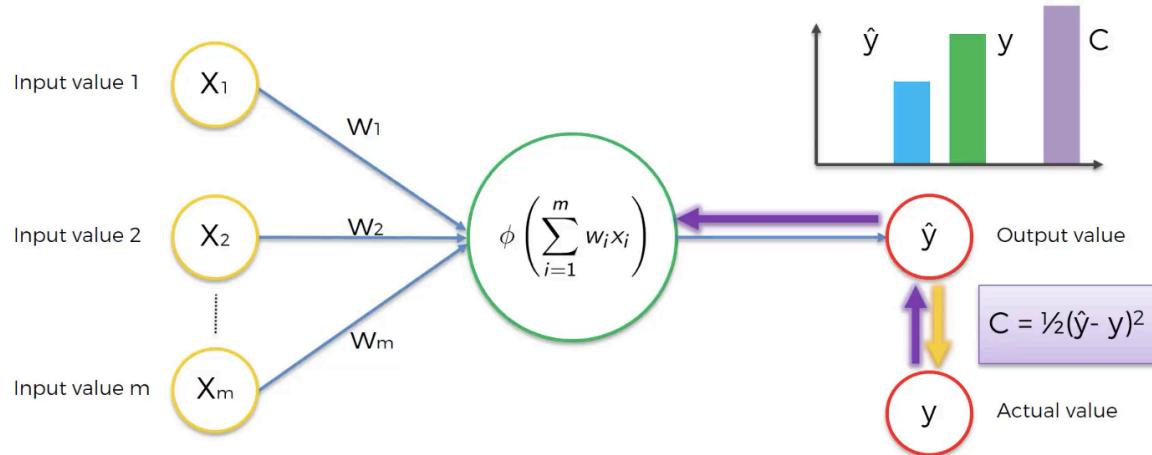
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At this step we comparing the two y's.

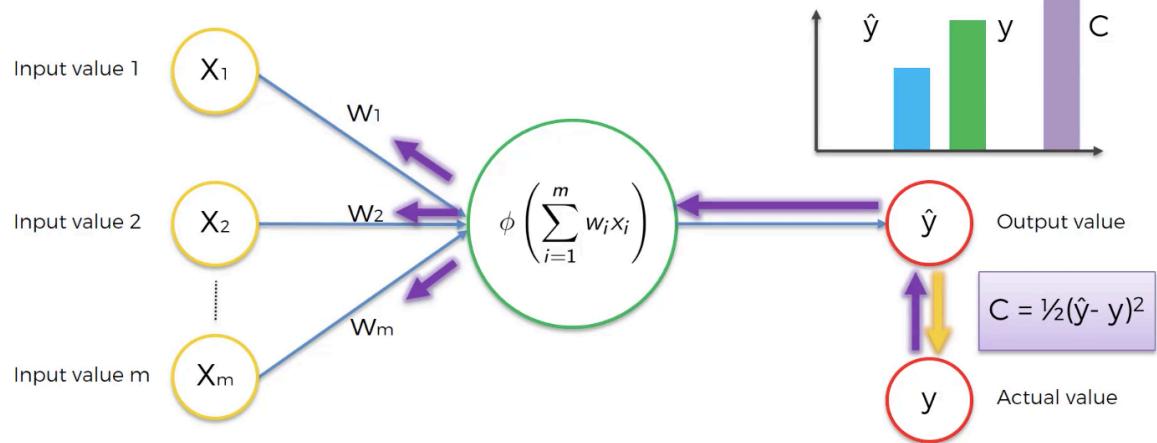
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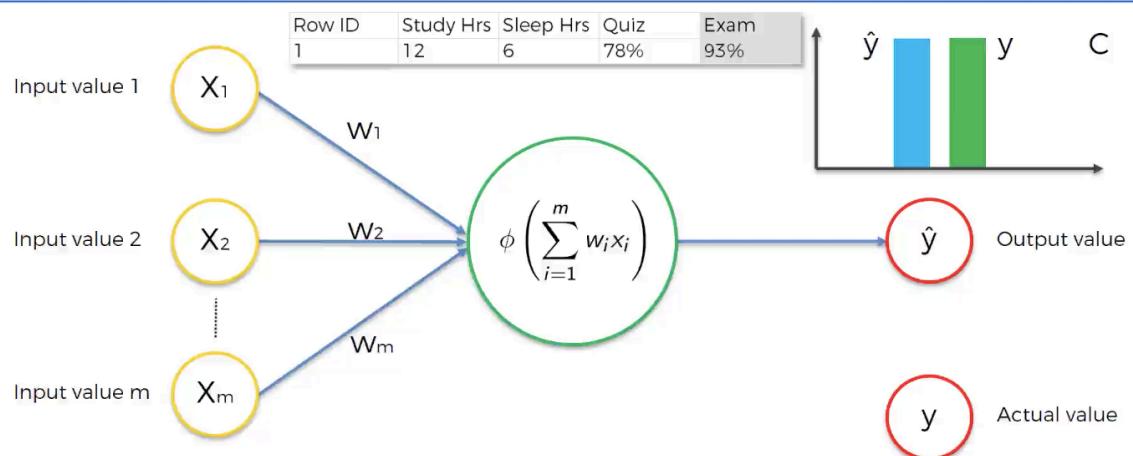


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At this step, the weights going to adjusted / updated.

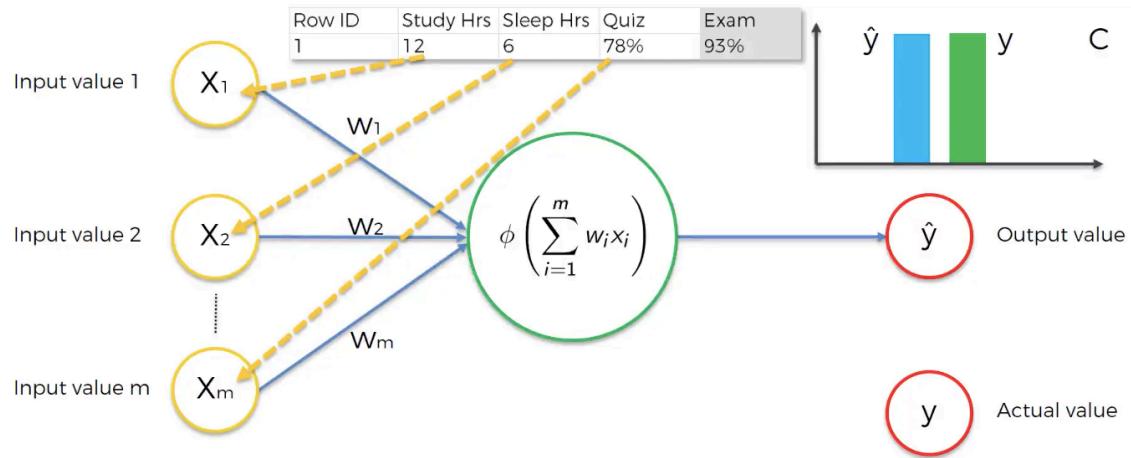
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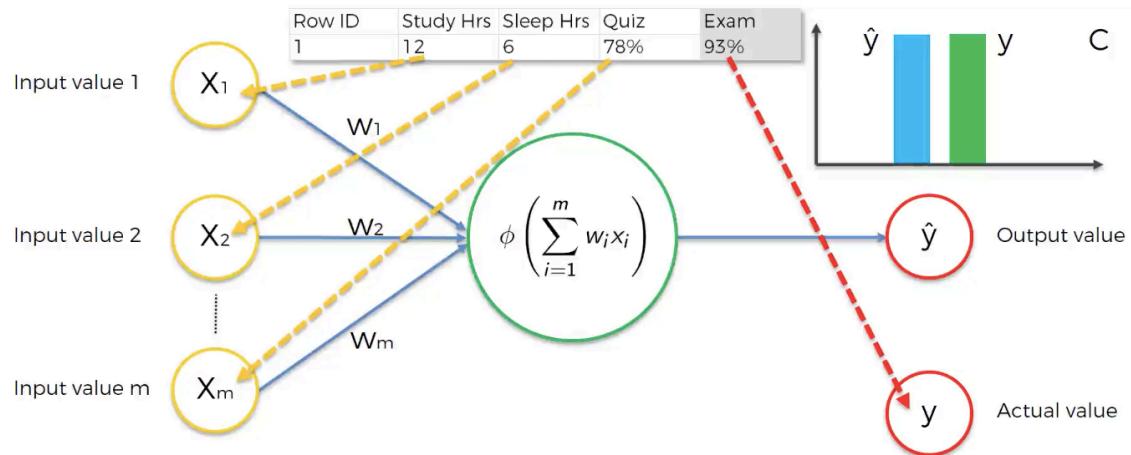
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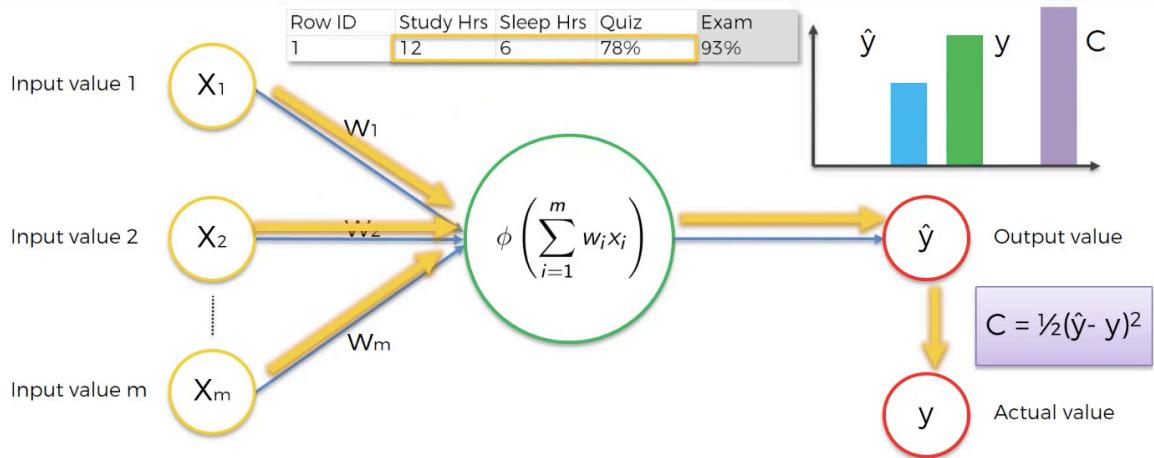
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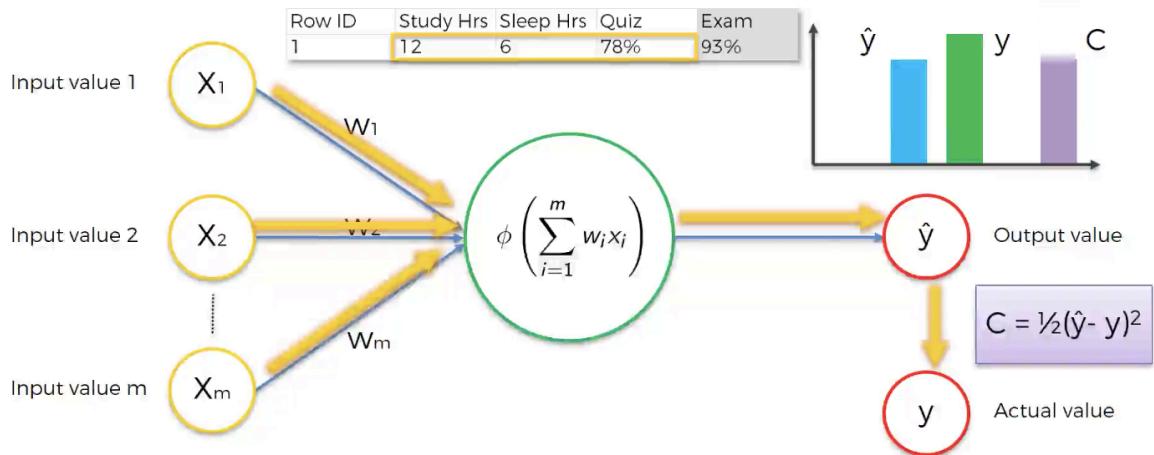
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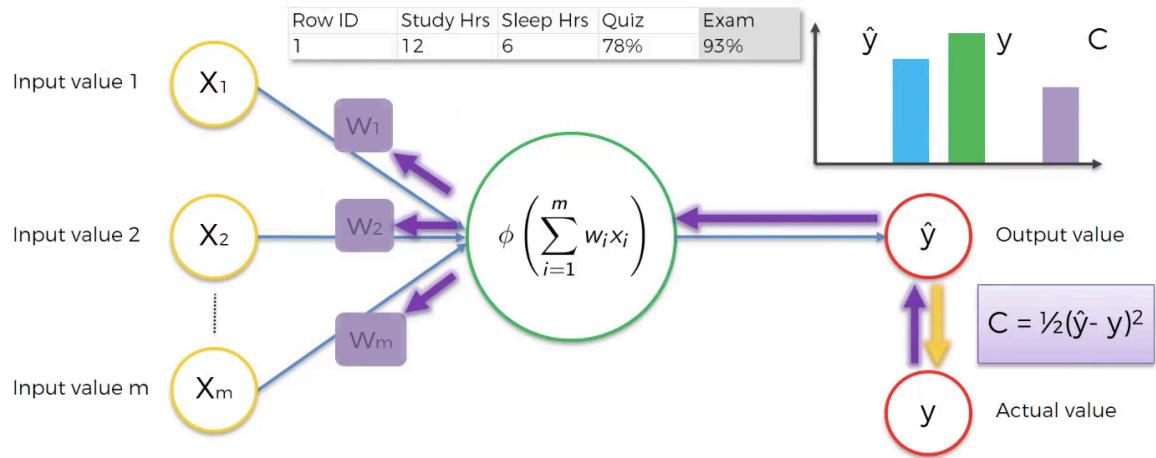
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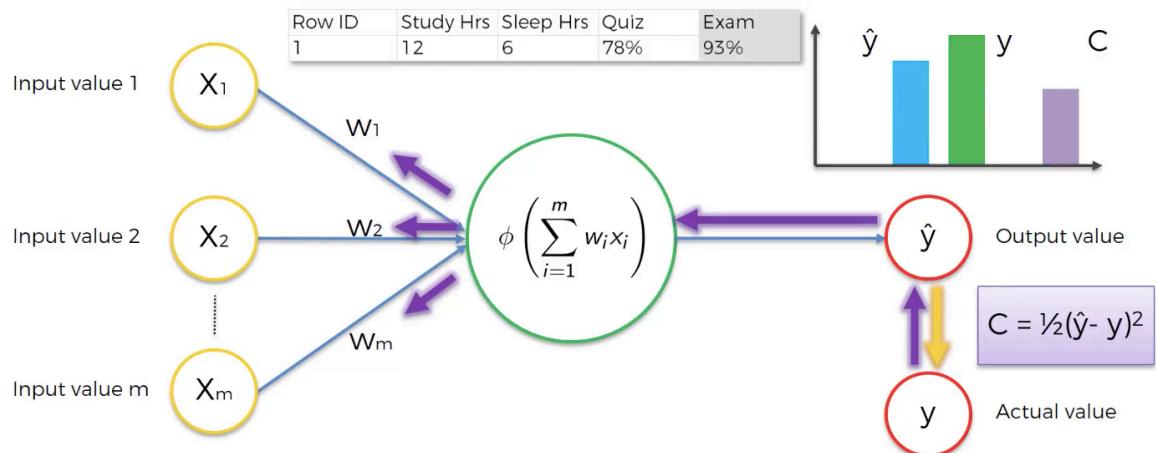


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Updating the weights.

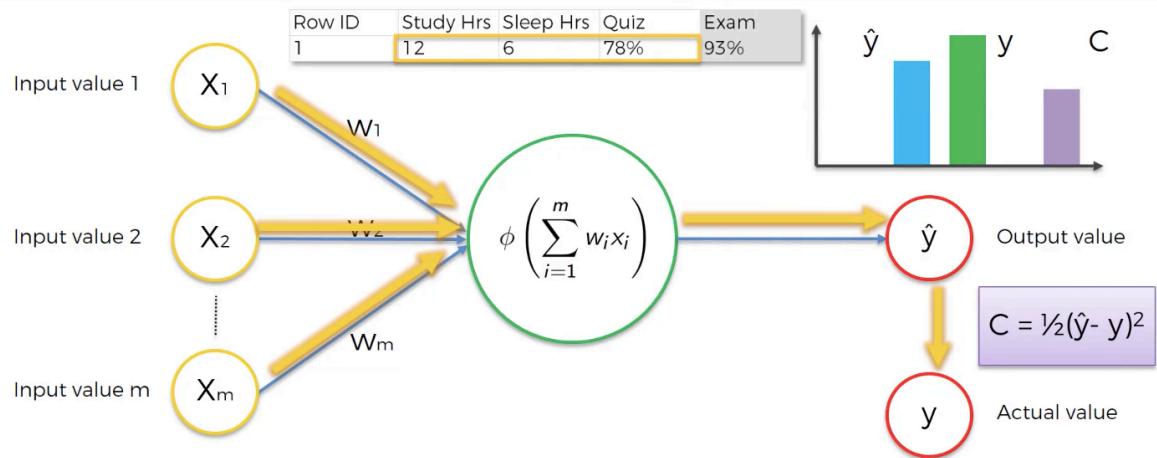
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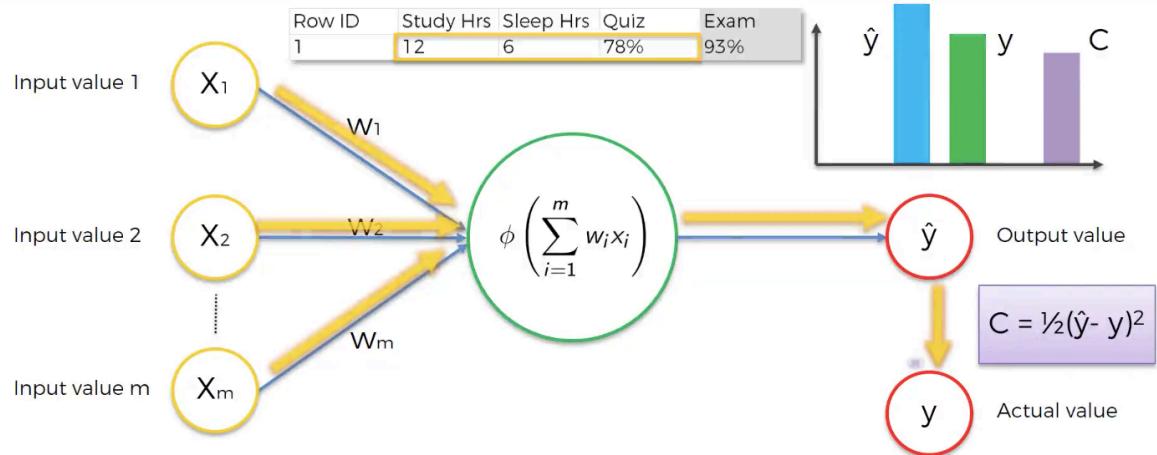
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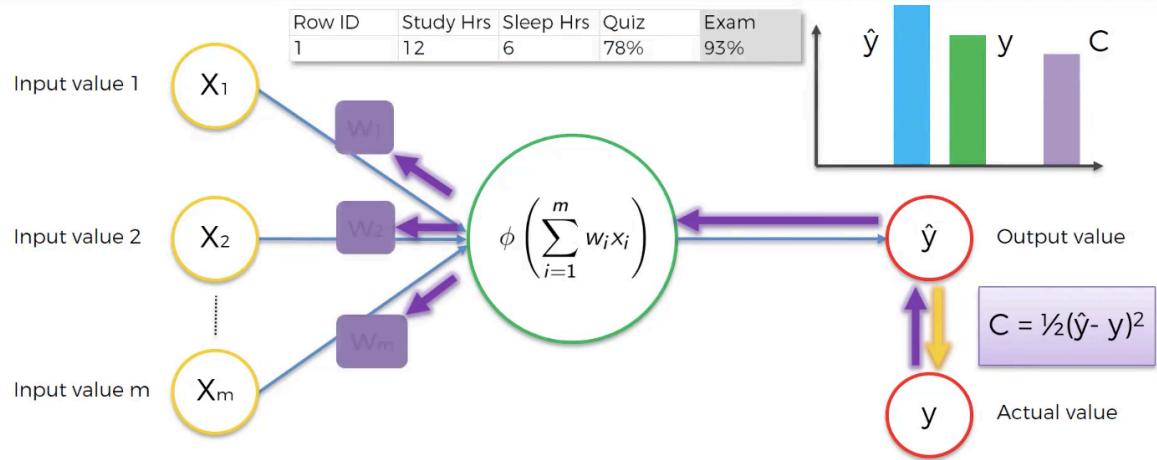
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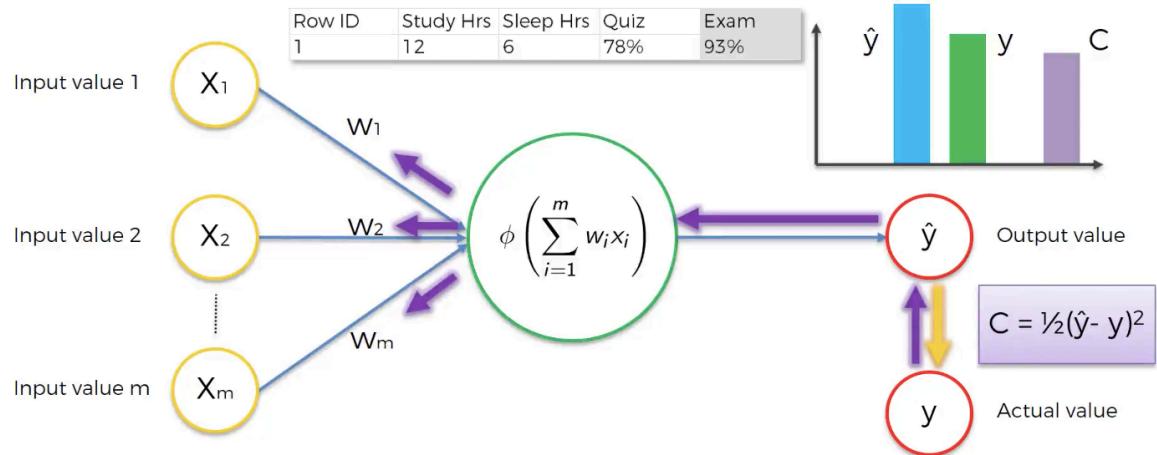
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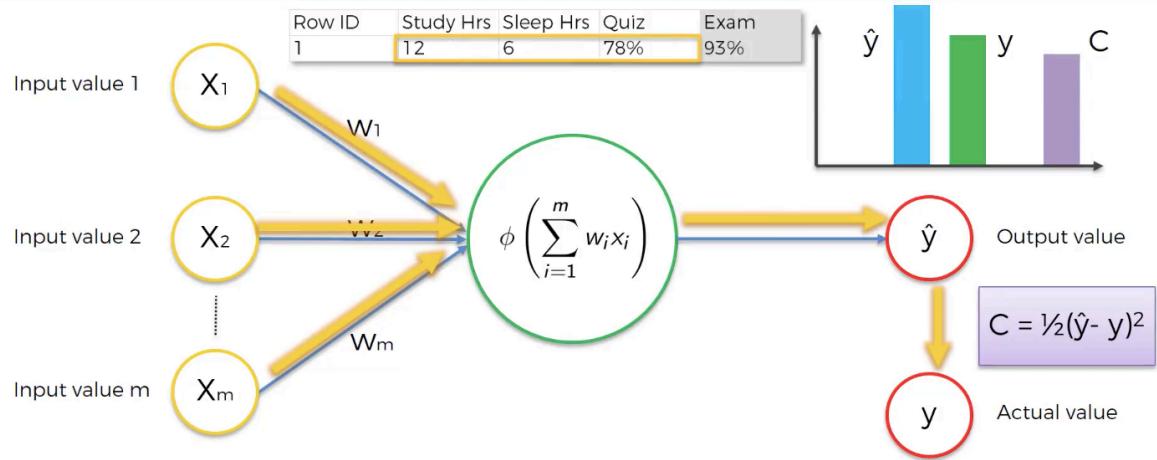
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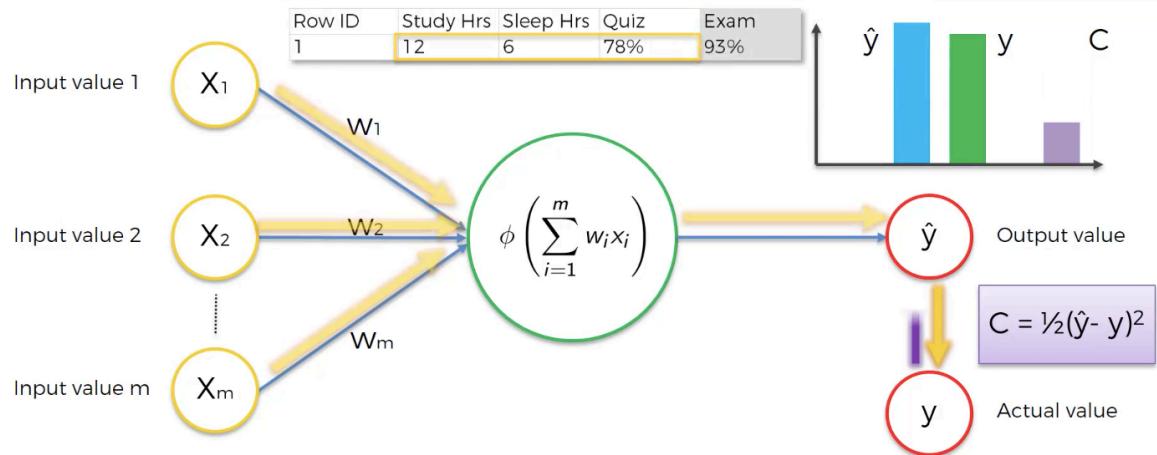
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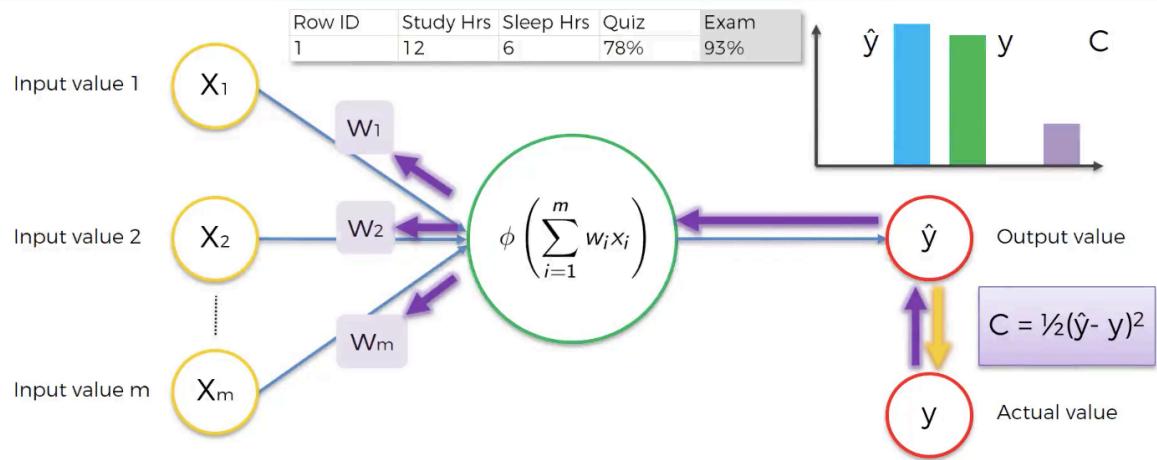
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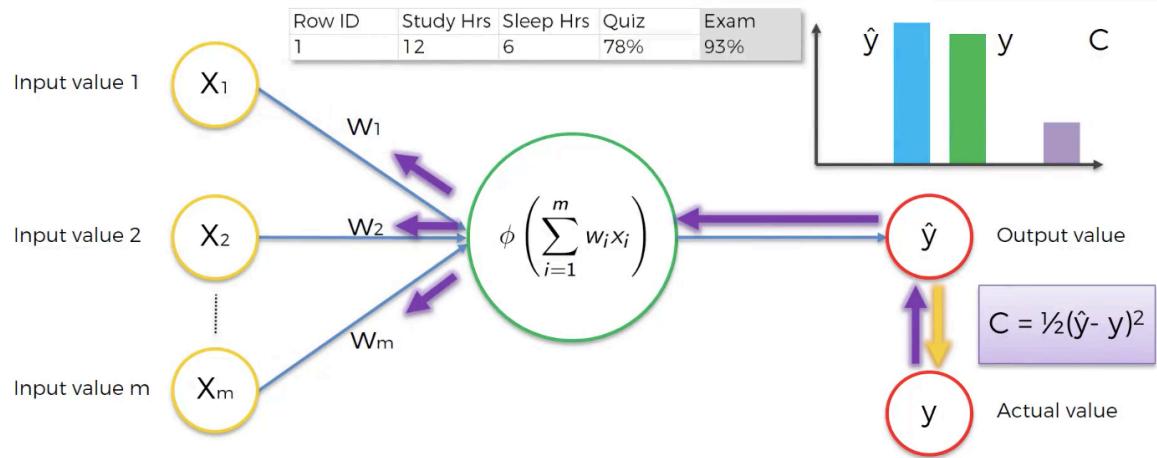
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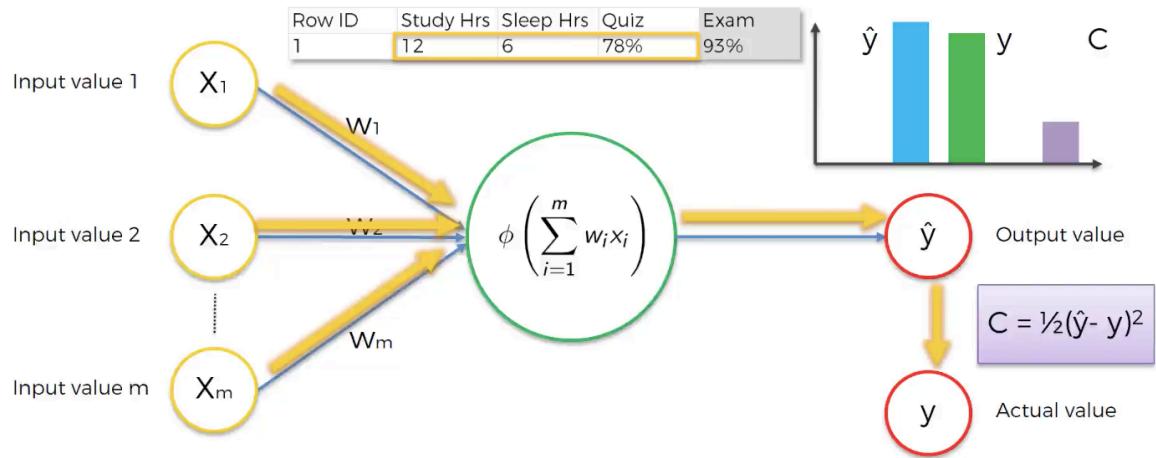
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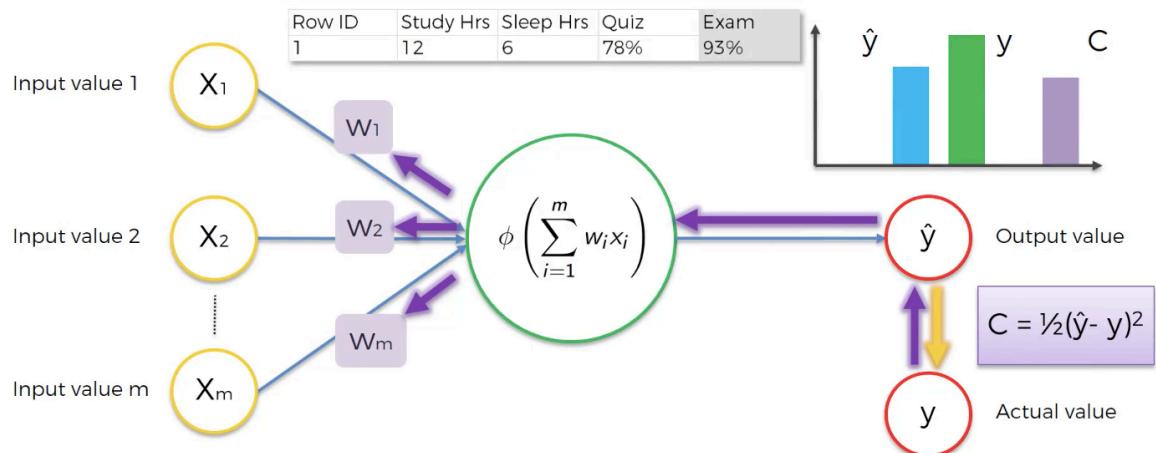
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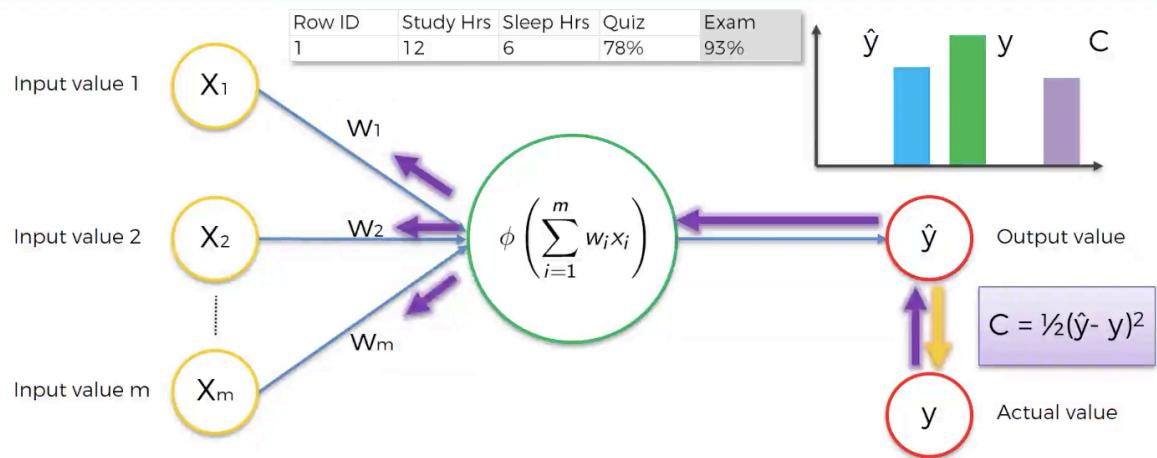
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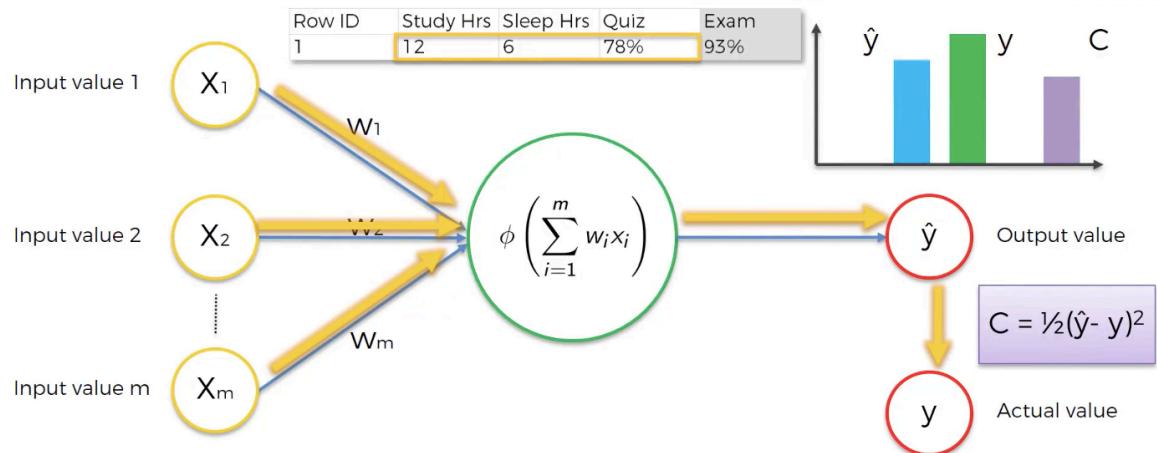
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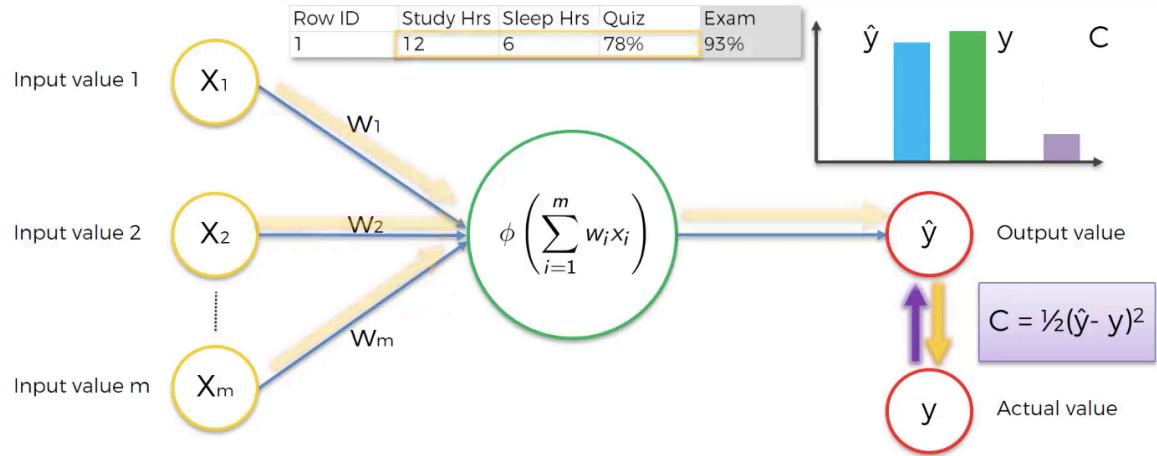
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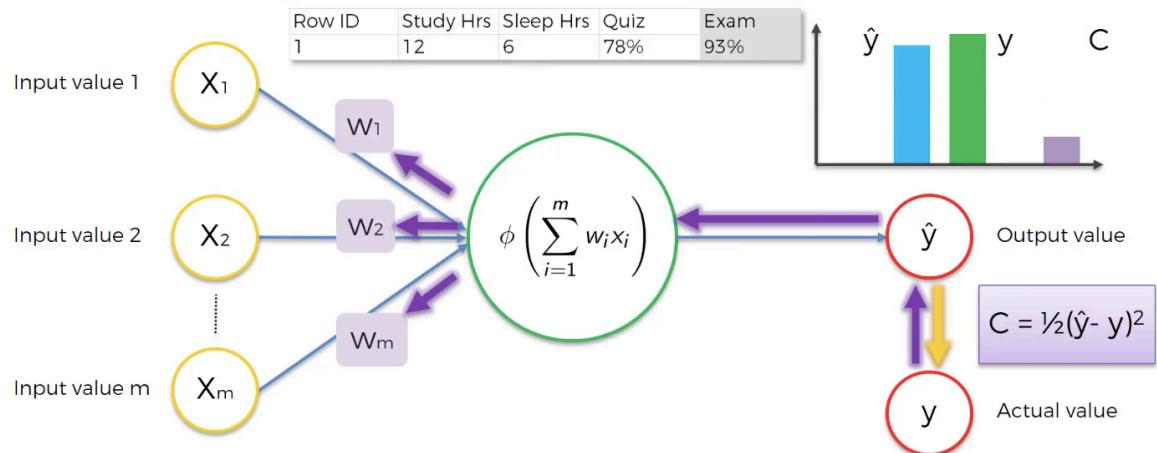
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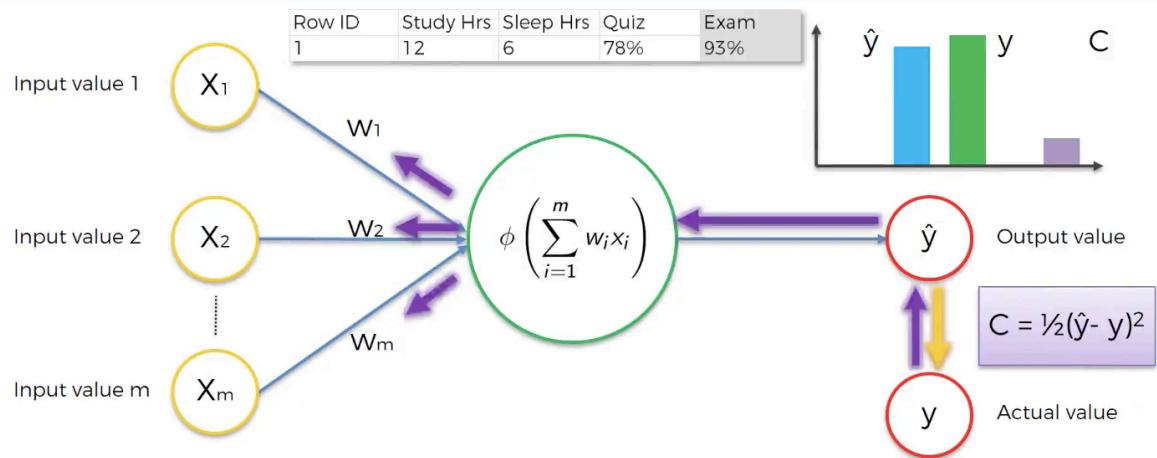
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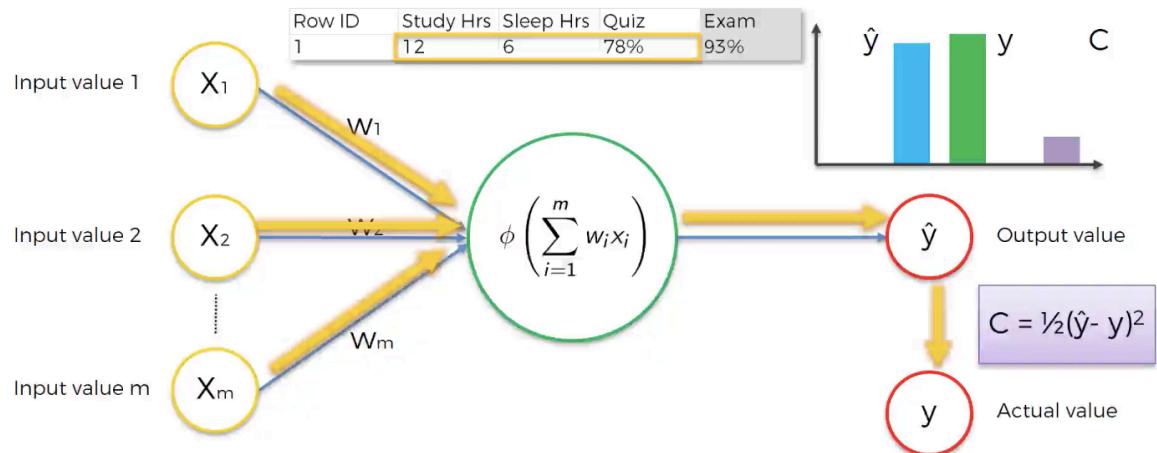
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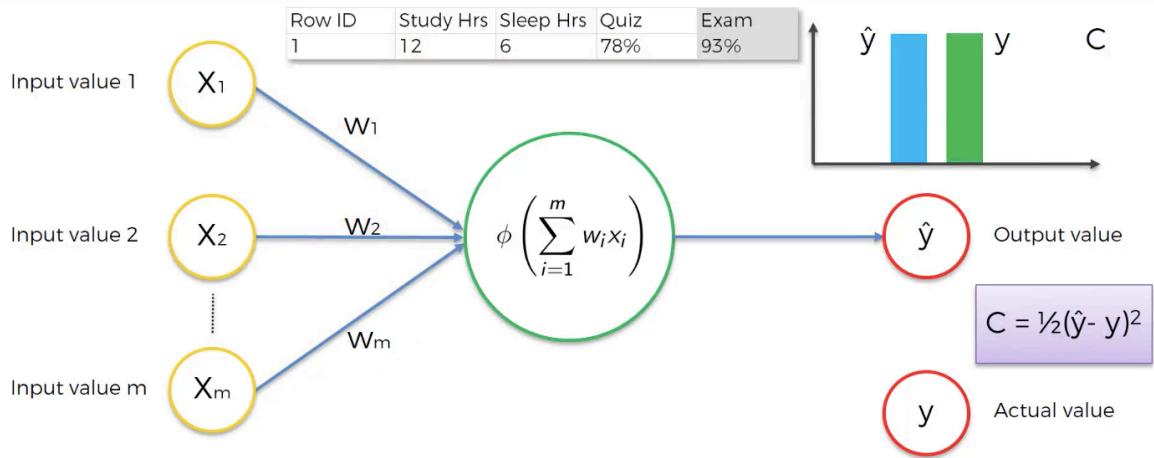
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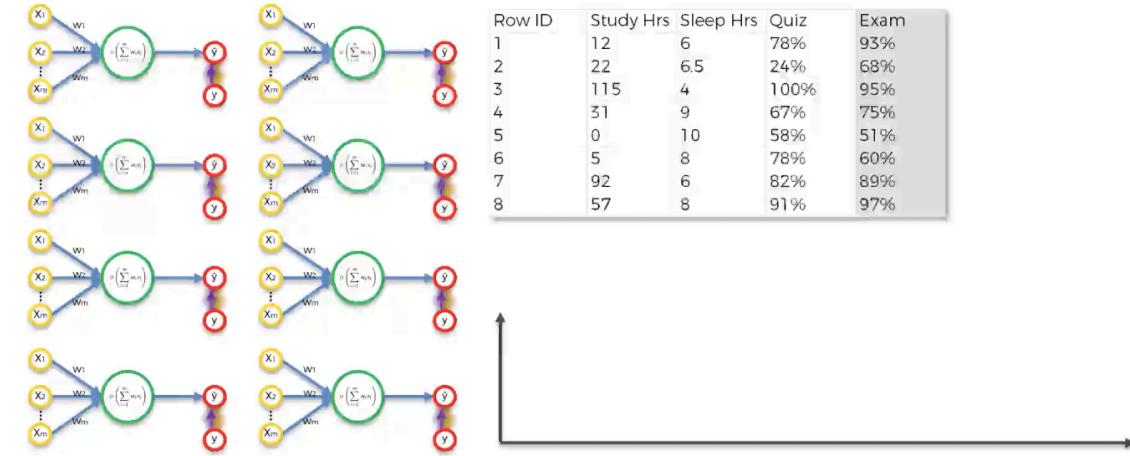


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Now this is perfect for use because we minimize the cost functions and our two y 's are almost the same.

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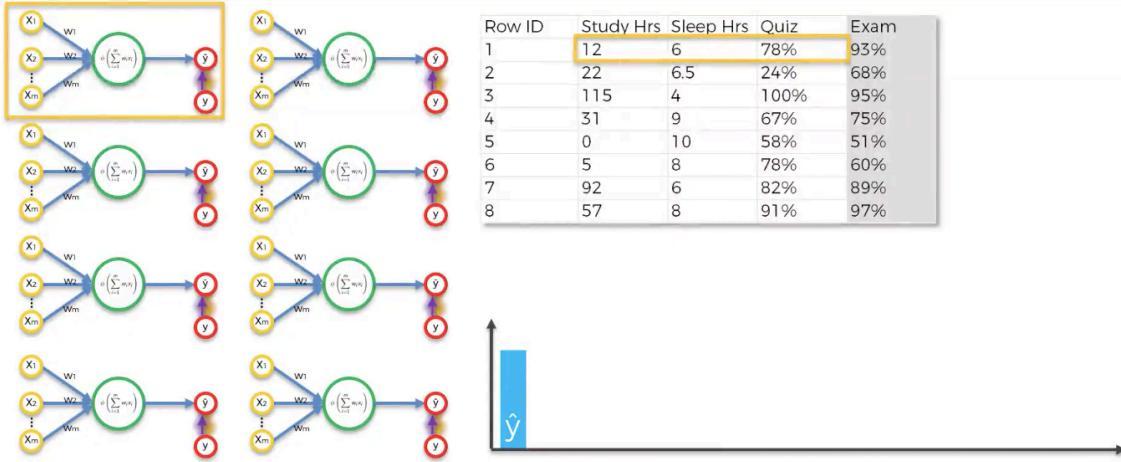


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The 8 perceptrons are the same, the reason for the multiplication is only to understand better.

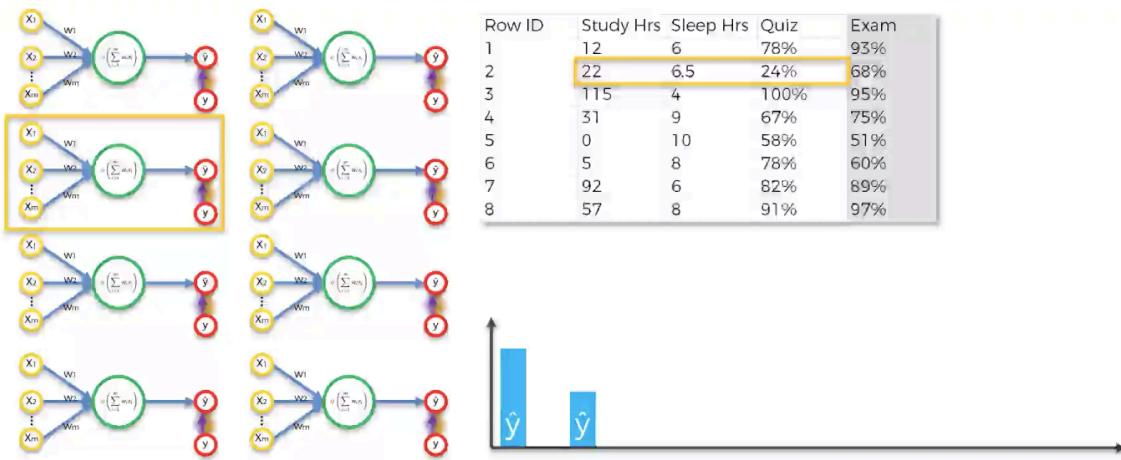
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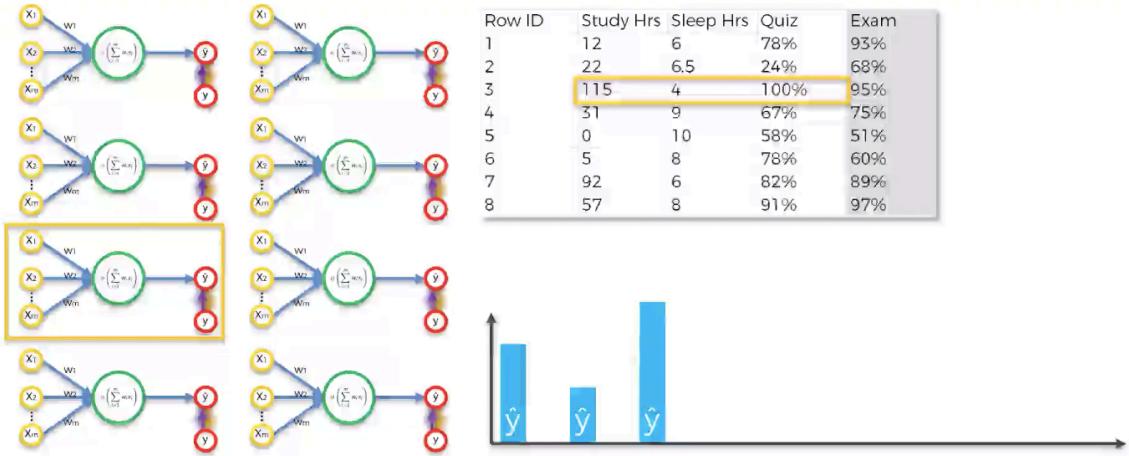
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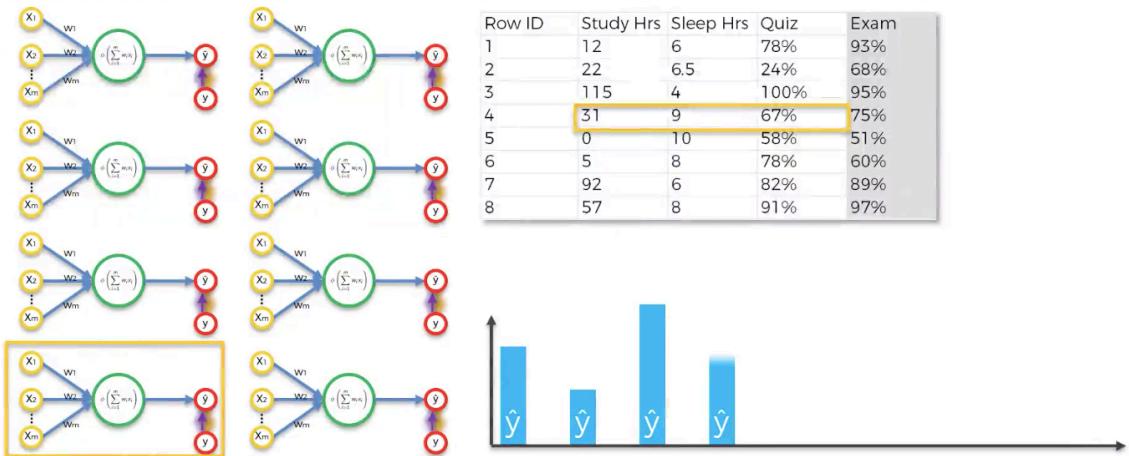
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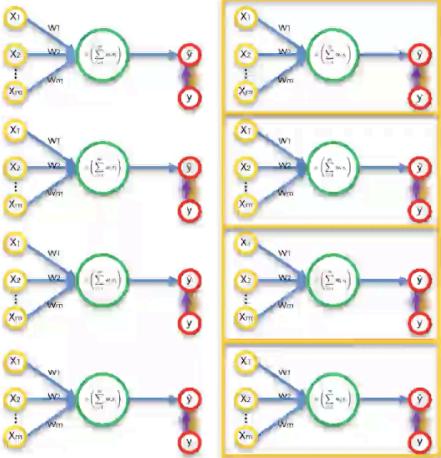
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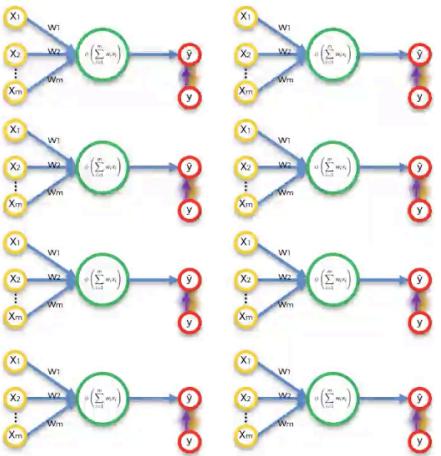
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Row ID	Study Hrs	Sleep Hrs	Quiz	Exam
1	12	6	78%	93%
2	22	6.5	24%	68%
3	115	4	100%	95%
4	31	9	67%	75%
5	0	10	58%	51%
6	5	8	78%	60%
7	92	6	82%	89%
8	57	8	91%	97%



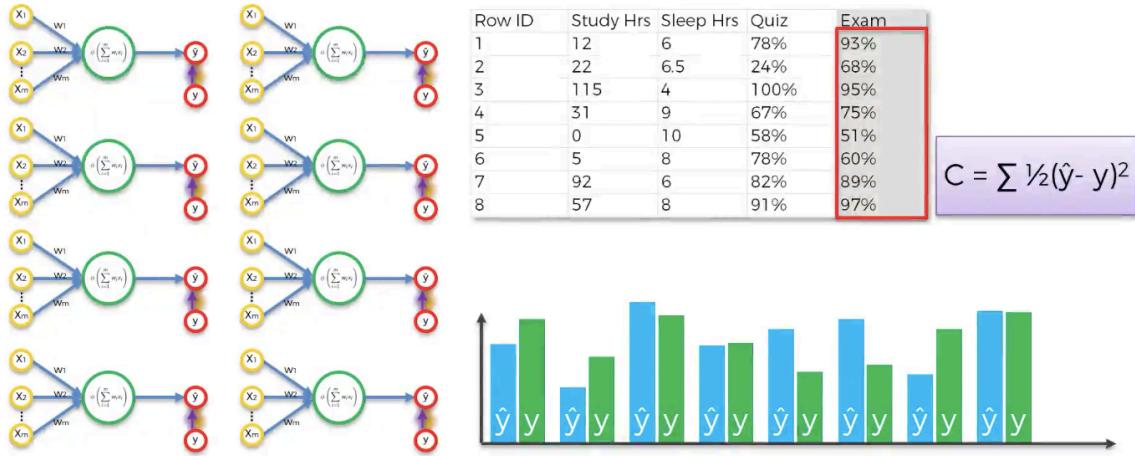
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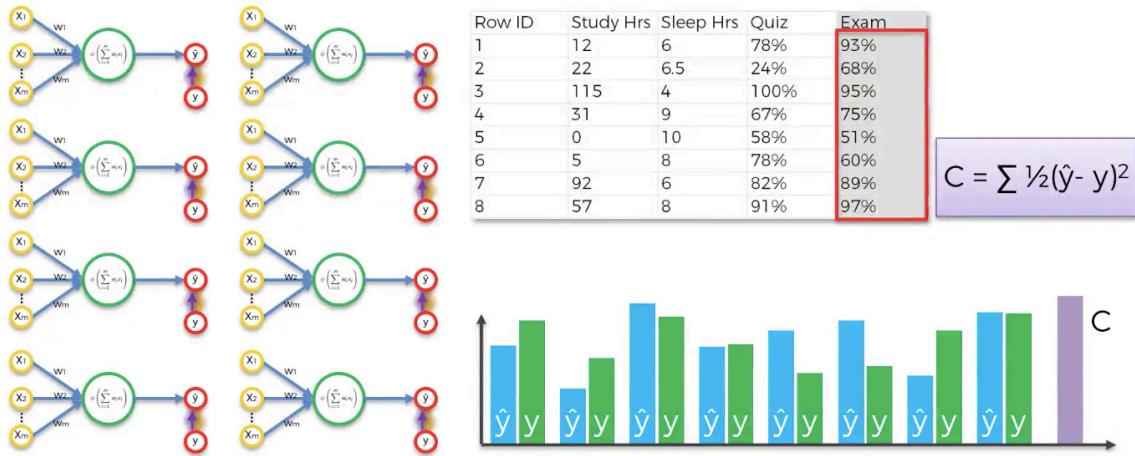
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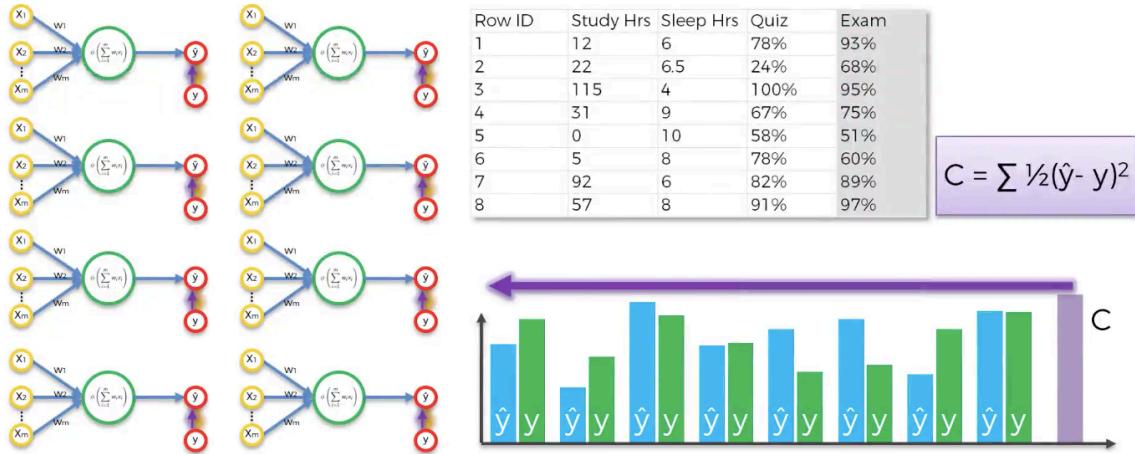
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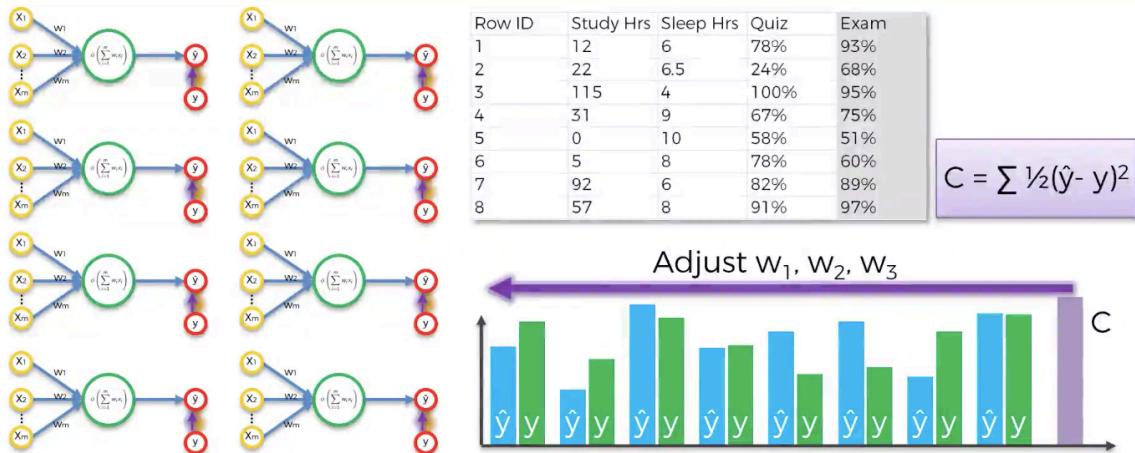
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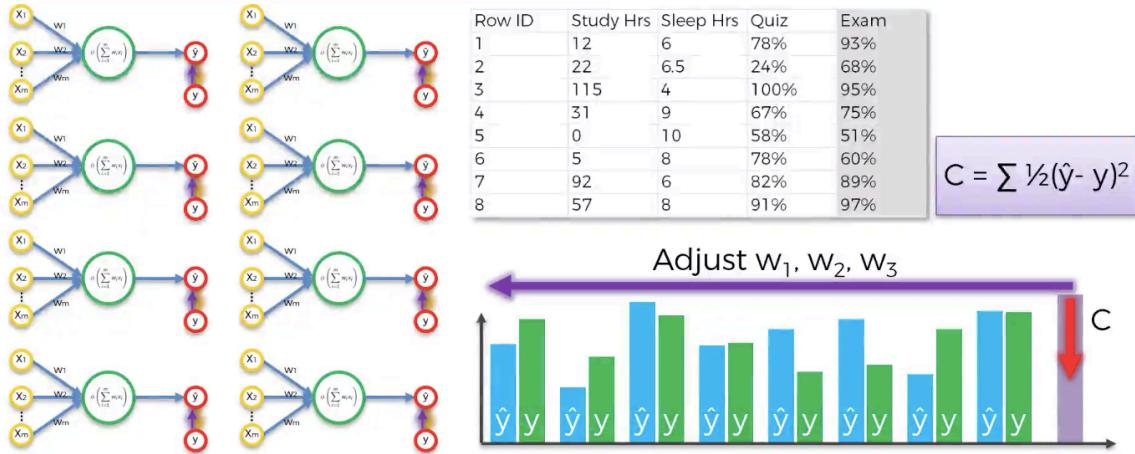
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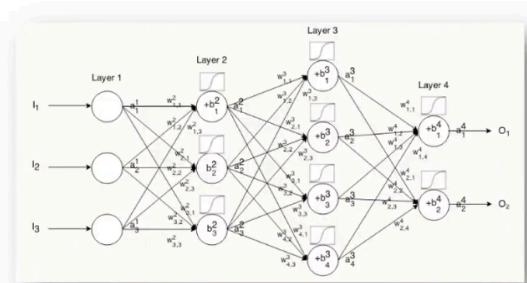
Additional Reading:

A list of cost functions used in neural networks, alongside applications

CrossValidated (2015)

Link:

<http://stats.stackexchange.com/questions/154879/a-list-of-cost-functions-used-in-neural-networks-alongside-applications>



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