Each of us has ever heard about n*eural network* and its achievements, but do you know what it actually is? I want to remove the black box and tell how it works in a nutshell.

The neural network is built of layers of neurons connected with weighted edges. Each neuron and weight of edge are just a number . We can group layers into: input, hidden, output.

The network works similar to human mind. Firstly we have to provide it with knowledge on how to solve problems, so it can solve them on its own.
This structure is learning by processing tons of inputs and outputs (training data).

Input (as N numbers) is entered to N neurons from input layers. Value of each neuron inside is just the sum of values of neurons from previous layer multiplied by weight of it .
Answer is taken from the neuron with the highest value on the output layer.

As we can see computing the answer isn't complicated.

How should we set values on weights of edges?
That is the most important thing in machine learning… LEARNING!
In the training part our network has to draw conclusions after every calculation.

Let call cost function as a sum of differences between output and goal output.
So the smaller difference, the better network.

Now our goal is of course to minimize a cost function.
We can interpret this problem as problem of minimizing a function in <number of all weights> dimension space which we already know how to solve.

And that is how neural networks work, explained in a simplified way. I know that I skipped implementation/math details, but what I wanted is to give you some intuition while sparing you dull nerd talk.