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Title of the Article: Perceptrons – the most basic form of a neural network

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Summary of the background:

Artificial neural networks, known as ANN, can do many things, such as classifying data by recognizing patterns, detecting anomalies or novelties, processing signals, and etc. Therefore, in real life, they can identify faces, recognize speech, read handwritings, translate texts, and etc.

Summary of the objectives:

Neural networks cannot be programmed. Rather, they must learn a way to finish a task just like humans. One of the ways they can do this is by supervised learning. This method is useful when there are already known results that exist with a large sample. The computer processes one data and goes on and compare the output against the known result and repeats this process by itself in supervised learning. Another way is unsupervised learning, which is used when no data exists and whether it is possible to derive cost function from desired behavior and this cost function “tells the neural network how much it is off the target.” The last way is reinforced learning, which is ‘carrot and stick’ method and can be used if neural network generates continuous action.

Summary of the discussion:

Artificial neural is the basic ingredient of ANN. It is consisted of number of input channels, processing stage, and an output. There are three simple steps in how a neuron processes the input. The first step is input getting scaled up or down. When the signal enters, a weight value is multiplied. Each signal has its own multiple so that if more than one signal enters, each signal can be multiplied to a different value. Next, the signals all add up. Here, the input signals literally are added up to a single number. In addition to these signals, an offset, known as the bias, is also added. After a few times, the neuron shifts itself and changes the weight and the biases each time so that it is closer to the desired output. Therefore, the neural network naturally changes its state to the desired patterns and “learns” the material. At the final stage, activation occurs, where the result of the calculation is turned into output signal.

The perceptron is a basic form of activation function that only has two results: 0 or 1. If the value is positive, the perceptron returns 1 while it returns 0 when the value is negative. This perceptron is very useful even though it looks simple. There are many problems that a single perceptron can handle. For example, when there is a two-dimensional plane and assume that there are many points on that paper and a line across it so that it divides the points and the plane. The single perceptron can learn the location of the line and can tell whether a point is below or above the line after learning.

What did you learn from article? What is most pertinent for your research?

From this article, I learned that just like humans, computers need experience and different trials to measure the weight to check the importance of each element. In addition, I learned that a single perceptron is very significant and can do many stuffs.

What questions do you have about the content that remain unanswered?

Some questions that I still have after reading this article are how do computers measure the weight after few trials just like humans? Are there algorithms that make it possible or are they smart enough to do it? In addition, what can we do more than one perceptron and where is this used?