Blog link: https://medium.com/@sumbatilinda/deep-learning-part-1-understanding-basic-

Highlighted parts are the ones that interest me

Structure of a Neural Network:

1. Neural networks are interconnected networks of neurons/nodes that mimic the human brain to perform certain calculations, functions or algorithms.
2. Deep learning is the multi-layered form of machine learning. It is also known as Artificial Neural Network (ANN).
3. Superficially, there are three parts to a neural network: Input layer, Hidden Layers, Output Layer. All these layers are connected through synapses.

Process:

1. The input layer captures the input data which is passed on to the several neurons/ nodes through various layers.
2. As the data is passed on to the next layer, it is multiplied by the weight assigned to the synapse and a bias is added.
3. The activation function acts like a gatekeeper which decides which neurons are to be activated and which are not. These activation functions introduce non-linearity to the neural network, enabling us to perform complex calculations apart from the linear functions.
4. The weighted sum finally reaches the output layer which decides and displays the final output.

Types of Neural Networks:

1. Perceptron (Just Input and Output Layer)
   a. It takes in several binary inputs and gives binary outputs.
   b. It is the simplest form of an ANN.
   c. This neural network does not contain hidden layers.
2. Multi-Layered Perceptron
   a. It also takes in several binary inputs and gives binary outputs.
   b. However, it consists of hidden layers which characterize the output based on the weights and biases assigned to synapses and through the activation function.

Types of Activation Functions:

1. Threshold Functions (Unit Step Function):
    a. These functions compute an output signal based on whether the weighted sum reaches a threshold value or not.
    b. These output signals are either 0 (False) or 1 (True).
    c. We can't use gradient-based optimization techniques since these functions are discontinuous.
2. Sigmoid Functions:
    a. These functions are used to address logistic regression and classification problems.
    b. It produces continuous values ranging from 0 to 1, making it the best fit in calculating probabilities.
    c. Since this function is smooth, we can use gradient-based optimization techniques by calculating derivatives.
3. Rectifier Linear Unit Functions (RELU):
    a. These are piece-wise linear functions which are prominently used in deep learning.
    b. If the value is less than zero, output is 0. While, if the value is non-negative, the output is the input itself.
4. Hyperbolic Tangent Functions:
    a. This function is defined as tanh(x).
    b. The output values range from -1 to 1 due to the range of the tanh(x) function.
    c. It is similar to the sigmoid function; however, the output values are shifted downwards.

Reflection:

This blog gave me an amazing introduction to neural networks in such a short and concise read. Machine learning and deep learning interest me deeply and currently I'm working towards exploring these domains. The information that I learnt about neural networks has definitely fascinated me and I will be looking forward to reading related research papers to gain further insights.