**Assigment-2**

**1.What is Deep Learning? Read about various activation functions.**

**Deep learning** is a class of **machine learning** algorithms that uses multiple layers to progressively extract higher-level features from the raw input. For **example**, in image processing, lower layers may identify edges, while higher layers may identify the concepts relevant to a human such as digits or letters or faces.

**Activation functions** are a critical part of the design of a neural network.

The choice of activation function in the hidden layer will control how well the network model learns the training dataset. The choice of activation function in the output layer will define the type of predictions the model can make.

**Types of Activation Functions**

* Sigmoid **Function**. In an ANN, the sigmoid **function** is a non-linear AF used primarily in feedforward neural networks. ...
* Hyperbolic Tangent **Function** (Tanh) ...
* Softmax **Function**. ...
* Softsign **Function**. ...
* Rectified Linear Unit (ReLU) **Function**. ...
* Exponential Linear Units (ELUs) **Function**

**2.Difference between supervised and unsupervised with your own set of examples.**

**Supervised Unsupervised**

|  |  |  |
| --- | --- | --- |
| Input Data | Uses Known and Labeled Data as input | Uses Unknown Data as input |
| Computational Complexity | Very Complex | Less Computational Complexity |
| Real Time | Uses off-line analysis | Uses Real Time Analysis of Data |
| Number of Classes | Number of Classes are known | Number of Classes are not known |
| Accuracy of Results | Accurate and Reliable Results | Moderate Accurate and Reliable Results |

**Example of Supervised Learning**  
Suppose there is a basket which is filled with some fresh fruits, the task is to arrange the same type of fruits at one place.  
Also, suppose that the fruits are apple, banana, cherry, grape.

Suppose one already knows from their *previous work* (or experience) that, the shape of each and every fruit present in the basket so, it is easy for them to arrange the same type of fruits in one place.

**Example of Unsupervised Learning**  
Again, Suppose there is a basket and it is filled with some fresh fruits. The task is to arrange the same type of fruits at one place.

This time there is no information about those fruits beforehand, its the first time that the fruits are being seen or discovered

So how to group similar fruits without any prior knowledge about those.  
First, any physical characteristic of a particular fruit is selected. Suppose *color*.

Then the fruits are arranged on the basis of the color. The groups will be something as shown below:  
**RED COLOR GROUP**: apples & cherry fruits.

**GREEN COLOR GROUP**: bananas & grapes.

So now, take another physical character say, *size*, so now the groups will be something like this.  
**RED COLOR** AND **BIG SIZE**: apple.  
**RED COLOR** AND **SMALL SIZE**: cherry fruits.  
**GREEN COLOR** AND **BIG SIZE**: bananas.  
**GREEN COLOR** AND **SMALL SIZE**: grapes.  
The job is done!  
Here, there is no need to know or learn anything beforehand. That means, no train data and no response variable. This type of learning is known as **Unsupervised Learning**.