Assignment -1

Title: Activation functions that are being used in neural networks.

Aim: Write a Python program to plot a few activation functions that are being used in neural networks.

Objective: To learn about activation functions and perform its code in python.

Theory:
These are computational models and inspire by the human brain. Many of the recent advancements have been made in the field of Artificial Intelligence, including Voice Recognition, Image Recognition, Robotics using it. They are the biologically inspired simulations performed on the computer to perform certain specific tasks like -

- Clustering
- Classification
- Pattern Recognition

In general - It is a biologically inspired network of artificial neurons configured to perform specific tasks. These biological methods of computing are known as the next major advancement in the Computing Industry.
Linear Activation Function: The linear activation function, also known as "no activation," or "identity function" (multiplied xl.O), is where the activation is proportional to the input. The function doesn't do anything to the weighted sum of the input, it simply spits out the value it was given.

Linear

$$F(x) = x$$

Sigmoid Activation Function: This function takes any real value as input and outputs values in the range of O to 1. The larger the input (more positive), the closer the output value will be to 1.0, whereas the smaller the input (more negative), the closer the output will be to 0.0, as shown below.

Sigmoid / Logistic

$$f(x) = \frac{1}{1 + e^{-x}}$$

ReLU Function: ReLU stands for Rectified Linear Unit. ReLU has a derivative

function and allows for backpropagation while simultaneously making it computationally efficient. The main catch here is that the ReLU function does not activate all the neurons at the same time. The neurons will only be deactivated if the output of the linear transformation is less than 0.

Conclusion:

We have successfully implemented program to plot a few activation functions that are being used in neural networks.

Questions:

1. What is ANN? Explain in detail.
2. What is BNN? Explain in detail.
3. What is Difference between ANN & BNN?
4. What is Perceptron?
5. What are the applications of ANN?