Report

1. Step function:

* Advantage: It is simple and easy to understand. It is also computationally efficient.
* Limitation: It is not differentiable and can cause issues with gradient-based optimization algorithms. It also only allows for binary outputs, which is not suitable for more complex tasks.

1. Sigmoid function:

* Advantage: It produces a smooth and continuous output that is suitable for gradient-based optimization algorithms. It can also be interpreted as a probability distribution, which is useful in certain applications.
* Limitation: It suffers from the vanishing gradient problem, which can cause issues with deep neural networks. It also has a limited range (0 to 1), which can lead to saturation and hinder the learning process.

1. TanH function:

* Advantage: It has a wider range than the sigmoid function (-1 to 1), which can be useful in some applications. It also produces a smooth and continuous output that is suitable for gradient-based optimization algorithms.
* Limitation: It also suffers from the vanishing gradient problem, which can cause issues with deep neural networks. It can also cause a problem with bias if the data is not centered around zero.

1. ReLU function:

* Advantage: It is computationally efficient and allows for faster training of deep neural networks. It also addresses the vanishing gradient problem and can lead to better performance in certain applications.
* Limitation: It suffers from the dying ReLU problem, where some neurons can become inactive and stop learning. It also produces a non-differentiable output for the negative values of x.

1. ELU function:

* Advantage: It addresses the dying ReLU problem and produces a smooth and continuous output that is suitable for gradient-based optimization algorithms. It can also produce negative outputs, which can be useful in some applications.
* Limitation: It can be computationally expensive compared to other activation functions. It also has a limited range of alpha values that can be used, which can limit its flexibility in certain applications.