REPORT

step activation function is a simple type of activation function used in artificial neural networks, typically for binary classification problems. It maps an input value to a binary output value, either 0 or 1, based on whether the input value is greater or less than a predefined threshold value.The step function has a discontinuous output, jumping suddenly from 0 to 1 as the input value crosses the threshold. This makes it less suitable for training neural networks using gradient-based optimization methods, as the derivative of the step function is 0 almost everywhere, making it difficult to update the weights of the network during backpropagation.The sigmoid activation function is a mathematical function commonly used in artificial neural networks to introduce non-linearity to the output of a node. It is a smooth, S-shaped function that maps any input value to a value between 0 and 1. The sigmoid function has a few important properties that make it useful for neural networks. First, it is a continuous function, which means that it has a derivative at every point. This makes it possible to use gradient-based optimization techniques to train the neural network. Second, it is a non-linear function, which means that it can introduce non-linearities into the output of the neural network, allowing it to learn complex patterns in the data.The hyperbolic tangent (tanh) activation function is a popular mathematical function used in artificial neural networks to introduce non-linearity to the output of a node. It is similar to the sigmoid function but maps input values to a range between -1 and 1, making it useful for problems where negative values are meaningful.Like the sigmoid function, the tanh function is a continuous and non-linear function, which makes it useful for neural networks. It also has the property of being zero-centered, meaning that its output is centered around zero, which can help with the convergence of the network during train.The rectified linear unit (ReLU) activation function is a popular mathematical function used in artificial neural networks to introduce non-linearity to the output of a node. It is a simple function that returns the input value if it is positive, and returns zero otherwise.The ReLU function has several advantages over other activation functions. First, it is a simple function that is computationally efficient to compute. Second, it does not suffer from the problem of vanishing gradients for large input values, making it easier to train deep neural networks. Third, it can help to sparsify the activation of the network, by setting some of the activations to zero, which can help to prevent overfitting.