Date: March, 2024

SMART INTERNZ - APSCHE
AI/ML Training.
Assessment-4.

① What is the purpose of the activation function in a neural network, and what are some commonly used activation function?

Ans: The activation function decides whether a neuron should be activated or not by calculating the weighted sum and further adding bias to it. The purpose of the activation function is to introduce non-linearity into the output of a neuron.

Activation functions:

→ Sigmoid / Logistic Activation function.
→ Tanh function
→ ReLU function
→ Leaky ReLU function
→ parametric ReLU function.
→ ELU function
→ Softmax function.
→ Swish.

② Explain the concept of gradient descent & how it is used to optimize the parameter of neural network during training?

Ans. It's based on a convex function and tweaks its parameters iteratively to minimize a given function to its local minimum.

(3) How does back propagation calculate the gradients of the loss function with respect to the parameters of a neural network?

Ans. Computing the gradient one layer at a time, iterating backward from the last layer to avoid redundant calculations of intermediate terms in the chain rule.

(4) Convolutional layers have fewer parameters compared with the fully connected layers of a traditional neural network, CNNs perform more efficiently on image processing tasks.

(5) → No require human supervision required
→ Automatic feature extraction.
→ Highly accurate at image recognition & classification.
→ weight sharing
→ minimizes computations.
→ uses same knowledge across all image locations.
→ Ability to handle large datasets
→ Hierarchical learning.

(6) Pooling layers are used to reduce the dimensions of the feature maps. Thus, it reduces the number of parameters to learn and the amount of computation performed in the networks.

(7) This can be done by applying transformations to the data, such as cropping, rotating, or flipping images. Data augmentation is used to improve the performance of machine learning models by reducing overfitting. Overfitting occurs when a model learns the training data too well and is unable to generalize to new data.

(8) predicts the class of the image based on the features extracted in previous stages.

(10) Transfer learning is used in Machine learning, is the reuse of a pre-trained model on a new problem. In transfer learning, a machine exploits the knowledge gained from a previous tasks to improve generalization about others.

(14) Domain and Language: Ensure that the pre-trained model is compatible with your task's domain or language. Fine-tuning on a similar domain or language can boost performance, especially for tasks involving domain-specific terminology. Pre-training datasets: Examine the datasets used for the model's pre-training.

(15) There are many ways for measuring classification performance. Accuracy, confusion matrix, log-loss, and AUC-ROC are some of the most popular metrics. Precision-recall is a widely used metrics for classification problems.