1 What is the main difference between a Convolutional Neural Network (CNN) and a Deep Neural Network (DNN)?

a) CNNs use convolutional layers, while DNNs use fully connected layers

b) CNNs are used only for image processing, while DNNs can be used for various tasks

c) CNNs can only have a single hidden layer, while DNNs can have multiple hidden layers

d) CNNs cannot use activation functions, while DNNs can use activation functions

Answer: a) CNNs use convolutional layers, while DNNs use fully connected layers

Explanation: The main difference between a CNN and a DNN is the type of layers they use. CNNs primarily use convolutional layers for local feature extraction, whereas DNNs use fully connected layers for learning complex patterns in the data.

2 What is the purpose of using pooling layers in a CNN?

a) To reduce the spatial dimensions of the feature maps

b) To introduce non-linearity in the network

c) To improve the training speed of the network

d) To regularize the network and prevent overfitting

Answer: a) To reduce the spatial dimensions of the feature maps

Explanation: Pooling layers in a CNN are used to reduce the spatial dimensions of the feature maps, which helps in reducing computational complexity and controlling the risk of overfitting.

3 In a DNN, what is the primary purpose of using activation functions?

a) To introduce non-linearity in the network

b) To reduce the dimensions of the input data

c) To perform regularization

d) To improve the training speed of the network

Answer: a) To introduce non-linearity in the network

Explanation: Activation functions in DNNs introduce non-linearity into the network, which enables the model to learn complex and non-linear relationships in the input data.

4 What is the primary advantage of using a CNN over a DNN for image processing tasks?

a) CNNs have fewer parameters and are less prone to overfitting

b) CNNs are more computationally efficient

c) CNNs can learn hierarchical features from input data

d) All of the above

Answer: d) All of the above

Explanation: CNNs have fewer parameters, are more computationally efficient, and can learn hierarchical features from input data, making them more suitable for image processing tasks compared to DNNs.

5 Which of the following is NOT a type of layer commonly found in a CNN architecture?

a) Convolutional layer

b) Pooling layer

c) Recurrent layer

d) Fully connected layer

Answer: c) Recurrent layer

Explanation: Recurrent layers are typically found in Recurrent Neural Networks (RNNs) and are not commonly used in CNN architectures. CNNs generally consist of convolutional, pooling, and fully connected layers.

6 How does a CNN handle translational invariance in image data?

a) By using fully connected layers

b) By using convolutional layers

c) By using pooling layers

d) By using recurrent layers

Answer: c) By using pooling layers

Explanation: Pooling layers in a CNN help achieve translational invariance by reducing the spatial dimensions of the feature maps and summarizing local information, making the network less sensitive to small translations in the input image.

7 In a CNN, what is the primary function of a pooling layer?

a) Feature extraction

b) Dimensionality reduction

c) Activation function computation

d) Regularization

Answer: b) Dimensionality reduction

Explanation: The primary function of a pooling layer is to reduce the spatial dimensions of the feature maps while maintaining their essential information.

8 Which of the following activation functions is commonly used in the convolutional layers of a CNN?

a) Sigmoid

b) Tanh

c) ReLU

d) ELU

Answer: c) ReLU

Explanation: ReLU (Rectified Linear Unit) is a popular activation function used in CNNs due to its ability to mitigate the vanishing gradient problem and speed up training.

9 What is the role of padding in a convolutional neural network (CNN)?

a) To improve feature extraction

b) To reduce overfitting

c) To maintain spatial dimensions after convolutions

d) To speed up training

Answer: c) To maintain spatial dimensions after convolutions

Explanation: Padding is used to maintain the spatial dimensions of feature maps after convolutions, which helps avoid excessive loss of information as the data passes through the network.

10 In a CNN, which of the following layers is responsible for combining features extracted from previous layers and making predictions?

a) Convolutional layer

b) Pooling layer

c) Fully connected layer

d) Dropout layer

Answer: c) Fully connected layer

Explanation: The fully connected layer combines features extracted from previous layers and produces predictions using a softmax or sigmoid activation function.