

1. What is the role of convolution in a CNN?
2. How does pooling contribute to feature extraction in a CNN?
3. What is the purpose of flattening in a CNN?

How does padding influence the performance of a CNN, especially for tasks like object detection and image segmentation?

How can you reduce the number of parameters in a convolutional layer while maintaining performance?

What is the impact of kernel size on the number of parameters?

How do padding and stride affect the number of parameters in a convolutional layer?

Explain the concept of feature extraction using convolution filters.

How do multiple convolution filters in a layer contribute to feature learning?

**Given:** A 5x5 image and a 3x3 filter. Calculate the output image size without padding.

**Given:** A 4x4 image and a 3x3 filter. What padding is required to maintain the original image size?

**Given:** A 4x4 feature map and a 2x2 pooling filter. Calculate the output dimensions for max, average, and sum pooling.

Convolutional Neural Network:

A CNN consists of the following layers:

Input: 64,64

Conv layer: 32 filters, kernel size 3x3, stride 1, padding 'same', input channels 3.

Max pooling: 2x2.

Conv layer: 64 filters, kernel size 3x3, stride 1, padding 'same'.

Fully connected layer: 1024 neurons.

Output layer: 10 neurons.

Calculate the total number of parameters in the network.

Explain the basic structure of a CNN, including its core components.

What are the common optimization algorithms used for CNN training?