**Subject: AI**

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In artificial intelligence, a Convolutional Neural Network (CNN) is a type of deep neural network designed for tasks involving visual data such as images and videos. CNNs are particularly effective for image classification, object detection, and image recognition tasks. They have also been successfully applied to other domains, such as natural language processing.

Key components of a CNN include:

Convolutional Layers: These layers apply convolutional operations to the input data, which helps capture local patterns and features. Convolutional filters slide over the input, extracting relevant features like edges, textures, and shapes.

Pooling Layers: Pooling layers downsample the spatial dimensions of the input volume. Common pooling operations include max pooling and average pooling. Pooling helps reduce the computational load and makes the network more robust to variations in input.

Activation Functions: Non-linear activation functions (e.g., ReLU - Rectified Linear Unit) are applied to introduce non-linearity into the network. This allows the network to learn complex relationships and patterns in the data.

Fully Connected Layers: After several convolutional and pooling layers, the network often ends with one or more fully connected layers. These layers connect every neuron to every neuron in the previous and subsequent layers, allowing the network to make decisions based on the learned features.

Flattening: Before the fully connected layers, the high-dimensional feature maps are flattened into a one-dimensional vector.

CNNs are designed to automatically and adaptively learn hierarchical representations from the input data. The convolutional and pooling layers enable the network to learn spatial hierarchies of features, allowing it to understand complex patterns in the data.

CNNs have proven to be highly effective in computer vision tasks and are the backbone of many state-of-the-art models for image classification, object detection, and other visual recognition tasks. They have played a crucial role in the success of deep learning in various domains.