

**You**

layers of a Convolutional neural network

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A Convolutional Neural Network (CNN) is a type of deep learning algorithm primarily used for processing data that has a grid-like topology, such as images. A CNN consists of various layers, each designed to perform different types of transformations on its inputs. Here are the typical layers found in a CNN:

1. **Input Layer:** This is where the network receives its input image data. The input is usually a matrix of pixel values.
2. **Convolutional Layer:** This is the core building block of a CNN. The layer's neurons apply a convolution operation to the input, passing the result to the next layer. It filters the input for useful features using kernels (small matrices of weights) that slide across the input image to produce feature maps.
3. **Activation Layer (ReLU):** This layer applies an element-wise activation function such as the Rectified Linear Activation (ReLU). This introduces non-linearity to the system, allowing the network to learn more complex patterns.
4. **Pooling Layer (Subsampling):** Pooling layers reduce the dimensions of the data by combining the outputs of neuron clusters at one layer into a single neuron in the next layer. Max pooling and average pooling are common methods used to reduce the spatial dimensions (width and height).
5. **Fully Connected Layer:** Neurons in a fully connected layer have full connections to all activations in the previous layer. This layer essentially takes the high-level filtered features from the previous layers and learns which features most contribute to the classification.
6. **Output Layer:** The final layer. It has as many neurons as there are classes to predict. It often uses the softmax activation function to output a probability distribution over the classes.

Between these layers, normalization layers such as Batch Normalization may also be used to make the network faster and more stable. CNN architectures vary greatly depending on the



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