

Convolutional Neural Networks (CNNs)

CNNs are a type of neural network specifically designed to process and analyze visual data such as images and videos. Just like our brain can detect patterns and features in an image, CNNs can also learn and detect patterns and features in images.

So how do CNNs work? Well, they are made up of layers that perform different functions. The first layer is the input layer where the raw image data is fed into the network. The second layer is the convolutional layer which applies a set of filters to the input image to extract features such as edges, lines, and shapes. The third layer is the pooling layer which reduces the size of the feature map and makes the network more efficient. The fourth layer is the fully connected layer which processes the extracted features and outputs a prediction.

Now, let's take a real-life example to understand how CNNs work. Imagine you have a dataset of images of different types of fruits. You want to build a model that can classify these fruits accurately. You can use CNNs to train a model that can learn the features and patterns in each fruit image and classify them correctly.

In the first convolutional layer, the network can learn to identify the edges and shapes of the fruit. In the second layer, it can learn to identify the texture and color of the fruit. The pooling layer helps to reduce the size of the feature map and make the network more efficient. Finally, in the fully connected layer, the network processes the extracted features and outputs a prediction for the fruit type.

CNNs are incredibly useful in many real-life applications such as self-driving cars, medical image analysis, facial recognition, and more. They can be trained on large datasets to learn and identify complex patterns in images, making them powerful tools for image processing and analysis.

In summary, CNNs are a type of neural network specifically designed to process and analyze visual data. They work by applying a set of filters to extract features from the

input image and process them through different layers to output a prediction. CNNs are widely used in many real-life applications and can be trained on large datasets to identify complex patterns in images.