

Monthly Report

This month I have read some paper about Artificial Intelligence (AI). AI is based on machine learning to build the ability to reason, knowledge, plan, learn, communicate, perceive, move, and manipulate objects similar to or even beyond humans. Convolutional neural network is the basis of machine learning.

Neural networks consist of a large number of neurons interconnected. After each neuron receives a linear combination of inputs, it starts with a simple linear weighting and then adds a non-linear activation function to each neuron to output after a nonlinear transformation. The connection between each two neurons represents a weighted value called the weight. Different weights and activation functions result in different outputs of the neural network. For instance, write a number to let the neural network identify what the number is. The input of the neural network at this time is defined by input neurons activated by a set of pixels of the input image. After a nonlinear transformation by a nonlinear activation function, neurons are activated and then transmitted to other neurons. Repeat this process until the last output neuron is activated. This identifies what word the current number is.

The operation of the inner product (multiply by element and then summing) between the image and the filter matrix is the so-called "convolution" operation, and is also the name of the convolutional neural network. The study found that at each convolution, the nerve layer may inadvertently lose some information. At this time, pooling can well solve this problem. And pooling is a process of screening and filtering, which can filter out the useful information in the layer to analyze the next layer, and also reduce the computational burden of the neural network.