Residual Network

The third model we used to train the two data set is ResNet. The ResNet referred to the VGG19 and make some modifications on it. ResNet also added residual unit through the short circuit mechanism. The structure of a building block of residual learning is shown in figure n. For an accumulation layer structure, when the input is x, the characteristics it learns are recorded as H(x). Now we hope that it can learn residual F(x) = H(x) - x, so that the original learning characteristic is F(x) + x. This is because residuals are easier to learn than primitive features. When the residual is 0, the accumulation layer only does identity mapping, and the network performance will not decline. In fact, the residual will not be 0, which will also make the accumulation layer learn new features based on the input characteristics, so as to have better performance.

手机屏幕截图

描述已自动生成

Fig n. Residual learning: a building block.

The changes between VGG and ResNet are mainly reflected in the fact that ResNet directly uses the convolution of stride=2 to sample and replaces the full connection layer with the global average pool layer. An important design principle of ResNet is that when the feature map size is reduced by half, the number of feature maps is doubled, which keeps the complexity of the network layer.

The result of MINIST

Here is the result while training MINIST, the accuracy can reach 0.906250 at last.

地图的截图

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一些文字和图案

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The result of cifar10

Here is the result while training cifar10, the accuracy can reach 79.460% at last.

地图的截图

描述已自动生成

手机屏幕截图

描述已自动生成

Reference

[1] He, Kaiming, et al. “Deep residual learning for image recognition.” *Proceedings of the IEEE conference on computer vision and pattern recognition*. 2016.