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Computer Vision  
Week 4 Writeup

The paper “Deep Residual Learning for Image Recognition” by Kaiming He et al. is an exploration of deep residual neural networks. The first question researchers seek is if adding more layers by itself enough to train a better network. One of the main problems facing neural networks is degradation, and the researchers answer to this is a deep residual learning network. Their model adds “shortcut” connections which skip one or more layers of a neural network. In essence the network will self-optimize using these residual layers if they can approximate the function without the layers in between.

Shortcut connections in this paper don’t add computational complexity, and results on imagenet classification achieved both top 1(3.5% error) and top 5 error rates. Major observations included that a 34 layer net is better than an 18-layer resnet by 2.8% in addition to having lower training error and better generalization. When models don’t converge enough, researchers bump the learning rate down to something low, and increase it later. When tested with a larger network, a 110 layer network performed better using their method than a 1202 layer network most likely due to overfitting or a network that is unreasonably large for the dataset.