Summary of Tutorials

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Tutorial 1

This tutorial shows the concepts of backpropagation by calculating the gradients manually. It also introduces Tensorflow as libary for maschine learning. Tensorflow brings different optimizers (with different learning rates), loss functions and model layers. Tensorflow makes it much more easier to setup a neuronal network and change parameters to improve the performance. Optimizers uses different ways to improve the parameters of your model while training. Regualization helps not to overfit your network for example by using early stopping.

Tutorial 2

This tutorial is about transfer learning. It's easier to use a pretrained model and optimize it with your more specific data to perform better on its goal. You don't need to learn a model from scratch, so you need less train data to get the same performance. A common way to implement transfer learning is to use a pretrained model and freeze those parameters and just train parameters from extra added layer(s). The network only needs to train much less parameters.

Tutorial 3

This tutorial is about image segmentation using a U-Net (convolutional neuronal network for biomedic). Goal of semantic secmentation is to class pixels in an image and in this tutorial we want to predict cell boundaries on images.

The dice loss compares the similarity of the prediction and the ground truth. It's a common used loss function for labeling images.

Data augmentation is use to get more train data. For this the images and labels get flipped, zoomed and rotated.