Documentation on Task2

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1 Summary of tutorials 1, 2 and 3

1.1 Tutorial 1 - Deep Learning Foundations

Tutorial 1 is all about the basics of a neural network and deep learning. Neural networks, as humans have them in their brain, can be implemented on an computer by describing the neurons with a function. This function reveives input and gives output to another neuron. Connecting many neurons with layers, it is possible to generate a specific output when specific input is given. By changing the networks parameters after each learning step a certain behaviour/output of the model can be reached.

1.2 Tutorial 2 - Transfer Learning for Object Classification

This one is all about transfer learning. This means you have a pre trained model which you want to further train on a different data set. This data set is not the same as the one that the model has been pre trained on. The advantage of this is that you can make use of effort that already has been done for you and just adjust the trained model to your specific dataset by transfer learning. The two possible ways of transfer learning are Feature Extraction and Retraining. Feature Extraction means you add a new ouput layer on top of the pre trained model and train it from scratch. This way the feature maps can be repurposed for the new dataset. Retraining means that you add new layers to the pre trained model which you train on your specific dataset. But not just the newly added layers are trained, also the last layers of the pre trained model to make them fit on our specific dataset.

1.3 Tutorial 3 - Segmentation with U-Net

Last but not least this tutorial is about Semantic Segmentation. Coming from object detection inside an image, this is one step further. The goal of Semantic Segmentation is to label each pixel of the image and classify its content. One way to reach this goal is by using UNET, which is a fully convolutional network model. Semantic Segmentation for example plays a big role when it comes to autonomous driving.

2 Report on Software Contribution

My documentation for the software contribution on Task2