nnUNet for stroke lesion segmentation

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Abstract. We propose a hybrid U-Net model with a convolution-based encoder and decoder consisting of 6 consecutive blocks of decreasing resolution. The 6 blocks have output channels of (32, 64, 128, 256, 320, 320) respectively, following the typical CNN layout of nnUNet [1]. The decoder has symmetrical number of channels to the encoder. Images are preprocessed using skullstripping, bias correction, reslicing to $1mm$, foreground cropping and z-score normalisation. Training data is augmented using lesion-weighted random crop to 128^3, random flip, gaussian noise, gaussian blur and intensity shift. Training is performed for 1000 epochs with an Adam optimiser. Final inference is performed across the ensemble using flip-based test-time augmentation. All training was performed using NVIDIA DALI and Auto-Mixed Precision in Pytorch Lightning, and can be trained on new data using the implementation available at https://github.com/liamchalcroft/MDUNet.

References

1. Isensee, F., Petersen, J., Klein, A., Zimmerer, D., Jaeger, P.F., Kohl, S., Wasserthal, J., Koehler, G., Norajitra, T., Wirkert, S., Maier-Hein, K.H.: nnu-net: Self-adapting framework for u-net-based medical image segmentation (2018). https://doi.org/10.48550/ARXIV.1809.10486, https://arxiv.org/abs/1809.10486