

Brain tissue segmentation based on transfer learning

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Brain tissue segmentation has great significance for modern medical treatment. MR brain images have different modes. In order to make full use of the multi-mode features, we designed a U-shaped network with multiple branches input and single branch output channels. In addition, due to the limited data, it is easy to cause overfitting, so we choose transfer learning for training, and the experiment shows that transfer learning can effectively inhibit overfitting. The model of transfer learning is vgg16 provided by pytorch official website, and we added the attention mechanism to improve the segmentation accuracy.

We used MR images of three modes (T1, T1-IR and FLAIR) for training. The pre-processing methods included horizontal flipping, rotation, height/width, zoom and clipping, and the input image size was 224*224. Training 500 epochs, the initial learning rate is 0.0001, and the learning rate is 1/10 every 100 epochs. Five models were obtained by cross-validation, and the final result was determined by the output results of the five models.

Our training and testing was performed on a GPU of Nvidia Tesla V10, and our algorithm took an average of about 34 seconds to segment a test sample. At present, our algorithm has not been tested in other databases.