Multi-scale network for brain tissue segmentation

Hui Xiong, Guohui Gao, Jinzhen Liu

TianGong University

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. The network can learn multi-modal features and integrate the learned feature information. At the same time, the multi-scale method is used to extract rich information, and the attention mechanism is added 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 0.001, and the learning rate is 1/10 every 100 epochs. Seven models were obtained by cross-validation, and the final result was determined by the output results of the seven models

Our training and testing was performed on a GPU of Nvidia Tesla V10, and our algorithm took an average of about 10 minutes to segment a test sample. This was because we removed the extreme value of 0.5% from the input data, which took the longest time to enter the test. At present, our algorithm has not been tested in other databases.