

Kits19TumorSegmentation with VNet

Junqiangchen

1207173174@qq.com

Abstract: we design the deeplearning network Vnet for segmentation tumor and kidney. First, preprocess the kidney and kidney tumor data, second, segmenting kidney progress split into two steps: Coarse segmentation and fine segmentation. third, segmentation kidney tumor process split into two steps: 2d segmentation and 3d segmentation,

1、Preprocess

analyze the ct image, and get the slice thickness and window width and position.

1.1 Preprocess Kidney

keep kidney region into fixed size(512,512,64) for Coarse Kidney Segmentation.

generate patch(128,128,64) kidney image and mask for Coarse Kidney Segmentation.

keep Kidney region range image for fine Kidney Segmentation.

generate patch(128,128,64) kidney image and mask for fine Kidney Segmentation.

save patch image and mask into csv file.

Split csv into training set and test set.

1.2 Preprocess Kidney Tumor

generate tumor image and mask for 2d Kidney Tumor Segmentation.

generate tumor image and mask for 3d Kidney Tumor Segmentation.

save tumor image and mask path into csv file.

Split csv into training set and test set

2、Kidney segmentation

2.1 Coarse Kidney Segmentation

Coarse Kidney Segmentation training: we use Vnet for segmentation, input size is (128x128x64), learning rate is 0.001, optimizer is adam, epochs is 20, batchsize is 1.

Coarse Kidney Segmentation inference.

this step get Coarse Kidney range, can find the start and end pos in the kidneyrang.txt

2.2 Fine Kidney Segmentation

Fine Kidney Segmentation training: we use Vnet for segmentation, input size is (128x128x64), learning rate is 0.001, optimizer is adam, epochs is 20

Fine Kidney Segmentation inference.

this step following the 2.1 result, get fine Kidney result.

2.3 Fine Kidney Segmentation

remove Kidney Segmentation small object.

3、Tumor segmentation

3.1 2d Kidney Tumor Segmentation

2d Kidney Tumor Segmentation training: we use Vnet2d for segmentation, input size is (512x512), learning rate is 0.001, optimizer is adam, epochs is 20, batchsize is 2.

2d Kidney Tumor Segmentation inference

this step get 2d slice tumor result.

3.2 3d Kidney Tumor Segmentation

3d Kidney Tumor Segmentation training: we use Vnet for segmentation, input size is (128x128x64), learning rate is 0.001, optimizer is adam, epochs is 20, batchsize is 1.

3d Kidney Tumor Segmentation inference

.this step get 3d tumor result

3.3 Kidney Tumor Result Process

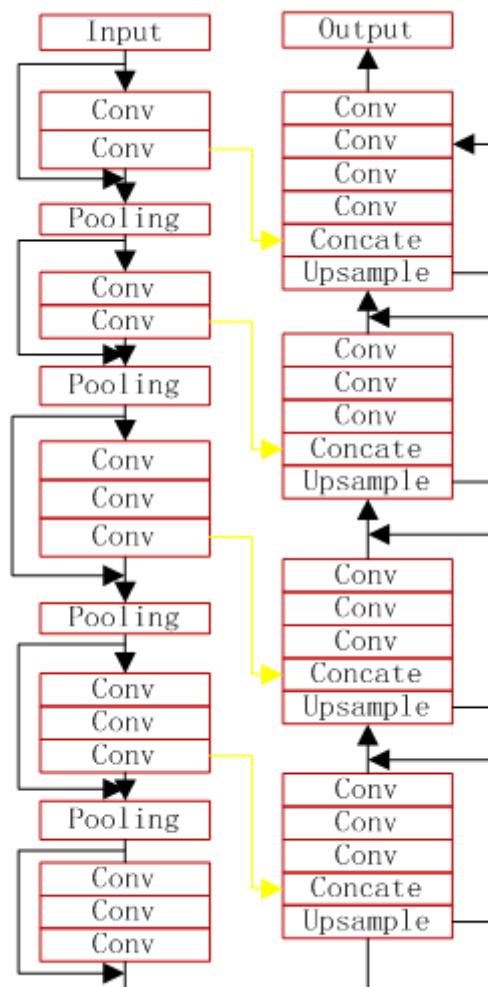
remove Kidney Tumor Segmentation small object.

calculate overlap between 2d tumor and 3d tumor result.

save the region of 2d tumor and 3d tumor result that connect overlap region.

save the region of 2d tumor and 3d tumor within Kidney result.

merge the above two result and get final tumor result



reference

You can find the source code on github: <https://github.com/junqiangchen/KiTS19-Challenge>