1. We use N4biasRegionCorrection as data preprocessing to cope with the unbalanced brightness distribution of the original MRI data
2. As the MRI data is obtained from chest scan, only a limited portion of it contains valueable information for our segmentation process.
3. Accordingly, center, height, length and width of the sub-volume representing artrium is calculated for further cropping of each volume.
4. Additionally, we applied an local feature enhancing algorithm called CLAHE(constractive limited adaptive histogram equalization). This method perform histogram equlization to sub-regions of the volume to increase the local contrast while avoiding lighten up the whole volume.
5. We used VNet as basic architecture for this semantic segmentation task. Furthermore, Residual block was added on each VNet layers. This aid the network from vanishing/exploding gradients.
6. SE(squeeze-and-stimulate) layer was tried either on each VNet layer or after the 4th down transfering block, but non shows its amelieorating potential.

Data information:

130 LGE(late gadolinium enhancement) MRIs from 3 medical centers was used in this research. All these clinical data have got institutional ethic approval and have been anonymized (please follow the data usage agreement, i.e., CC BY NC ND). The provided gold standard labels of left atrial (LA) blood pool is labeled and peer-reviewed by experienced clinical doctors and imaging doctors.

multicenter, multi-modalities

The details of LGE MRIs are as follows:

Center 1 (University of Utah): The clinical images were acquired with Siemens Avanto 1.5T or Vario 3T using free-breathing (FB) with navigator-gating. The spatial resolution of one 3D LGE MRI scan was 1.25 × 1.25 × 2.5 mm. The patient underwented an MR examination prior to ablation or was 3-6 months after ablation.

Center 2 (Beth Israel Deaconess Medical Center): The clinical images were acquired with Philips Acheiva 1.5T using FB and navigator-gating with fat suppression. The spatial resolution of one 3D LGE MRI scan was 1.4 × 1.4 × 1.4 mm. The patient underwented an MR examination prior to ablation or was 1 month after ablation.

Center 3 (King’s College London): The clinical images were also acquired with Philips Acheiva 1.5T using FB and navigator-gating with fat suppression. The spatial resolution of one 3D LGE MRI scan was 1.3 × 1.3 × 4.0 mm. The patient underwented an MR examination prior to ablation or was 3-6 months after ablation.

Center 4: tbc...

slmgr /ipk W269N-WFGWX-YVC9B-4J6C9-T83GX

slmgr /skms kms.03k.org

slmgr /ato