

IVDM3Seg Challenge

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Abstract. Lower back pain is a common disease. It has been revealed that there was a strong relationship between lumbar disc degeneration and LBP. In the past few decades, medical imaging technology was widely used in clinical diagnosis and therapy. The segmentation and localization of intervertebral discs in medical images could provide efficient information for clinical use. In this challenge, I proposed an automatic algorithm to segment 7 required intervertebral discs precisely and locate them.

Keywords: Intervertebral Discs, Segmentation, Localization, Deep Learning, Registration.

1 Brief Description

For the limitation of GPU memory, a U-Net like architecture was applied to segment intervertebral discs. Several adjacent sagittal slices from four different modalities were taken as input to predict the segmentation results. Besides, the inadequacy of 3D training data was also a main reason why I choose 2D-like net. Moreover, 2D-like network has a better capability to involve more parameters compared to 3D network, which makes the architecture of net more flexible during the experiment.

The localization of 7 required intervertebral discs was implemented by a robust post-process pipeline. A spine mask generated from the original data was applied first to refine segmentation results. Then I used some criteria to eliminate the noise in segmentation results. To separate the 7 intervertebral discs, a V-Net was trained to find the location of the last intervertebral discs. With the reference of the last intervertebral discs, the other 6 intervertebral discs could also be located. A registration-based method was applied to take the morphology information in account.

References

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