Reviewer's report

Title: Brain SegNet: 3D Local Refinement Network for Brain Lesion Segmentation

Version: 0 Date: 19 Nov 2019

Reviewer: Claire Chalopin

Reviewer's report:

The authors present a new deep learning classification approach for the segmentation of brain lesions in MR imaging. It is based on the 3D U-Net and V-Net. The improvements concern the development of a single model which is able to process 3D MR images including multiple modalities, which avoids the loss of information on fine structures (3D refinement module), which can deal with imbalance foreground and background (curriculum training) and which is fast.

The approach was evaluated on open databases of MR data of patients with brain tumors and ischemic stroke lesions. The authors demonstrated that their approach performs better regarding Dice, specificity, sensitivity and recall than other recently published approaches. Moreover the computing time is much faster.

The paper is well written and clear. Although my expertise in the field of deep learning remains basic, I recommend accepting the paper for publication after minor revisions. Further comments follow.

Background

The introduction is a bit long but necessary to explain the innovations performed by the authors. However, I found a bit confusing the mix ("back and forth") between literature review and author contributions. It would be for me clearer if the authors mention first the literature overview with limitations and at the end their contributions.

Methods

Some abbreviations like "CRF", "ReLU", "BN" are not defined.

Results

If you define the metrics used in the evaluation, please describe the "recall" as well (table 2).

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.
Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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