

## Apprentissage semi-supervisé pour la segmentation du réseau vasculaire cérébral : une étude comparative

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# Guidelines for Cerebrovascular Segnentation: Managing Imperfect Annotations in the context of Semi-Supervised Learning Pierre Rougé<sup>\*†</sup>, Nicolas Passat<sup>\*</sup>, Odyssée Merveille<sup>†</sup>



-What types of annotation imperfections most significantly degrade segmentation results and should be prioritarily avoided? -What type of semi-supervised approach should be used for cerebrovascular segmentation?

-Can semi-supervised learning methods effectively mitigate overfitting on the annotated data they use?

Cerebrovascular annotations are time-consuming and error-prone.
Also, no guidelines exist for cerebrovascular annotations. Thus, concept-shift between different dataset is a big bottleneck for the conception of robust segmentation methods.



- Semi-supervised methods highly reduce the variability between data seeds.

## Exp. 3: Impact of the annotation quality

In this experiment, our objective is to study the impact of both type and degree of label imperfection on the segmentation results.

## Exp. 1: Methods comparison and impact of the data availability

The goal of this experiment is to conduct a comparative analysis among various semi-supervised learning methods and assess their performance in comparison to a supervised baseline.







- ► All semi-supervised methods perform similarly.
- Semi-supervised methods outperform supervised method only for very low data setup.
- Semi-supervised methods are more regularized.

- Erosion and dilation generate a systematic error leading to strong results degradation.
- Missing vessels in the annotations deteriorate less the results and can be partially compensated with more data.
- ► Missing vessels can also lead to a systematic error.



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