Rapid Quantification of White Matter Disconnection in the Human Brain

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Overview

- Introduction
- Methods
- Results
- Summary

Introduction: Our objective

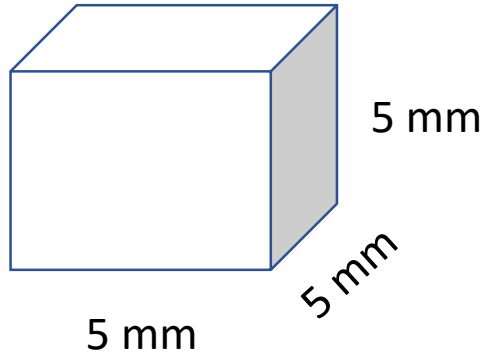
- Determining the brain disconnection due to a lesion.

- Predicting the behaviour due to the disconnection.

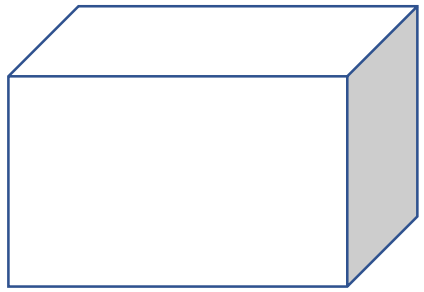
Methods: Our approach

- We partition the brain into nodes.

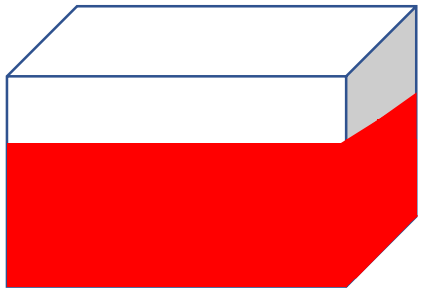
- At any node, we study the:
    - Direct damage.
    - Indirect damage.



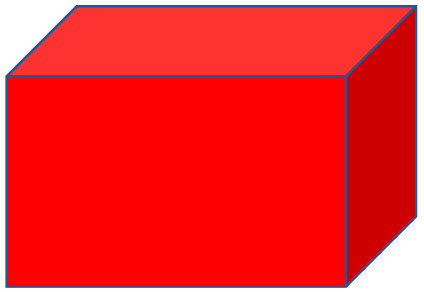
Methods: Direct damage



0 % damage

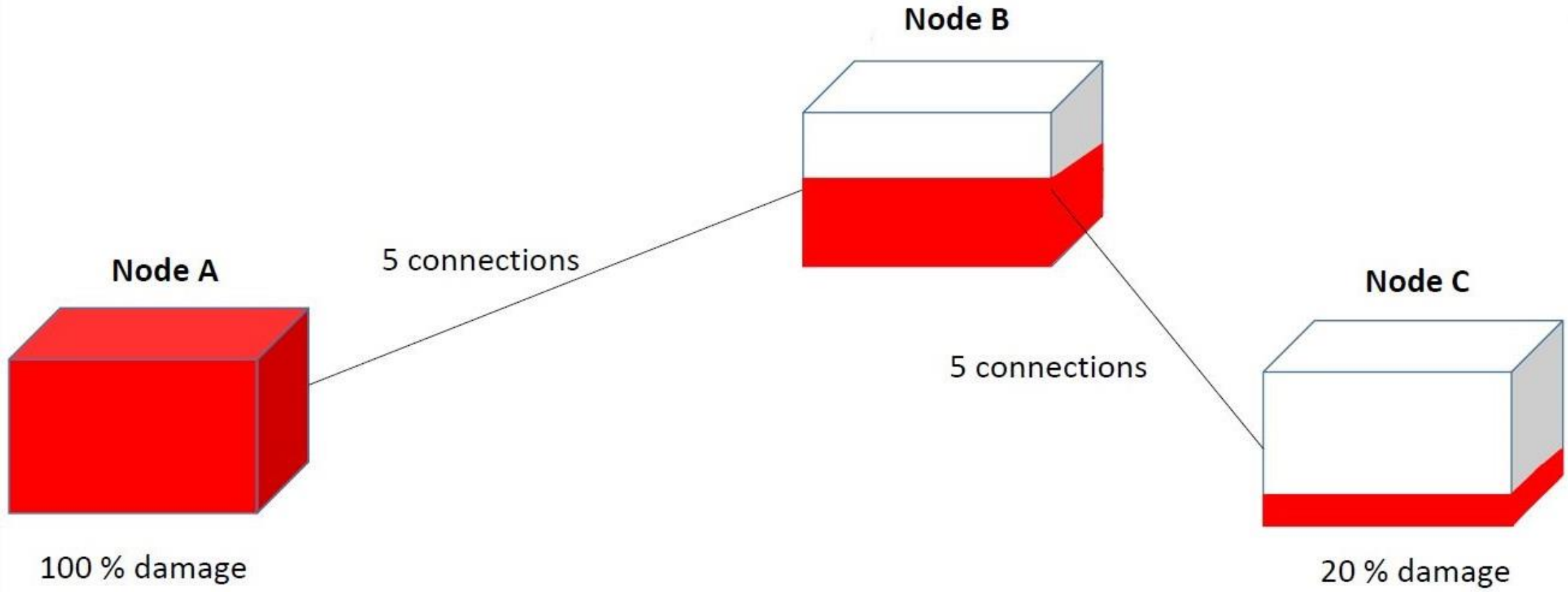


70 % damage

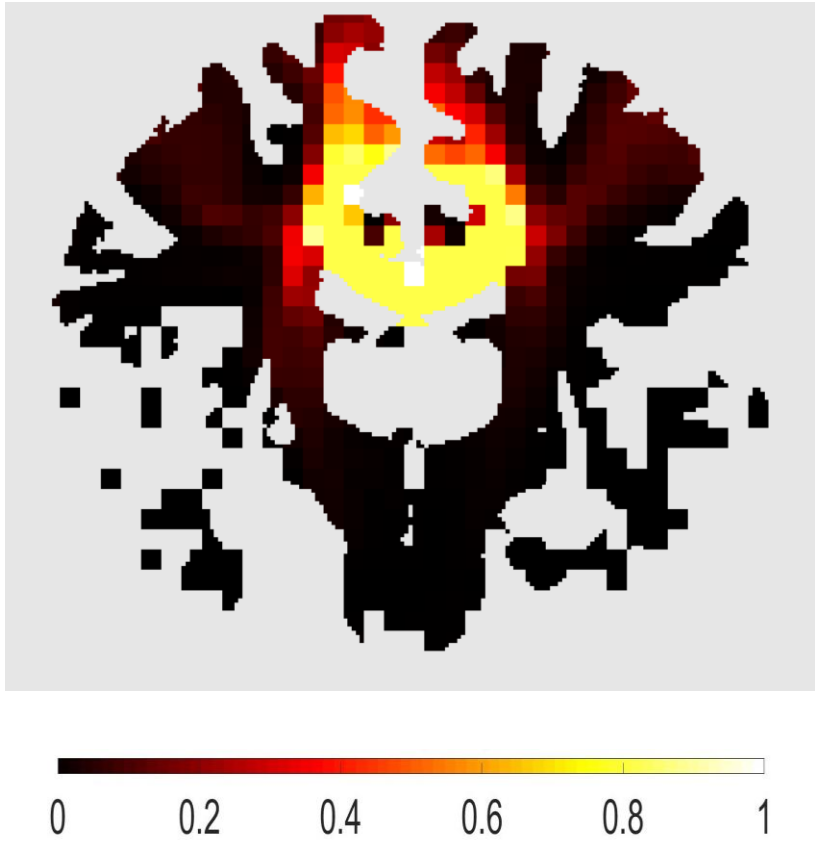


100 % damage

Methods: Indirect damage

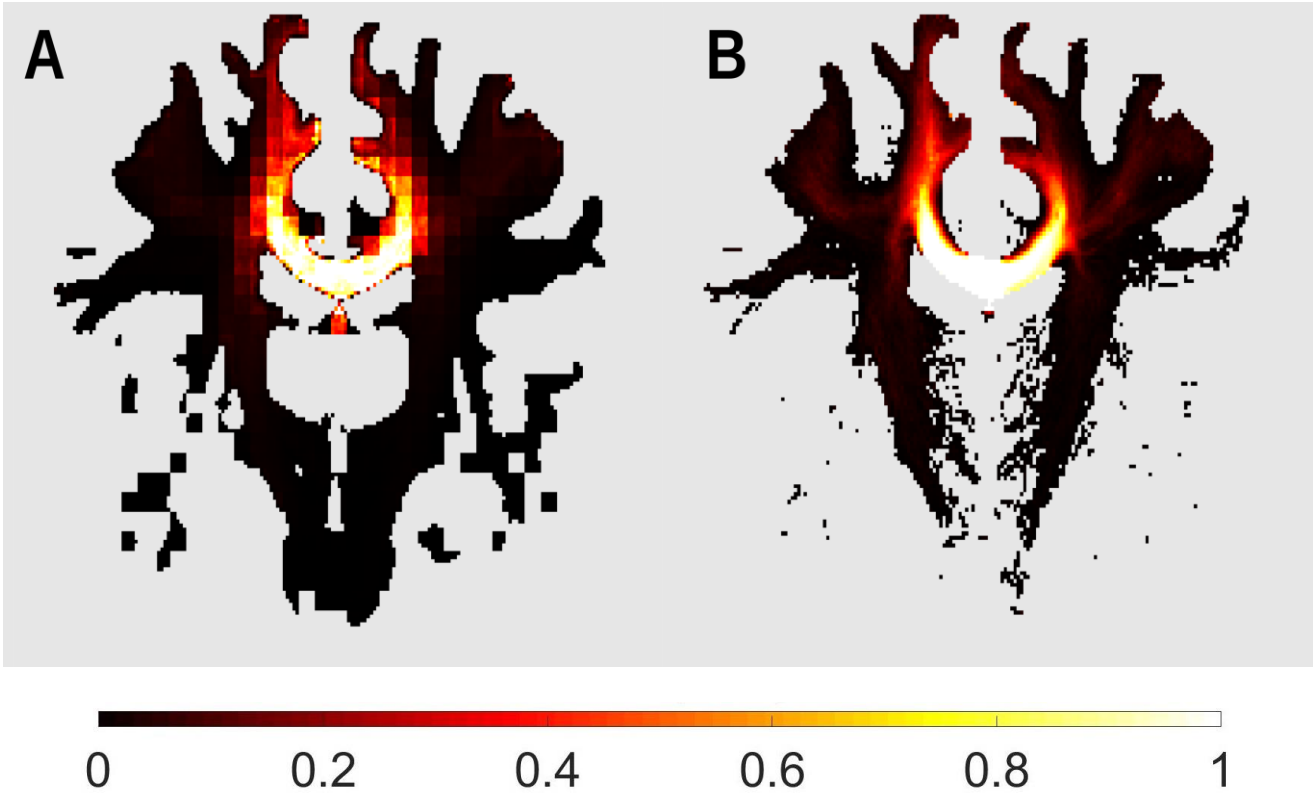


Results: Simulated data preliminary results



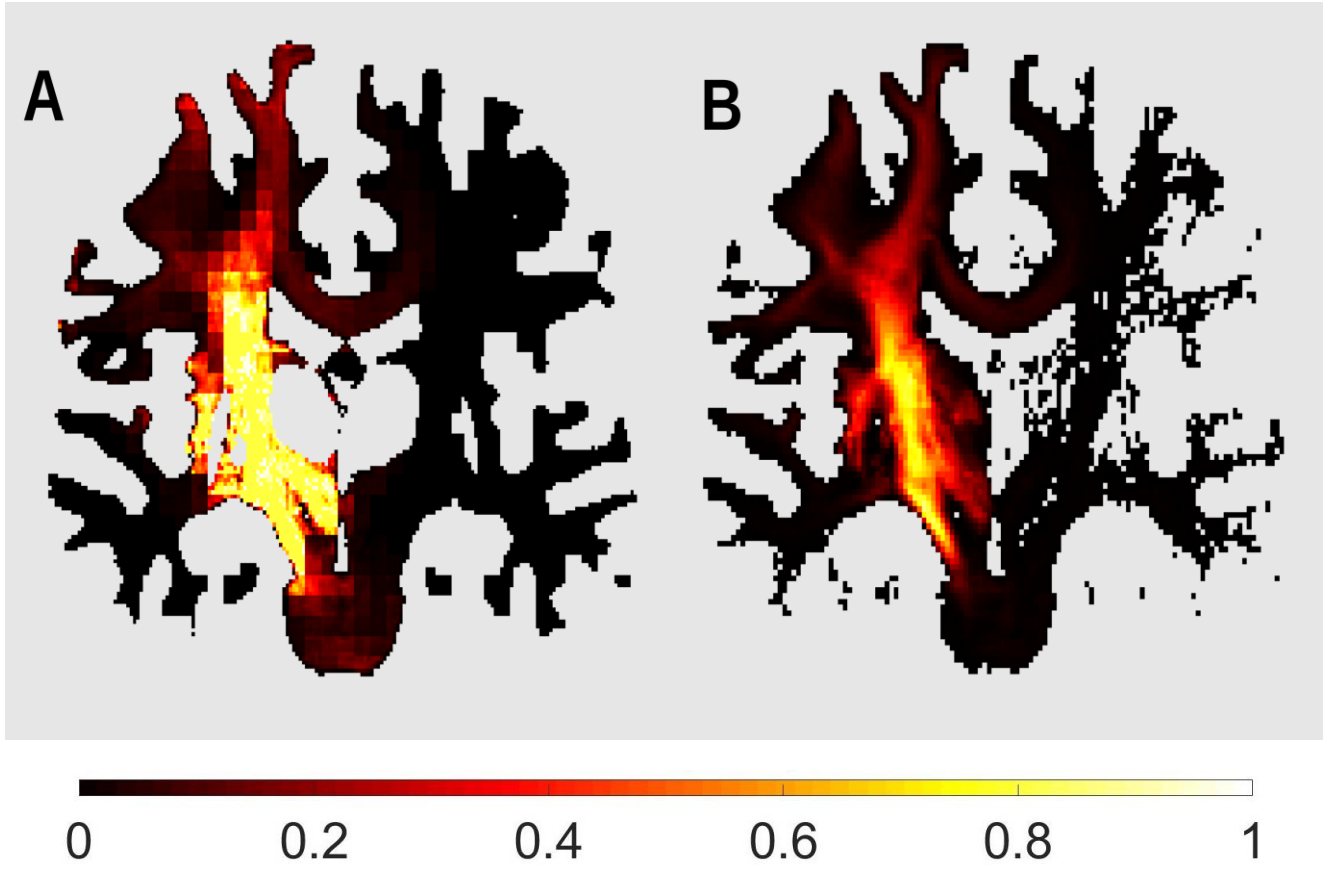
Results: Simulated data

- A comparison between our method (A) and Mrtrix3 (B).



Results: Real data

- A comparison between our method (A) and Mrtrix3 (B).



Summary

- We present a rapid and practical method for quantifying the impact of white matter disconnection.
  - Our method is more than 9 times faster than MRtrix3
  - Our method gives very similar spatial pattern of results
- This is the first step towards rapid quantification of network disconnections for clinical application.
- For questions and comments: christopher.steele@concordia.ca

THANK
YOU!