



Classifyber, a streamline-based method for white matter bundle segmentation

Giulia Bertò

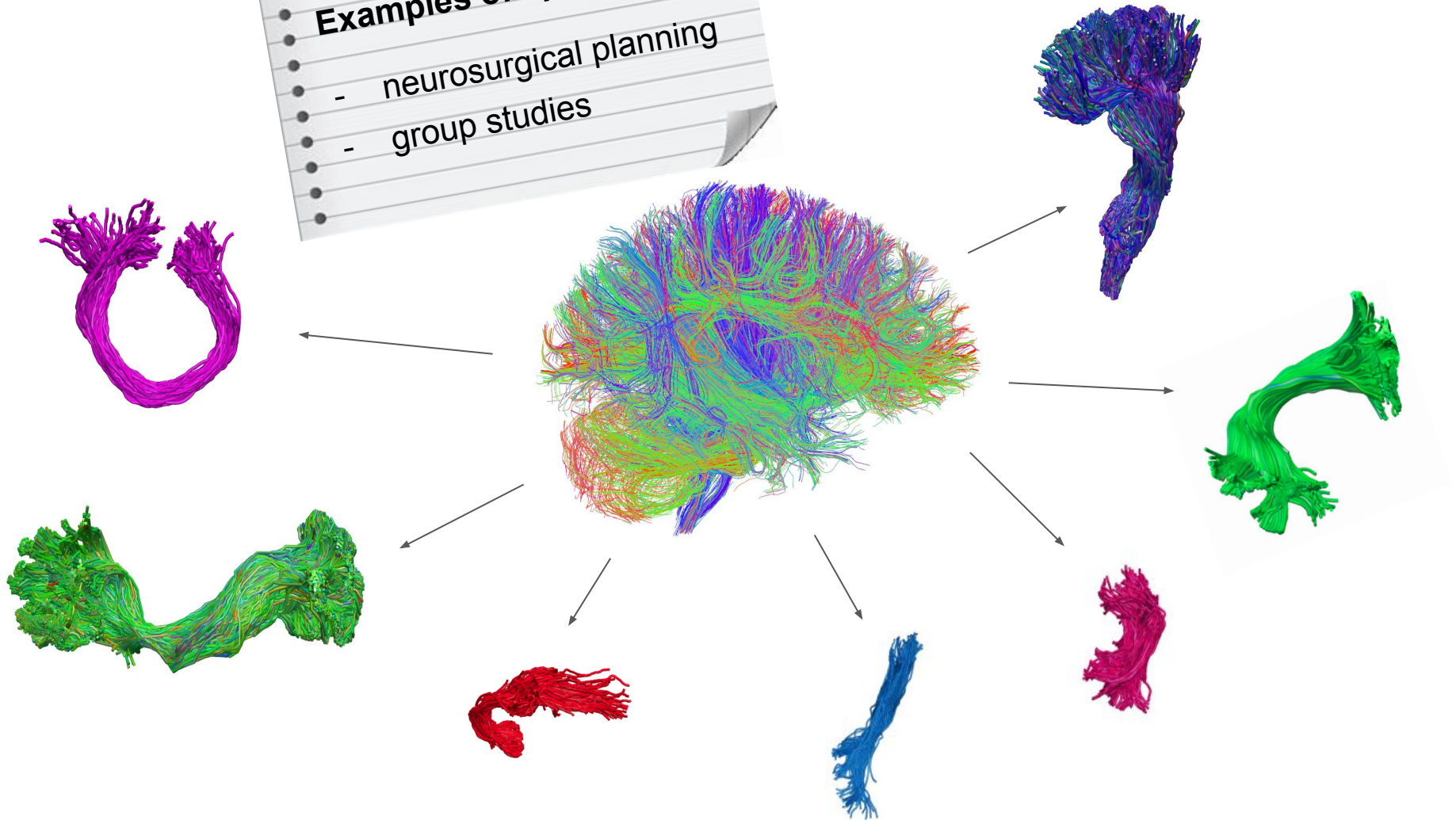
gberto@iu.edu

NeuroInformatics Laboratory (NILab), Bruno Kessler Foundation, Trento (Italy)
Department of Psychological and Brain Sciences, Indiana University, IN (USA)

White matter bundle segmentation

Examples of applications:

- neurosurgical planning
- group studies

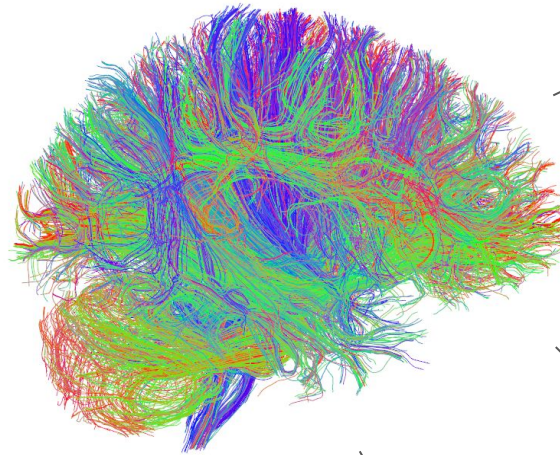


Challenges

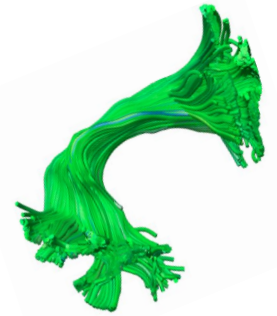
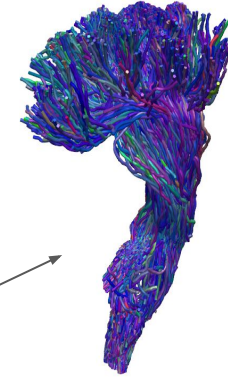
VARIABILITY OF
DATA QUALITY



VARIABILITY OF
TRACKING
ALGORITHM

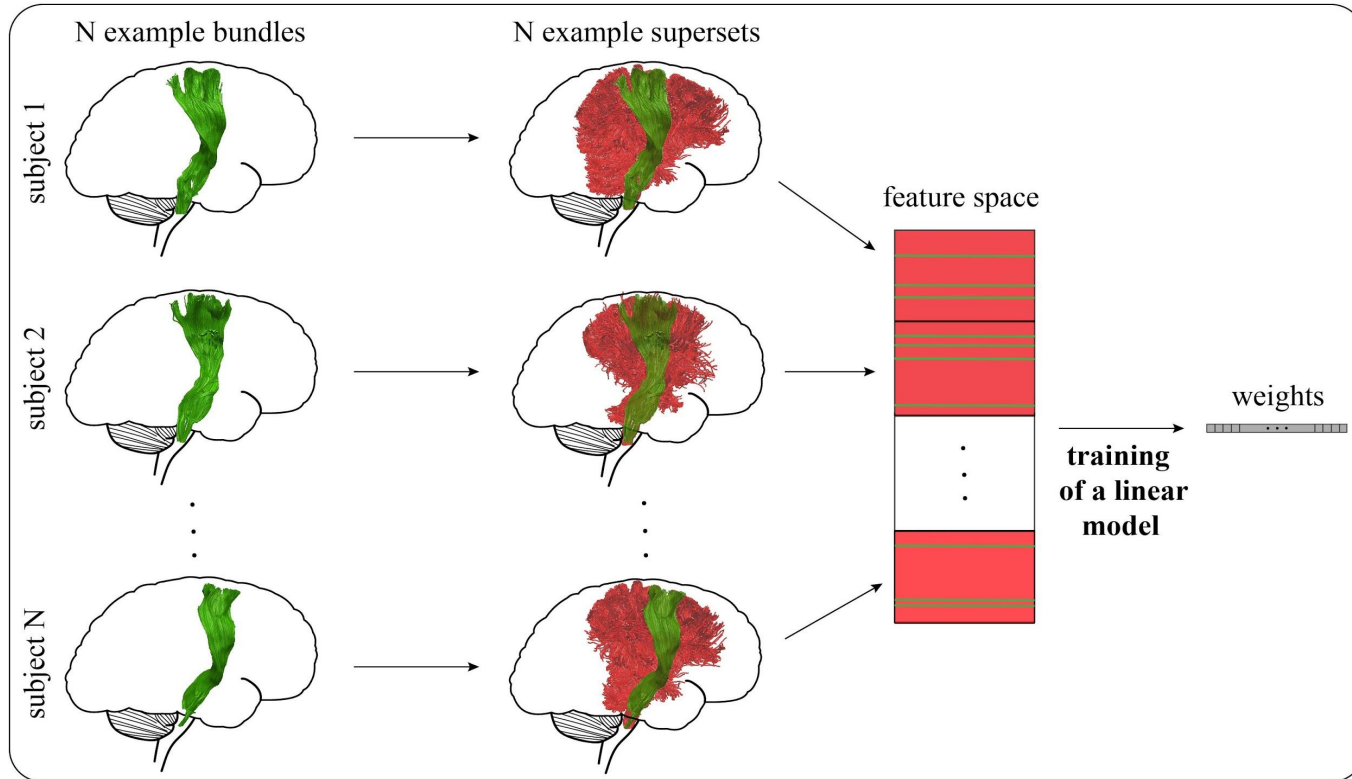


VARIABILITY
OF BUNDLE
SIZE

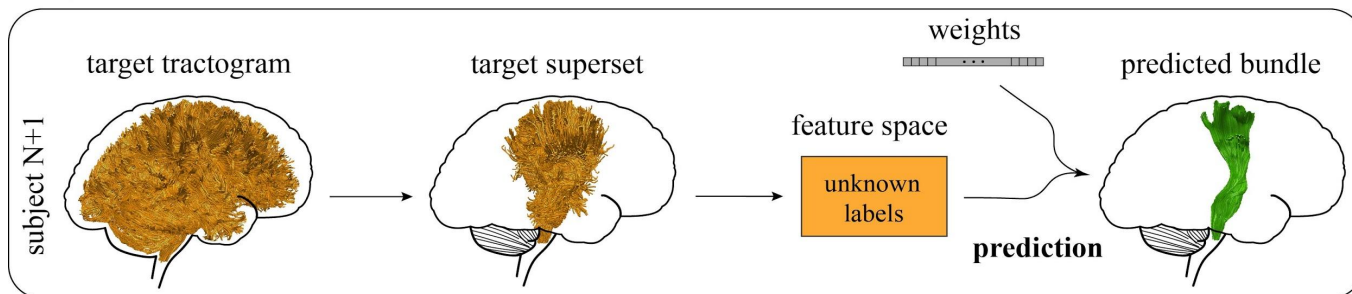


Proposed method: Classifyber

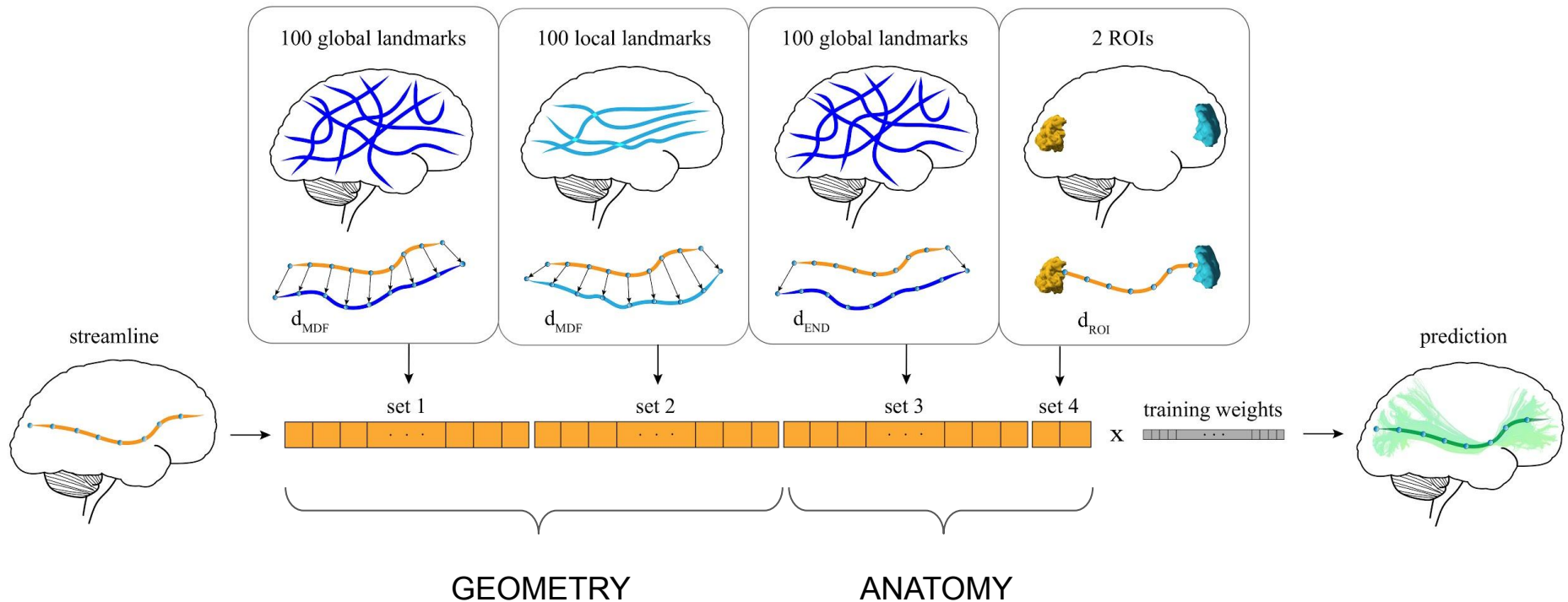
Training phase



Test phase



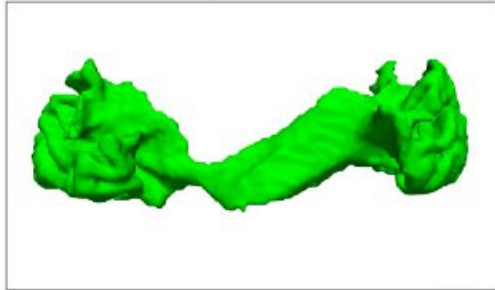
Proposed method: Classifyber (*)



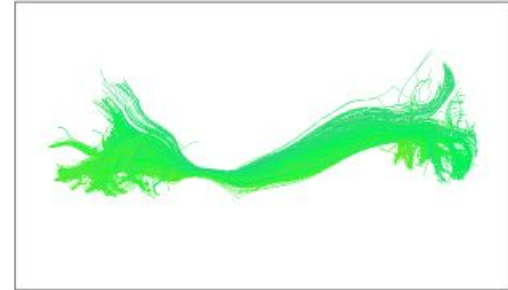
(*) Bertò, G., Bullock, D., Astolfi, P., Hayashi, S., Zigiotta, L., Annicchiarico, L., Corsini, F., De Benedictis, A., Sarubbo, S., Pestilli, F., Avesani, P., Olivetti, E., "Classifyber, a robust streamline-based linear classifier for white matter bundle segmentation". Under review in NeuroImage.

Results of one segmented bundle

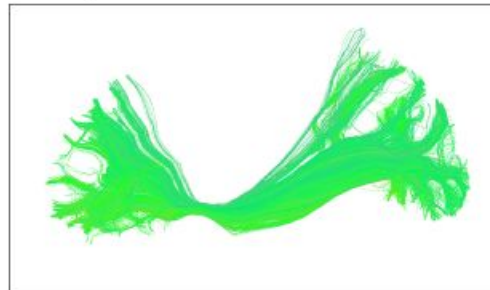
TractSeg - DSC=0.46



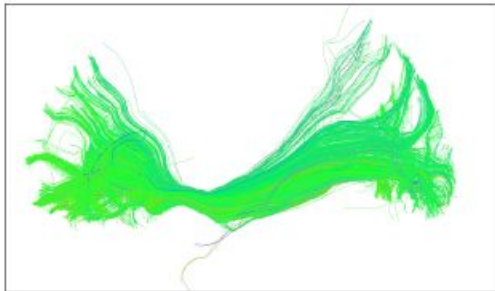
RecoBundles - DSC=0.64



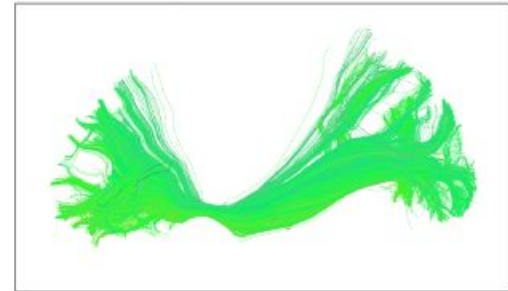
expert neuroanatomist



LAP - DSC=0.81



Classifyber - DSC=0.94



Qualitative comparison of a left inferior fronto-occipital fasciculus (IFOF). The Dice Similarity Coefficient (DSC) score represents the degree of overlap between the automatically segmented bundle and the bundle segmented by an expert neuroanatomist.

Web apps on brainlife.io

Two main **web apps** available on brainlife:

- Classifyber: <https://doi.org/10.25663/brainlife.app.228>
- Classifyber-segmentation: <https://doi.org/10.25663/brainlife.app.265>



Classifyber

FBK-NILab/app-classifyber **1.0**

● track/tck ● anat/t1w acpc_aligned
● wmc **multi** ● track/tck **multi**
● anat/t1w acpc_aligned **multi** →
● wmc **classifyber**

Code of Classifyber, a robust streamline-based linear classifier for white matter bundle segmentation.

▶ 87 👤 2 📄 3 ✓ 49.2%

Classifyber - segmentation

FBK-NILab/app-classifyber-segmentation **1.3**

● track/tck ● anat/t1w acpc_aligned →
● wmc **classifyber** ● tcks **classifyber**

Code to run Classifyber as a pre-trained bundle segmentation method

▶ 199 👤 7 📄 3 ✓ 80.4%

Thank you!