Dismantling varifold metrics for partial matchings

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Shape registration is a central problem in computational anatomy. The well-studied case where shapes are homologous is yet not always adapted. The reason can be the inter-individual variability, the study of pathological anomalies or some acquisition methods that provide cropped data.

In this talk, I will present an asymmetric data attachment term characterizing the inclusion of one shape in another. This term is based on the metrics of varifold spaces. Varifolds are representations of geometric objects, including curves and surfaces. Their specificity is to take into account the tangent spaces of these objects and to be robust to the choice of parametrization.

This new data attachment term widens the field of application of the pre-existing methods of matching by large diffeomorphic deformations (LDDMM). The partial registration is indeed induced by a diffeomorphic deformation of the source shape. The anatomical (topological) characteristics of this shape are thus preserved.
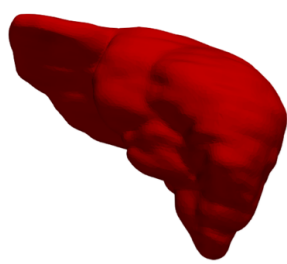
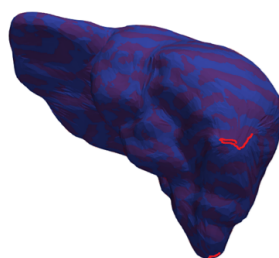**Joint work with:** Pierre-Louis Antonsanti and Joan Glaunès.

References

[1] P-L. Antonsanti, J. Glaunès, T. Benseghir, V. Jugnon, I. Kaltenmark. Partial Matching in the Space of Varifolds. IPMI 2021.

[2] H-W. Hsieh, and N. Charon. Diffeomorphic Registration with Density Changes for the Analysis of Imbalanced Shapes. IPMI 2021.
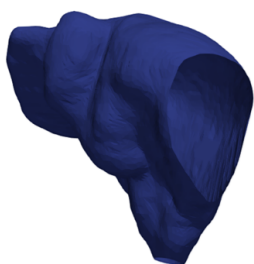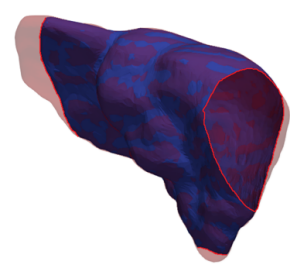
Source (CBCT) Target (CT) Registration with classic varifolds data attachment Registration with local, normalized, partial matching