Efficient and robust learning on non-rigid surfaces

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In this talk I will describe several approaches for learning on curved surfaces, represented as point clouds or triangle meshes, undergoing non-rigid deformations. I will first give a brief overview of geodesic convolutional neural networks (GCNNs) and their variants [1] and then present a recent approach based on diffusion. The key properties of this approach is that it avoids potentially error-prone and costly operations with robust and efficient building blocks that are based on learned diffusion and gradient computation [2]. I will then show several applications, ranging from RNA surface segmentation to non-rigid shape correspondence, while highlighting the invariance of this technique to sampling and triangle mesh structure.

Joint work with: Nick Sharp, Souhaib Attaiki, Keenan Crane

References

[1] J. Masci, D. Boscaini, M. Bronstein, P. Vandergheynst, Geodesic convolutional neural networks on Riemannian manifolds. *Proc. CVPRW*, 2015

[2] N. Sharp, S. Attaiki, K. Crane, M. Ovsjanikov Diffusionnet: Discretization agnostic learning on surfaces *Trans. on Graph.*, 2022