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# Differential analysis of point set surfaces at multiple scales

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## Abstract

The Scale-Space Theory is a standard analysis tools for structured signals such as images and curves. In this talk, I'll present how the ideas behind the Scale-Space Theory can be adapted to 3d point clouds analysis in order to detect pertinent scales and structures. I will present the main challenges raised by the study of unstructured point clouds, which do not provide an intrinsic parametrization (in contrat to images) for derivatives computations. I will then introduce the ideas of scale derivatives and stability analysis for pertinent scale extraction. I will then illustrate how these ideas can be applied to relative scale factor estimation between shapes, primitive extraction using persistence analysis, and interactive geometric labeling using deep learning.

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