BMVC 2015 Keynote: A Spectral Perspective on Shapes

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1 Speaker Biography

Ron Kimmel is a Professor of Computer Science at the Technion where he holds the Montreal Chair in Sciences. He held a post-doctoral position at UC Berkeley and a visiting professorship at Stanford University. He has worked in various areas of image and shape analysis in computer vision, image processing, and computer graphics. Kimmel's interest in recent years has been non-rigid shape processing and analysis, medical imaging and computational biometry, numerical optimization of problems with a geometric flavor, and applications of metric geometry and differential geometry. Kimmel is an IEEE Fellow for his contributions to image processing and non-rigid shape analysis. He is an author of two books, an editor of one, and an author of numerous articles. He is the founder of the Geometric Image Processing Lab. and a founder and advisor of several successful image processing and analysis companies.



2 Abstract

The differential structure of surfaces captured by the Laplace Beltrami Operator (LBO) can be used to construct a space for analyzing visual and geometric information. The decomposition of the LBO at one end, and the heat operator at the other end provide us with efficient tools for dealing with images and shapes. Denoising, matching, segmenting, filtering, exaggerating are just few of the problems for which the LBO provides a convenient operating environment. We will review the optimality of a truncated basis provided by the LBO, and a selection of relevant metrics by which such optimal bases are constructed. A specific example is the scale invariant metric for surfaces, that we argue to be a natural choice for the study of articulated shapes and forms.

Prof. Kimmel will comment about Intel's RealSense geometry sensor, the intrinsic and extrinsic transformations applied to Alice in Wonderland, and the benefit of having an axiomatic model when valid.