

KEYNOTE TALK
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1:30PM – 2:30 PM / Ballroom 4-5

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Tensor Voting in 2 to N dimensions: fundamental elements and applications

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Abstract

We first briefly review tensor voting, which is an efficient, non-iterative framework for tackling perceptual organization problems in arbitrary dimension spaces. It is based on data representation by second-order symmetric tensors, which allow a unified representation of inliers of smooth structures, discontinuities and outliers, and data communication by tensor voting, during which tokens propagate information in their neighborhood by casting tensor votes. Our framework has proven to be very robust even under extreme noise corruption, with a single free parameter, the scale of the voting field. Tensor voting can be applied to concrete computer vision problems, such as stereo and motion analysis, when expressed as the inference of smooth structures in the appropriate spaces. Finally, we show how tensor voting can be applied to problems in higher dimensions, while keeping the computational complexity low. We illustrate the use of N-D Tensor Voting to modeling and tracking rigid and nonrigid 3D facial deformations from a monocular video sequence.



Speaker Bio-Sketch: Professor Gérard Medioni received the Diplôme d'Ingenieur from ENST, Paris in 1977, a M.S. and Ph.D. from the University of Southern California in 1980 and 1983 respectively. He has been at USC since then, and is currently Professor of Computer Science and Electrical Engineering, co-director of the Institute for Robotics and Intelligent Systems (IRIS), and co-director of the USC Games Institute. He was Chairman of the Computer Science Department from 2001 to 2007. Professor Medioni has made significant contributions to the field of computer vision. His research covers a broad spectrum of the field, such as edge detection, stereo and motion analysis, shape inference and description, and system integration. He has published 3 books, over 60 journal papers and 180 conference articles, and is the recipient of 8 international patents. Prof. Medioni is associate editor of the Image and Vision Computing Journal, associate editor of the Pattern Recognition and Image Analysis Journal and of the International Journal of Image and Video Processing. He is a Fellow of IAPR, IEEE, and AAAI.