KEYNOTE TALK

ISVC 2018: International Symposium on Visual Computing Las Vegas, NV USA

Monday, November 19, 2018 at 9:00am

Dynamics-based Invariants for Video Understanding

Octavia I. Camps Northeastern University

The power of *geometric invariants* to provide solutions to computer vision problems has been recognized for a long time. On the other hand, *dynamics-based invariants* are often overlooked. Yet, visual data come in streams: videos are temporal sequences of frames, images are ordered sequences of rows of pixels and contours are chained sequences of edges. In this talk, I will discuss the key role that systems theory can play in timely extracting and exploiting dynamics-based invariants to capture actionable information that is very sparsely encoded in high dimensional data streams. The central theme of this approach is the use of dynamical models, and their associated invariants, as an information-encoding paradigm. We will show that embedding problems in the conceptual world of dynamical systems makes available a rich, extremely powerful resource base, leading to robust solutions, or, in cases where the underlying problem is intrinsically hard, to computationally tractable approximations with sub optimality certificates. We will illustrate these ideas in the context of several practical applications: crowd-sourcing video, activity recognition, human reidentification and video prediction.



Octavia Camps received a B.S. degree in computer science and a B.S. degree in electrical engineering from the Universidad de la Republica (Uruguay), and a M.S. and a Ph.D. degree in electrical engineering from the University of Washington. Since 2006, she is a Professor in the Electrical and Computer Engineering Department at Northeastern University. From 1991 to 2006 she was a faculty of Electrical Engineering and of Computer Science and Engineering at The Pennsylvania State University. Prof. Camps was a visiting researcher at the Computer Science Department at Boston University during Spring 2013

and in 2000, she was a visiting faculty at the California Institute of Technology and at the University of Southern California. She is an associate editor of Computer Vision and Image Understanding (CVIU). Her main research interests include robust computer vision, image processing, and machine learning.