Berliner Colloquium für wissenschaftliche Visualisierung

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Computer vision as inverse graphics: efficient algorithms for model-based image understanding

Prof. Iasonas Kokkinos

Ecole Centrale Paris - Center for Visual Computing

Montag, 29. April 2013 um 17:15 Uhr
Zuse-Institut Berlin (ZIB), Takustraße 7, 14195 Berlin
Hörsaal (Rundbau, Erdgeschoss)

The model-based, analysis-by-synthesis approach has served as a rich source of ideas for computer vision. The conceptual appeal of this approach is however marred by the computational complexity of the resulting 'inverse' optimization problems.

In this talk, I will present recent advances on accelerating model-based computer vision. I will start with branch-and-bound optimization for deformable object detection in natural images, demonstrating how simple geometric reasoning can result in multifold acceleration of state-of-the-art object detection systems.

I will then proceed to 'shape grammar parsing', which can be understood as inverse procedural modeling. I will describe how reinforcement learning can be used to perform optimization with grammatical models with structure variability and present applications to the interpretation of building facades.

In the final part of the talk, time permitting, I will outline connections with 3D data modeling and analysis, and address in particular the construction of invariant 3D surface descriptors.

Iasonas Kokkinos obtained the Diploma of Engineering in 2001 and the Ph.D. Degree in 2006, both from the School of Electrical and Computer Engineering of the National Technical University of Athens in Greece. In 2006 he joined the University of California at Los Angeles as a postdoctoral scholar. As of 2008 he is an Assistant Professor at the Department of Applied Mathematics of Ecole Centrale Paris and is also affiliated with the Galen group of INRIA-Saclay in Paris.

He has been awarded a young researcher grant by the French National Research Agency, and serves regularly as a reviewer for all major computer vision conferences and journals; he has served as an area chair for CVPR 2012, co-organized POCV 2012 and is an associate editor for the Image and Vision Computing Journal.

His research interests are in the broader areas of computer vision, signal processing and machine learning, while he has worked on nonlinear speech processing, biologically motivated vision, texture analysis and image segmentation. His currently research activity is focused on efficient algorithms for object detection, shape-based object recognition and learning-based approaches to feature detection.

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