



DAGM 2006

28th Annual Symposium of the German Association for Pattern Recognition

TM1: Elements of Geometric Computer Vision by Andrea, University of Verona, Italy

Abstract:

This tutorial will cover the geometric basis underlying Computer Vision (CV), namely the relationships among multiple views (calibrated or uncalibrated) and will touch upon the basic algorithms that allow to compute algebraic descriptions of such relationships and eventually reconstruct the geometric structure of the scene starting from pixels.

The approach taken in this tutorial is to explain well established results with the simplest and more compact notation as possible.

The potential target includes PhD students in CV at the beginning of their programme as well as scholars of related discipline. A working knowledge of Linear Algebra and Analytical Geometry is required. Some familiarity with basic notation of Projective Geometry might be helpful.

Outline:

The tutorial consists of 3 hours of teaching.

- 1. Introduction(1/2h)
- 2. Pinhole camerageometry (1/2h)
 - Camera anatomy
 - Camera calibration
- 3. Two view geometry(1h)
 - Epipolar geometry
 - Triangulation
 - Planes and collineations
 - 3D Reconstruction
- 4. Multiple view geometry (1h)
 - Trifocal geometry
 - 3D Reconstruction
 - Multifocal constraints

CV:

Andrea Fusiello received his Laurea (Master) degree in Computer Science from the University of Udine in 1994. He received the Dottorato di Ricerca (PhD) in Computer Engineering from the University of Trieste in 1999. He had been Visiting Research Fellow at Heriot-Watt University, Edinburgh in 1999 supported by an EPSRC grant. From 2001 to 2004 he served as a Ricercatore (Assistant Professor) at the Department of Computer Science, University of Verona. He is now Professore Associato (Associate Professor) at the same department, where he teaches Computer Vision and Computer Graphics. He has been advisor of more than 20 master students and 3 PhD students.

His research is mainly focused on Computer Vision (image analysis, model acquisition), with applications to Human-Computer Interaction (cross-modality) and Computer Graphics (image based rendering, augmented reality).



He published more than 50 papers in the field.

Andrea Fusiello has been a member of the programme committee of several important conferences (CVPR'05-06, ICCV'05 and ECCV'06). He was guest editor for a special issue of IEEE Transactions on System, Man and Cybernetics in 2003 and since 1999 he has served as a reviewer for international journals and conferences. Andrea Fusiello is a member of the IAPR, EUROGRAPHICS and IEEE CS.