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Funding decision

Name	Organisation	Project title	Decision No.	Decision date	Funding period	Funding
Brandt, Sami	OY	Statistical Methods in Geometric Computer Vision	122098	17.09.2007	01.01.2008 - 31.12.2010	138 000

Project description
The research is based on a statistical approach to the geometric imaging and image analysis. The statistical approach is stressed since it is the natural, sound way in processing real data. The core technologies of this research are hence statistical signal and image processing, statistical modelling, and statistical inversion. The research directions utilising the statistical basis are (1) geometry of rigid and dynamic scenes, (2) calibration and auto-calibration of generic cameras, and (3) image and volume reconstruction. Geometric computer vision is an important research area since it develops means for automatic recovery and recognition of 3D information from 2D images. We expect to find fundamental tools for extracting spatial or temporal geometric information from images or video and make the methods directly available for vision applications. The application problems considered shall form natural links to the fundamental problems of the research area. For instance, we shall continue our recent work in robust estimation and further study the implications of uncertain geometric estimates. Moreover, we shall consider better ways to utilise the uncertainty of the geometric estimates. Geometric calibration is prerequisite of making accurate geometric measurements from image data. As a natural extension for our previous activity, we are going extend the calibration methodology for even more generic cameras. We also aim at studying the auto-calibration problem of general cameras, i.e., the general problem where no explicit calibration object is used but the projection geometry is directly estimated from the scene. To develop such a successful and generic calibration framework, many sub-problems needs to be solved. We aim at studying the image and volume reconstruction from a general view-point. One of our goals is to recover the 2D or 3D information using a statistically sound setting and utilising the underlying geometric constraints of the views and objects. Moreover, we aim at obtaining dense reconstruction by using the statistical approach since statistical inversion provides a natural and general approach for the reconstruction problem. In addition, we are about to develop the image registration by direct methods.