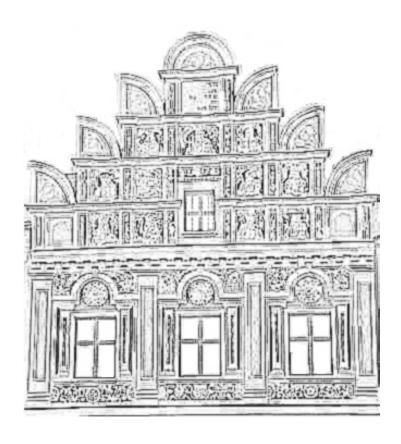# CVWW 2006

Proceedings of the 11th Computer Vision Winter Workshop

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Ondřej Chum and Vojtěch Franc (eds.)

Czech Society for Cybernetics and Informatics
(Czech Pattern Recognition Society group)

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Proceedings of the Computer Vision Winter Workshop 2006

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Organisation

The CVWW'06 is organised jointly by the
Center for Machine Perception at CTU Prague, and
Czech Society for Cybernetics and Informatics.
Local Organising Committee:
Eva Matysková, Center for Machine Perception

Preface

The CVWW'06 is an annual meeting formed around four groups: the Pattern Recognition and Image Processing Group, TU Wien, the Computer Vision Lab of the University of Ljubljana, the Institute for Computer Graphics and Vision, TU Graz, and the Center for Machine Perception of the Czech Technical University in Prague. The basic goal of the workshop is to communicate fresh ideas within the four groups, and provide conference experience to PhD students. Nevertheless, the workshop is open to everyone.

Besides papers that were selected in the review process, two invited talks were included. We would like to express our thanks to Prof. Ivan Havel (Center for Theoretical Study, Charles University and the Academy of Sciences of the CR) and Antonio Criminisi (Microsoft Research, Cambridge).

We extend our thanks to the members of the programme committee for their time ant the valuable feedback in their reviews. We are grateful to the following people that made the organisation of the workshop easier: Vít Zýka (proceedings), Daniel Večerka (submission software), Martin Matoušek (registration software & technical support). We thank to all senior members of the CMP group for their advice. Very special thanks belong to Eva Matysková for her immense contribution to the organisation of the workshop.

Ondřej Chum
Vojtěch Franc
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Cognitive Science and Perception

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In the last two or three decades Cognitive Science has become highly developed transdisciplinary field on the borderlines of computer science, brain and neural sciences, psychology, linguistics and, last but not least, philosophy of human cognition. Originating from psychologically motivated stream in AI aiming at computational models of cognition, Cognitive Science is now in the stage when, based on extensive knowledge of human mental processes, it can pay back by offering some new insights and ideas also in the area of machine perception and thought. In the lecture I will survey several of the new trends in Cognitive Science that perhaps may be of interest to researchers in machine perception. In particular, I will highlight a new approach that views our (human) perception, especially vision, as something we do, or are ready to do, rather than something that happens to us, or in us. This yields a non-representationalist theory of perception in which the world itself serves as an external memory.

Probabilistic Fusion of Stereo
with Color and Contrast for Bi-layer Segmentation

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In this talk I will describe two algorithms for the real-time segmentation of foreground from background layers in stereo video sequences. Automatic separation of layers from colour/contrast or from stereo alone is known to be error-prone. Here, colour, contrast and stereo matching information are fused to infer layers accurately and efficiently. The first algorithm, Layered Dynamic Programming (LDP), solves stereo in an extended 6-state space that represents both foreground/background layers and occluded regions. The stereo-match likelihood is then fused with a contrast-sensitive colour model that is learned on the fly, and stereo disparities are obtained by dynamic programming. The second algorithm, Layered Graph Cut (LGC), does not directly solve stereo. Instead the stereo match likelihood is marginalised over disparities to evaluate foreground and background hypotheses, and then fused with a contrast-sensitive colour model like the one used in LDP. Segmentation is solved efficiently by ternary graph cut. Both algorithms are evaluated with respect to ground truth data and found to have similar perfomance, substantially better than either stereo or colour/contrast alone. However, their characteristics with respect to computational efficiency are rather different. The algorithms are demonstrated in the application of background substitution and shown to give good quality composite video output. Live demos will also be shown.