Lecture Notes in Computer Science 3766

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison
Lancaster University, UK

Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler
University of Surrey, Guildford, UK

Jon M. Kleinberg
Cornell University, Ithaca, NY, USA

Friedemann Mattern
ETH Zurich, Switzerland

John C. Mitchell
Stanford University, CA, USA

Moni Naor
Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz
University of Bern, Switzerland

C. Pandu Rangan
Indian Institute of Technology, Madras, India

Bernhard Steffen
University of Dortmund, Germany

Madhu Sudan
Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos
New York University, NY, USA

Doug Tygar
University of California, Berkeley, CA, USA

Moshe Y. Vardi
Rice University, Houston, TX, USA

Gerhard Weikum
Max-Planck Institute of Computer Science, Saarbruecken, Germany
Preface

Human-Computer Interaction (HCI) lies at the crossroads of many scientific areas including artificial intelligence, computer vision, face recognition, motion tracking, etc. In order for HCI systems to interact seamlessly with people, they need to understand their environment through vision and auditory input. Moreover, HCI systems should learn how to adaptively respond depending on the situation.

The goal of this workshop was to bring together researchers from the field of computer vision whose work is related to human-computer interaction. The selected articles for this workshop address a wide range of theoretical and application issues in human-computer interaction ranging from human-robot interaction, gesture recognition, and body tracking, to facial features analysis and human-computer interaction systems.

This year 74 papers from 18 countries were submitted and 22 were accepted for presentation at the workshop after being reviewed by at least 3 members of the Program Committee. We had therefore a very competitive acceptance rate of less than 30% and as a consequence we had a very-high-quality workshop.

We would like to thank all members of the Program Committee for their help in ensuring the quality of the papers accepted for publication. We are grateful to Dr. Jian Wang for giving the keynote address.

In addition, we wish to thank the organizers of the 10th IEEE International Conference on Computer Vision and our sponsors, University of Amsterdam, Leiden Institute of Advanced Computer Science, and the University of Illinois at Urbana-Champaign, for support in setting up our workshop.

August 20, 2005

Nicu Sebe
Michael S. Lew
Thomas S. Huang
IEEE International Workshop on Human-Computer Interaction 2005 (HCI 2005)  
Organization

Organizing Committee

Nicu Sebe  
University of Amsterdam, The Netherlands

Michael S. Lew  
Leiden University, The Netherlands

Thomas S. Huang  
University of Illinois at Urbana-Champaign, USA

Program Committee

Kiyo Aizawa  
University of Tokyo, Japan

Alberto Del Bimbo  
University of Florence, Italy

Nozha Boujemaa  
INRIA Rocquencourt, France

Kim Boyer  
Ohio State University, USA

Edward Chang  
University of California, Santa Barbara, USA

Ira Cohen  
HP Research Labs, USA

Jeffrey Cohn  
University of Pittsburgh, USA

James Crowley  
INRIA Rhônes-Alpes, France

Jonathan Foote  
FXPAL, USA

Theo Gevers  
University of Amsterdam, The Netherlands

Alan Hanjalic  
TU Delft, The Netherlands

Thomas S. Huang  
University of Illinois at Urbana-Champaign, USA

Alejandro Jaimes  
FujiXerox, Japan

Brigitte Kerherve  
University of Quebec, Canada

Michael S. Lew  
Leiden University, The Netherlands

Frank Nack  
CWI, The Netherlands

Jan Nesvadba  
Philips Research, The Netherlands

Mark Nixon  
University of Southampton, UK

Maja Pantic  
TU Delft, The Netherlands

Ioannis Patras  
University of York, UK

Vladimir Pavlovic  
Rutgers University, USA

Alex Pentland  
Massachusetts Institute of Technology, USA

Stan Sclaroff  
Boston University, USA

Nicu Sebe  
University of Amsterdam, The Netherlands

Qi Tian  
University of Texas at San Antonio, USA

Guangyou Xu  
Tsinghua University, China

Ming-Hsuan Yang  
Honda Research Labs, USA

HongJiang Zhang  
Microsoft Research Asia, China

Xiang (Sean) Zhou  
Siemens Research, USA
Sponsors

Faculty of Science, University of Amsterdam
Leiden Institute of Advanced Computer Science, Leiden University
Beckman Institute, University of Illinois at Urbana-Champaign
# Table of Contents

Multimodal Human Computer Interaction: A Survey ................. 1  
_**Alejandro Jaimes and Nicu Sebe**_

## Tracking

Tracking Body Parts of Multiple People  
for Multi-person Multimodal Interface .................................. 16  
_Sébastien Carbini, Jean-Emmanuel Viallet, Olivier Bernier,  
and Bénédicte Bascle_

Articulated Body Tracking Using Dynamic Belief Propagation ........... 26  
_Tony X. Han and Thomas S. Huang_

Recover Human Pose from Monocular Image  
Under Weak Perspective Projection ........................................ 36  
_Minglei Tong, Yuncai Liu, and Thomas S. Huang_

A Joint System for Person Tracking and Face Detection ................. 47  
_Zhenqiu Zhang, Gerasimos Potamianos, Andrew Senior, Stephen Chu,  
and Thomas S. Huang_

## Interfacing

Perceptive User Interface, a Generic Approach .......................... 60  
_Michael Van den Bergh, Ward Servaes, Geert Caenen,  
Stefaan De Roeck, and Luc Van Gool_

A Vision Based Game Control Method ................................. 70  
_Peng Lu, Yufeng Chen, Xiangyong Zeng, and Yangsheng Wang_

Mobile Camera-Based User Interaction ................................. 79  
_Antonio Haro, Koichi Mori, Tolga Capin, and Stephen Wilkinson_

## Event Detection

Fast Head Tilt Detection for Human-Computer Interaction ............... 90  
_Benjamin N. Waber, John J. Magee, and Margrit Betke_

Attention Monitoring Based on Temporal Signal-Behavior Structures ........ 100  
_Akira Utsumi, Shinjiro Kawato, and Shinji Abe_

Action Recognition with Global Features ............................... 110  
_Arash Mokhber, Catherine Achard, Xingtai Qu, and Maurice Milgram_
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Human Action Recognition Using Spatio-temporal Motion Templates</td>
<td>120</td>
</tr>
<tr>
<td>Fengjun Lv, Ramakant Nevatia, and Mun Wai Lee</td>
<td></td>
</tr>
<tr>
<td>Augmented Reality</td>
<td></td>
</tr>
<tr>
<td>Interactive Point-and-Click Segmentation for Object Removal in Digital Images</td>
<td>131</td>
</tr>
<tr>
<td>Frank Nielsen and Richard Nock</td>
<td></td>
</tr>
<tr>
<td>Information Layout and Interaction Techniques on an Augmented Round Table</td>
<td>141</td>
</tr>
<tr>
<td>Shintaro Kajiwara, Hideki Koike, Kentaro Fukuchi, Kenji Oka, and Yoichi Sato</td>
<td></td>
</tr>
<tr>
<td>On-Line Novel View Synthesis Capable of Handling Multiple Moving Objects</td>
<td>150</td>
</tr>
<tr>
<td>Indra Geys and Luc Van Gool</td>
<td></td>
</tr>
<tr>
<td>Hand and Gesture</td>
<td></td>
</tr>
<tr>
<td>Resolving Hand over Face Occlusion</td>
<td>160</td>
</tr>
<tr>
<td>Paul Smith, Niels da Vitoria Lobo, and Mubarak Shah</td>
<td></td>
</tr>
<tr>
<td>Real-Time Adaptive Hand Motion Recognition Using a Sparse Bayesian Classifier</td>
<td>170</td>
</tr>
<tr>
<td>Shu-Fai Wong and Roberto Cipolla</td>
<td></td>
</tr>
<tr>
<td>Topographic Feature Mapping for Head Pose Estimation with Application to Facial Gesture Interfaces</td>
<td>180</td>
</tr>
<tr>
<td>Bisser Raytchev, Ikushi Yoda, and Katsuhiko Sakaue</td>
<td></td>
</tr>
<tr>
<td>Accurate and Efficient Gesture Spotting via Pruning and Subgesture Reasoning</td>
<td>189</td>
</tr>
<tr>
<td>Jonathan Alon, Vassilis Athitsos, and Stan Sclaroff</td>
<td></td>
</tr>
<tr>
<td>Applications</td>
<td></td>
</tr>
<tr>
<td>A Study of Detecting Social Interaction with Sensors in a Nursing Home Environment</td>
<td>199</td>
</tr>
<tr>
<td>Datong Chen, Jie Yang, and Howard Wactlar</td>
<td></td>
</tr>
<tr>
<td>HMM Based Falling Person Detection Using Both Audio and Video</td>
<td>211</td>
</tr>
<tr>
<td>B. Uğur Töreyin, Yiğithan Dedeoğlu, and A. Enis Çetin</td>
<td></td>
</tr>
<tr>
<td>Appearance Manifold of Facial Expression</td>
<td>221</td>
</tr>
<tr>
<td>Caifeng Shan, Shaogang Gong, and Peter W. McOwan</td>
<td></td>
</tr>
<tr>
<td>Author Index</td>
<td>231</td>
</tr>
</tbody>
</table>