



**Springer**

*Berlin*

*Heidelberg*

*New York*

*Barcelona*

*Hong Kong*

*London*

*Milan*

*Paris*

*Tokyo*

Jiming Liu Pong C. Yuen Chun-hung Li  
Joseph Ng Toru Ishida (Eds.)

# Active Media Technology

6th International Computer Science Conference, AMT 2001  
Hong Kong, China, December 18-20, 2001  
Proceedings



Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany  
Juris Hartmanis, Cornell University, NY, USA  
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Jiming Liu  
Pong C. Yuen  
Chun-hung Li  
Joseph Ng  
Hong Kong Baptist University  
Department of Computer Science  
Kowloon Tong, Hong Kong, China  
E-mail: {jiming/pcyuen/chli/jng}@comp.hkbu.edu.hk

Toru Ishida  
Kyoto University, Department of Social Informatics  
Sakyo-ku, Kyoto 606-8501, Japan  
E-mail: ishida@i.kyoto-u.ac.jp

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Active media technology : proceedings / 6th International Computer Science  
Conference, AMT 2001, Hong Kong, China, December 18 - 20, 2001. Jiming  
Liu ... (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ; London ;  
Milan ; Paris ; Tokyo : Springer, 2001  
(Lecture notes in computer science ; Vol. 2252)  
ISBN 3-540-43035-0

CR Subject Classification (1998): H.5, H.3, H.4.3, I.2.11, C.2.4-5, K.4.2-4, I.4

ISSN 0302-9743

ISBN 3-540-43035-0 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is  
concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting,  
reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication  
or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965,  
in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are  
liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York  
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2001  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP Berlin, Stefan Sossna  
Printed on acid-free paper SPIN 10845981 06/3142 5 4 3 2 1 0

## Preface

The past few years have witnessed rapid scientific and technological developments in human-centered, seamless computing environments, interfaces, devices, and systems with applications ranging from business and communication to entertainment and learning. These developments are collectively best characterized as Active Media Technology (AMT), a new area of information technology and computer science that emphasizes the proactive, seamless roles of interfaces and systems as well as new digital media in all aspects of human life. This volume contains the papers presented at the Sixth International Computer Science Conference: Active Media Technology (AMT 2001), the first conference of its kind, capturing the state of research and development in AMT and the latest architectures, prototypes, tools, and fielded systems that demonstrate or enable AMT.

The volume is organized into the following eight parts: I. Smart Digital Media; II. Web Personalization; III. Active Interfaces; IV. Autonomous Agent Approaches; V. Facial Image Processing; VI. AMT-Supported Commerce, Business, Learning, and Health Care; VII. Tools and Techniques; and VIII. Algorithms.

We would like to thank all the program committee members for their excellent, timely service and great efforts in reviewing and selecting papers. We would also like to express our gratitude to all the invited speakers of AMT 2001 for their inspiring contributions. The invited speakers include: James L. Crowley, Toshio Fukuda, Toru Ishida, Takeo Kanade, and Oussama Khatib. We are grateful to the AMT 2001 congress chair, Ernest Lam, and general chair, Toshio Fukuda, for their strong support and valuable suggestions. The AMT 2001 conference would not have been possible without the team work of the organizing committee under the supervision of the organizing committee chair, Kelvin Wong. In particular, we would like to express our gratitude to the publication chairs, C.H. Li and M.W. Mak, for their efforts in setting up on-line tools and handling manuscript submissions, and the registration and finance chair, K.C. Tsui, for keeping a good financial balance, and the local arrangement chair, William Cheung, for coordinating conference logistics. Special thanks also go to Alfred Hofmann of Springer-Verlag for his vision and help in publishing this very first volume of AMT proceedings. Last but not the least, we would like to acknowledge the generous sponsorships from Hong Kong Baptist University, Croucher Foundation, IEEE Hong Kong Section Computer Chapter, and Joint Chapter of the Robotics and Automation and Control Systems Society.

We hope that you enjoy and benefit from the papers in this volume.

October 2001

Jiming Liu, P. C. Yuen, C. H. Li  
Joseph Ng, and Toru Ishida

## **Organizing Committee**

Congress Chair:	Ernest C. M. Lam
General Chairs:	Toshio Fukuda Joseph Ng
Program Chairs:	Jiming Liu P. C. Yuen Toru Ishida
Organizing Chair:	Kelvin C. K. Wong
Local Arrangement Chair:	William K. W. Cheung
Registration and Finance Chair:	K. C. Tsui
Publications Chairs:	C. H. Li M. W. Mak
Workshop Chair:	Samuel P. M. Choi
Publicity Chair:	C. S. Huang

## VIII Organization

### Program Committee

Keith Chan	Hong Kong Polytechnic University
David Cheung	Hong Kong University
Jeffrey Cohn	University of Pittsburgh, USA
Stefan Decker	Stanford University, USA
Dieter Fensel	Vrije Universiteit Amsterdam, The Netherlands
Myron Flickner	IBM Almaden Research Center, USA
Barbara Hayes-Roth	Stanford University, USA
Toru Ishida	Kyoto University, Japan
Tomonari Kamba	NEC Internet Systems Research Laboratories, Japan
Juntae Kim	Dongguk University, Korea
David Kinny	University of Melbourne, Australia
Sarit Kraus	University of Maryland, USA
Jiming Liu	Hong Kong Baptist University
Helen Meng	Chinese University of Hong Kong
Hideyuki Nakanishi	Kyoto University, Japan
Hideyuki Nakashima	ETL, Japan
Wee-Keong Ng	Nanyang Technological University, Singapore
Toshikazu Nishimura	Ritsumeikan University, Japan
Sun Park	Rutgers University, USA
Terry R. Payne	Carnegie Mellon University, USA
Eugene Santos	University of Connecticut, USA
Carles Sierra	CSIC-Spanish Scientific Research Council, Spain
Yasuyuki Sumi	ATR Laboratory, Japan
Takao Terano	University of Tsukuba, Japan
Hong Yan	City University of Hong Kong
Yiming Ye	IBM T. J. Watson Research Center, USA
Dit-Yan Yeung	Hong Kong UST
Tetuya Yoshida	Osaka University, Japan
Eric Yu	University of Toronto, Canada
P. C. Yuen	Hong Kong Baptist University

### Sponsors

Hong Kong Baptist University  
Croucher Foundation  
IEEE Hong Kong Section Computer Chapter

# Table of Contents

## Keynote Presentations

Intelligent Adaptive Interface . . . . .	1
<i>Toshio Fukuda</i>	
Digital City: Bridging Technologies and Humans . . . . .	2
<i>Toru Ishida</i>	
Detection, Recognition, and Expression Analysis of Human Faces . . . . .	3
<i>Takeo Kanade</i>	
Digital Interactivity: Human-Centered Robotics, Haptics, and Simulation . . . . .	4
<i>Oussama Khatib</i>	

## I. Smart Digital Media

Smart Media: Empower Media with Active Data Hiding . . . . .	5
<i>Hong Heather Yu, Peng Yin, Samuel Cheng, Xiangyang Kong,</i> <i>Alexander Gelman, Robert S. Fish</i>	
Congestion Prospect of Network Traffics by Fluctuation of Internet Transmission Time . . . . .	17
<i>Hiroto Takahashi, Yasuo Yonezawa</i>	
Naturalistic Human-Robot Collaboration Mediated by Shared Communicational Modality in Teleoperation System . . . . .	24
<i>Yukio Horiguchi, Tetsuo Sawaragi</i>	

## II. Web Personalization

Web Personalization Techniques for E-commerce . . . . .	36
<i>Suwimol Sae-Tang, Vatcharaporn Esichaikul</i>	
A Shopping Negotiation Agent That Adapts to User Preferences . . . . .	45
<i>Runhe Huang, Jianhua Ma, Qun Jin</i>	
Combining Meta-level and Logic-Based Constructs in Web Personalization . . . . .	57
<i>Sofie Goderis, Gustavo Rossi, Andres Fortier, Juan Cappi,</i> <i>Daniel Schwabe</i>	
Web Personalisation – An Overview . . . . .	65
<i>San Murugesan, Annamalai Ramanathan</i>	
Business-Oriented Web Personalization: A Decision-Making Approach . . . . .	77
<i>Carlos Alberto Odorico de Moraes Filho, Francilene Procpio Garcia</i>	



X Table of Contents

A Personalized Interface Agent with Feedback Evaluation . . . . .	83
<i>Weihua Li, Xiaodong Fu</i>	

### III. Active Interfaces

VHML – Directing a Talking Head . . . . .	90
<i>Andrew Marriott, Simon Beard, John Stallo, Quoc Huynh</i>	

Believable and Interactive Talking Heads for Websites: MetaFace and MPEG-4 . . . . .	101
<i>Simon Beard, Donald Reid, Russel Shepherdson</i>	

Building Multi-modal Personal Sales Agents as Interfaces to E-commerce Applications . . . . .	113
<i>Yasmine Arafa, Abe Mamdani</i>	

Feature vs. Model Based Vocal Tract Length Normalization for a Speech Recognition-Based Interactive Toy . . . . .	134
<i>Chun Keung Chau, Chak Shun Lai, Bertram Emil Shi</i>	

A Genetic Algorithm Based Approach to the Synthesis of Three Dimensional Morphing Sequences . . . . .	144
<i>Stephen Wang-Cheung Lam, Kelvin Yuen-Hin Ho</i>	

### IV. Autonomous Agent Approaches

A Comparative Study of ANT-Based Optimization for Dynamic Routing . .	153
<i>Kwang Mong Sim, Weng Hong Sun</i>	

What Kind of Cooperation Is Required by Situated Agents? (The Principle of Situated Cooperation) . . . . .	165
<i>Angélica Muñoz-Meléndez, Alexis Drogoul</i>	

A Fault-Tolerant Scheme of Multi-agent System for Worker Agents . . . . .	171
<i>YunHee Kang, HoSang Ham, ChongSun Hwang</i>	

Decentralized Control of Multi-agent Systems Based on Modal Logics and Extended Higher Order Petri Nets . . . . .	182
<i>Osamu Katai, Kentaro Toda, Hiroshi Kawakami</i>	

### V. Facial Image Processing

An Improved Foreground Extraction Approach . . . . .	191
<i>Erda Gu, Duanqing Xu, Chun Chen</i>	

Object Detection Simulating Visual Attention . . . . .	199
<i>Xingshan Li, Chunwei Yuan</i>	

Fast Face Detection Using Neural Networks and Image Decomposition . . .	205
<i>Hazem M. El-Bakry</i>	

Modeling of Facial Expressions Using NURBS Curves .....	216
<i>Ding Huang, Wei Lin, Hong Yan</i>	

## VI. AMT-Supported Commerce, Business, Learning, and Health Care

Evolutionary Negotiation in Agent-Mediated Commerce .....	224
<i>Samuel P.M. Choi, Jiming Liu, Sheung-Ping Chan</i>	

Optimizing Agent-Based Negotiations with Branch-and-Bound.....	235
<i>Andy Hon Wai Chun, Rebecca Y.M. Wong</i>	

Engineering Fuzzy Constraint Satisfaction Agents for Multi-user Timetable Scheduling .....	244
<i>Chi Kin Chau, Kwang Mong Sim</i>	

An XML-Based Distance Learning System Capable of Conveying Information on “LECTURE EVENT” .....	255
<i>Naoaki Mashita, Hiroshi Shigeno, Yutaka Matsushita</i>	

An Authoring Tool for Building Adaptive Learning Guidance Systems on the Web .....	268
<i>José A. Macías, Pablo Castells</i>	

A Framework of Caring Interaction by a Network Model of Client’s Concepts Based on a Nursing Theory and Naive Psychological Approaches .....	279
<i>Akira Notsu, Osamu Katai, Hiroshi Kawakami</i>	

## VII. Tools and Techniques

Parallel Design Based on Neural Network .....	291
<i>Shaobai Zhang, Xiefeng Cheng, Zhiquan Feng</i>	

Fair Play Protocol .....	297
<i>Tak-Ming Law</i>	

Collaborative Filtering Methods for Binary Market Basket Data Analysis .....	302
<i>Andreas Mild, Thomas Reutterer</i>	

An Implementation and Design of COMOR System for OOM Reuse .....	314
<i>Young-Jun Kim</i>	

Automatic Aircraft Recognition Using Maximum Likelihood Ratio Test ...	321
<i>Wei Yi</i>	

## VIII. Algorithms

A Machine Learning Algorithm Based on Supervised Clustering and Classification .....	327
<i>Nong Ye, Xiangyang Li</i>	
Visualization of a Parallel Genetic Algorithm in Real Time .....	335
<i>Xiaodong Li</i>	
The Rise and Fall of Napster – An Evolutionary Approach .....	347
<i>Bengt Carlsson, Rune Gustavsson</i>	
On the Elaboration of Hand-Drawn Sketches .....	355
<i>Saul Simhon, Gregory Dudek</i>	
The Introduction of Three Methods Generating Stereoscopic Image .....	365
<i>Guoying Zhao, Xinyuan Huang</i>	
Kansei-Oriented Image Retrieval .....	377
<i>Shangfei Wang, Enhong Chen, Jing Hu and Xufa Wang</i>	
ICSPACE – An Internet Cultural Space .....	389
<i>T.A. Tavares, A.S. Araújo, G.L. Souza Filho</i>	
<b>Author Index</b> .....	401