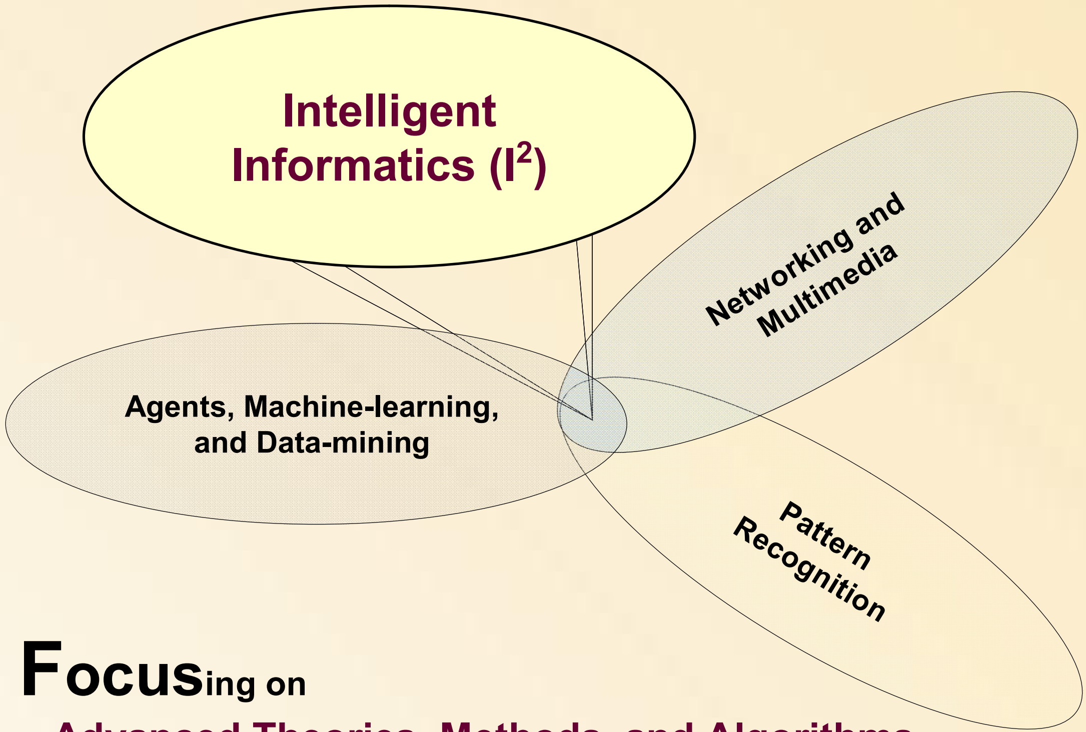
Areas of Research Strength



Focusing on

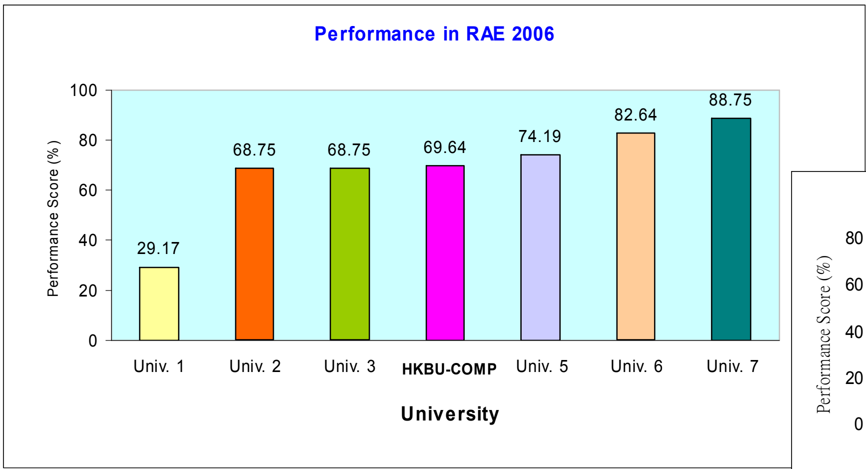
Advanced Theories, Methods, and Algorithms
of **Information Processing and Communications** for
Adaptive Interfaces, Systems, and Networks

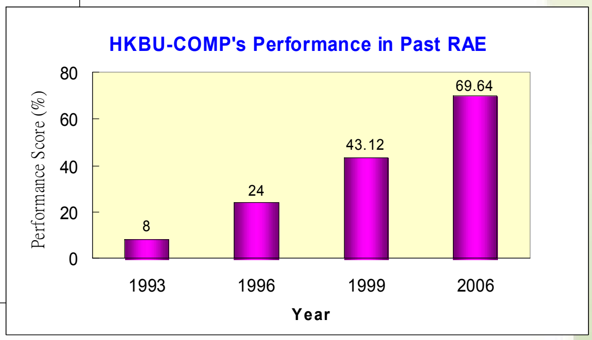
Research & Development Laboratories

Laboratories	Expertise
1. Agents, Machine-learning, and Data-mining (AMD)	• Autonomous Agents and Multi-agent Systems • Data Mining and Machine Learning • Intelligent Software Tools and Systems • On-line Media and Network Analysis • Web Intelligence
2. Networking and Multimedia	• All-optical Networks • IP Networks • Mobile Computing • Multimedia Communications and Systems • Visual Information Systems • Wireless Communications
3. Pattern Recognition	• Image Processing • Vision-based Human Understanding Technology • Wavelet Analysis and its Applications

Research Assessment Exercise (RAE) 2006

The Department has achieved very good research performance in the past several years, as confirmed in the Research Assessment Exercise 2006 conducted by the UGC. Our research performance scores among local universities in the 2006 exercise and in the past exercises are presented as follows:





Research Outputs

Number of Refereed International **Journal** Papers

	No. of Papers	Average No. of Papers per Faculty
2005-2006	38	2.714
2004-2005	42	3.50
2003-2004	32	2.285

Monographs, Books, & Proceedings Written or Edited, 2003-2006

Monographs	5
Edited Books & Proceedings	12
Total	**17**

Editorships & Editorial Boards

Editors-in-Chief:

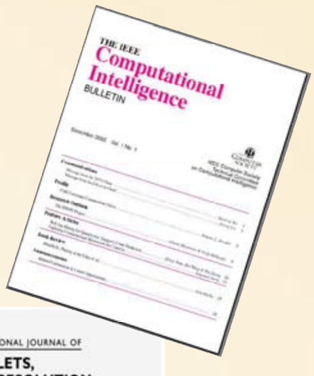
Annual Review of Intelligent Informatics (World Scientific)
International Journal of Wavelets, Multiresolution and Information Processing (World Scientific)
The IEEE Intelligent Informatics Bulletin (IEEE Computer Society)
Web Intelligence and Agent Systems (IOS Press, The Netherlands)

Editorial Boards:

IEEE Transactions on Knowledge and Data Engineering
IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews
International Journal of Applied Systematic Studies (Inderscience)
International Journal of Document Analysis and Recognition (Springer)
International Journal of Pattern Recognition and Artificial Intelligence (World Scientific)
Journal of Data Warehousing and Mining (IGI Global)
Journal of Embedded Computing (IOS Press)
Journal of Mobile Multimedia (Rinton Press)
Journal of Multimedia Tools and Applications (Springer)
Journal of Pervasive Computing and Communications (Troubador)
Journal of Ubiquitous Computing and Intelligence (American Scientific Publishers)
Knowledge and Information Systems (Springer)
Microprocessor and Microsystems (Elsevier)
Pattern Recognition (Elsevier)
Real-Time Systems: The International Journal of Time-Critical Computing Systems (Kluwer)

... in High-Impact Journals

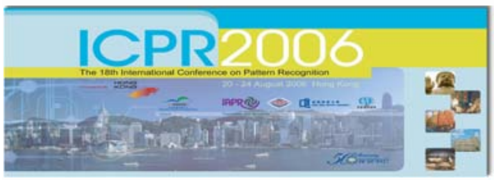
Artificial Intelligence
Communications of the ACM
IEEE Computer
IEEE Intelligent Systems
IEEE Internet Computing
IEEE Journal of Lightwave Technology
IEEE Journal of Selected Areas in Communications
IEEE Multimedia
IEEE Transactions on Circuits and Systems for Video Technology
IEEE Transactions on Communications
IEEE Transactions on Computers
IEEE Transactions on Evolutionary Computation
IEEE Transactions on Image Processing
IEEE Transactions on Knowledge and Data Engineering
IEEE Transactions on Medical Imaging
IEEE Transactions on Mobile Computing
IEEE Transactions on Multimedia
IEEE Transactions on Neural Networks
IEEE Transactions on Parallel and Distributed Computing
IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Signal Processing
IEEE Transactions on Systems, Mans and Cybernetics
IEEE/ACM Transactions on Networking
Journal of Systems and Software
Pattern Recognition
Real-Time Systems Journal

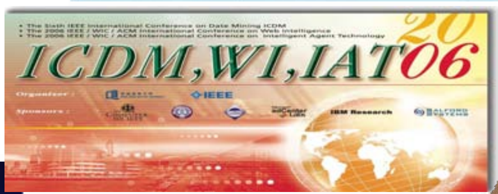


Major Conferences Organized/Co-organized, 2003-2006

Including …

- 2006 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology ((WI 2006 & IAT 2006)
- 2006 IEEE International Conference on Data Mining (ICDM 2006)
- 18th International Conference on Pattern Recognition (ICPR 2006)
- 2005 International Conference on Computational Intelligence and Security (CIS 2005)
- 2005 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI 2005 & IAT 2005)
- 11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2005)
- 2005 IEEE International Conference on e-Technology, e-Commerce, and e-Service (EEE 2005)
- 2004 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI 2004 & IAT 2004)
- 2004 IEEE International Conference on e-Technology, e-Commerce, and e-Service (EEE 2004)
- 2003 IEEE/WIC International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI 2003 & IAT 2003)
- 4th International Conference on Intelligent Data Engineering and Automated Learning (IDEAL 2003)





Centre for e-Transformation Research (CTR)

(An affiliated research centre of Web Intelligence Consortium)

Mission

To be a major contributor to Hong Kong's knowledge base in researching the new fundamental roles and practical impacts of Artificial Intelligence (AI) and advanced Information Technology (IT) on the next generation of Web-empowered products, systems, services, and activities

Milestones

- 2003: Established under the Faculty of Science
- 2004: Funded by HK Research Grants Council (first IT group research project funded)
- 2007: Advanced e-Transformation Technology Research becomes a University's strategic research area

Research Team

Director:

Jiming Liu, Head and Professor
Computer Science Department, HKBU

Area Leaders:

- Qiang Yang, Professor
  Computer Science Department, HKUST
- C. J. Tan, Director and Chair Professor
  E-Business Technology Institute (ETI), HKU

Coordinator:

William K. Cheung, Associate Professor
Computer Science Department, HKBU

Key Members:

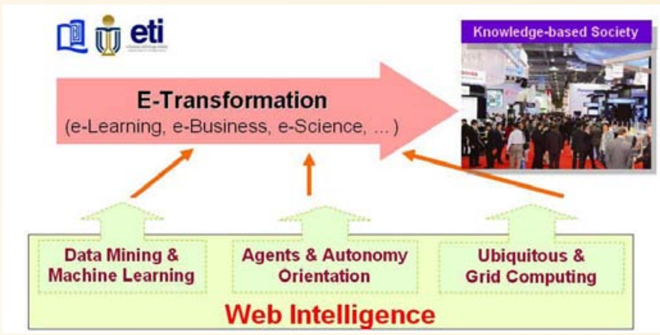
From HKBU, HKUST, and ETI-HKU

Research Focus

Basic Research	e-Transformation Applications
- Agents and Autonomy Oriented Computing - Data Mining and Machine Learning - Grid and Service Oriented Computing	- Community Analysis in the Networked Society - Decision Technologies for Supply Chain Management - Services Management for Computation, Data Analysis, and Knowledge Inference

Publications

- Communications of the ACM
- IEEE Internet Computing
- IEEE Transactions on Knowledge and Data Engineering
- Journal of Data Mining and Knowledge Discovery
- SIGKDD Exploration
- Proceedings of prestigious international conferences, such as AAAI, ICDM, ICML, ISCAI, and WI/IAT



Centre URL: http://www.comp.hkbu.edu.hk/~ctr

Research Centre for Ubiquitous Computing

Mission

- To excel in some focused areas related to ubiquitous/pervasive computing
- To coordinate and develop research activities towards ubiquitous/pervasive computing
- To construct test-beds based on different positioning technologies for testing & benchmarking and to develop software which becomes the common basic building blocks for ubiquitous/pervasive applications

Research Team

Principal Investigator:

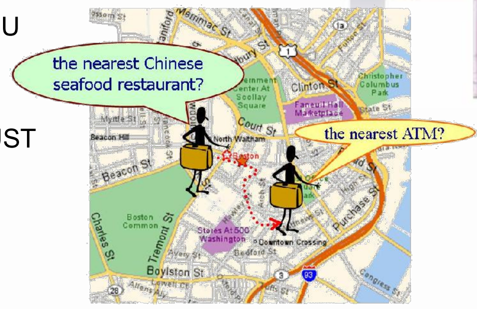
Joseph Kee-Yin Ng, Professor
Computer Science Department, HKBU

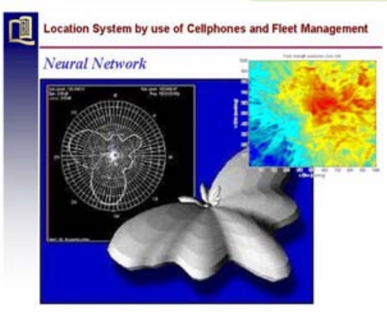
Co-Investigator:

Lionel Ni, Head and Professor
Computer Science Department, HKUST

Key Members:

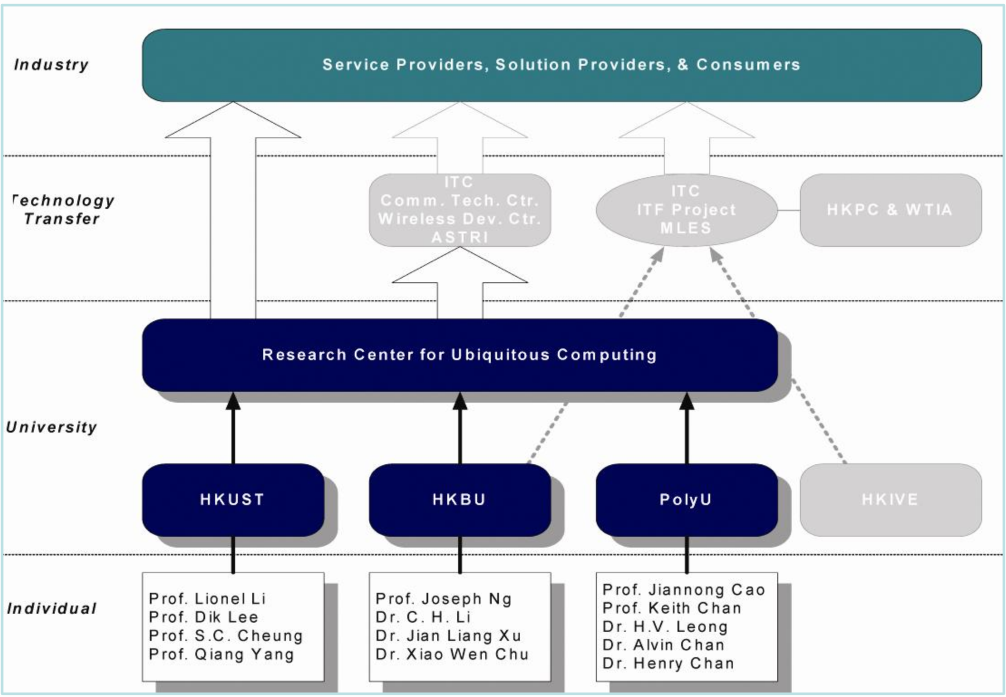
From HKBU, HKUST, and PolyU





Research Focus

- Location-aware computing with a focus on mobile and wireless technology
- RFID and sensor networks with a focus on positioning and data access
- The design and construct of API / Middleware for ubiquitous computing
- Software development on providing location-based services



For more information about the Research Centre for Ubiquitous Computing, please contact Prof. Joseph Ng at jng@comp.hkbu.edu.hk or (852)-3411-7864

Awards

Prof. Liu Jiming

President's Award
for Outstanding Performance 2007
in recognition of his Outstanding Performance
in Scholarly Work

Prof. Tang Yuan-yan

First Class of Natural Science Award
of Technology Development Centre
Ministry of Education of the People's
Republic of China in 2005

Elected Fellow of the IEEE in January 2004
and Fellow of IAPR
in August 2004

President's Award
for Outstanding Performance 2003
in recognition of his Outstanding Performance
in Scholarly Work

Dr. Feng Jian

Most Cited Paper Award
for the Journal of Visual Communication and
Image Representation 2004-2006

Dr. Feng is an expert in image/video processing and multimedia applications. She and her three research partners successfully applied the concept of radar signal detection to video segmentation, enabling the accurate retrieval of key information from videos.

計算機科學系講師馮健博士的合著論文〈A new cut detection algorithm with constant false-alarm ratio for video segmentation〉獲《Journal of Visual Communication and Image Representation》(《視覺通訊與圖像表達學報》)2004-2006 論文被引用次數最多獎。

Prof. Ng Kee-yin, Joseph

Together with his two German partners, Prof. Wolfgang Halang and Dr. Thomas Erdner and his graduate student Mr. Stephen Ka Chun Chan, received two **patents** issued by the German Patent Office for their research work entitled "*Clock Synchronization in Nodes on a Ring Bus*", and "*Real Time Capable and Fault Tolerant Data Transfer*" granted by The Germany Patent Office, Munchen, 9 February 2006 and 22 March 2007, respectively.
Patent Registration Number: 10253533 / 10253534

IEEE Computer Society
Meritorious Service Award 2004

Together with his two students Mr. Kan Ka-ho Kenny,
Mr. Chan Ka-chun Stephen, received
"AINA2003 Excellent Paper Award"

Mr. Tong Tat Ming

under the supervision of Prof. Tang Yuan-yan

First-grade Award
in the Pan-Pearl River Delta Region
Amway Universities IT Project
Competition 2007

Mr. Chan Ka-ho
Mr. Chan Kai-kin
Mr. Yeung Man-chung

under the supervision of Prof. Ng Kee-yin, Joseph

2nd Runners-up
in the Microsoft Imagine Cup 2007

Mr. Yeung Man-chung

under the supervision of Prof. Ng Kee-yin, Joseph

Distinction Award
in Intervarsity Internet Technologies Exposition
and Conference 2005

Certificate of Merit (Post-Secondary)
of the 7th IT Excellence Awards by
Hong Kong Computer Society in 2005

Agents, Machine-learning, and Data-mining

Department of Computer Science

AMD1

Hong Kong Baptist University

Computational Intelligence, Volume 21, Number 2, 2005

ON KNOWLEDGE GRID AND GRID INTELLIGENCE: A SURVEY

William K. Cheung and Jiming Liu

Service-Oriented Distributed Data Mining

William K. Cheung, Xiao-Feng Zhang, Ho-Fai Wong, and Jiming Liu, Hong Kong Baptist University

Zong-Wei Luo and Frank Tong, E-Business Technology Institute, University of Hong Kong

IEEE Transactions on Systems, Man, and Cybernetics—Part A: Systems and Humans, Vol. 34, No. 1, January 2004

Correspondence

Extended Latent Class Models for Collaborative Recommendation

Kwok-Wai Cheung, Kwok-Ching Tsui, and Jiming Liu

Grounding Collaborative Learning in Semantics-Based Critiquing

William K. Cheung, Anders I. Mørch, Kelvin C. Wong, Cynthia Lee, Jiming Liu, and Mason H. Lam

A Novel Orthogonal NMF-Based Belief Compression for POMDPs

Xin Li, William K. W. Cheung, Jiming Liu, Zhili Wu

IEEE Transactions on Neural Networks, Vol. 18, No. 1, January 2007

Rival-Model Penalized Self-Organizing Map

Yiu-ming Cheung and Lap-tak Law

Pattern Recognition Letters 24 (2003) 2883–2893

k^*-Means: A new generalized k-means clustering algorithm

Yiu-Ming Cheung

IEEE Transactions on Knowledge and Data Engineering, Vol. 17, No. 6, June 2005

Maximum Weighted Likelihood via Rival Penalized EM for Density Mixture Clustering with Automatic Model Selection

Yiu-ming Cheung, Member, IEEE

IEEE Transactions on Knowledge and Data Engineering, Vol. 18, No. 10, October 2006

Concise Papers

On Weight Design of Maximum Weighted Likelihood and an Extended EM Algorithm

Zhenyue Zhang and Yiu-ming Cheung, Senior Member, IEEE

Agents, Machine-learning, and Data-mining

Department of Computer Science

AMD2

Hong Kong Baptist University

The Development of Successful On-Line Communities

Karen S.K. Cheung, Fion S.L. Lee, Rachael K.F. Ip, and Christian Wagner

Department of Information Systems
City University of Hong Kong
HONG KONG

Virtual Community Informatics: What We Know and What We Need to Know

Fion S. L. Lee
Department of Information Systems
City University of Hong Kong

Douglas Vogel
Department of Information Systems
City University of Hong Kong

Moez Limayem
Department of Information Systems
City University of Hong Kong

JITTA
Journal of Information Technology Theory and Application

Virtual Community Informatics: A Review and Research Agenda

Fion S. L. Lee, City University of Hong Kong
Douglas Vogel, City University of Hong Kong
Moez Limayem, City University of Hong Kong

Abstract

Divergent opinions exist on the basic understanding of the concept, virtual community. This study offers a working definition by examining different definitions, and proposes adoption of virtual community classifications. It also includes a summary of research conducted in the field. The research categorizes the different stages in virtual community growth to show the transition of research in this area. The results illustrate a paucity of technology development studies. We also investigate the extent of the adoption of informatics in these communities using a survey 200 virtual communities. The results indicate that discussion forum is the most popular tool adopted in virtual communities. The integration of the research review and tool adoption survey contributes to the generation of an agenda to direct future virtual community research.

Ken Peffers acted as senior editor for this paper.

Lee, F.S.L., D. Vogel, and M. Limayem, "Virtual Community Informatics: A Review and Research Agenda", The Journal of Information Technology Theory and Application (JITTA), 5:1, 2003, 47-61.

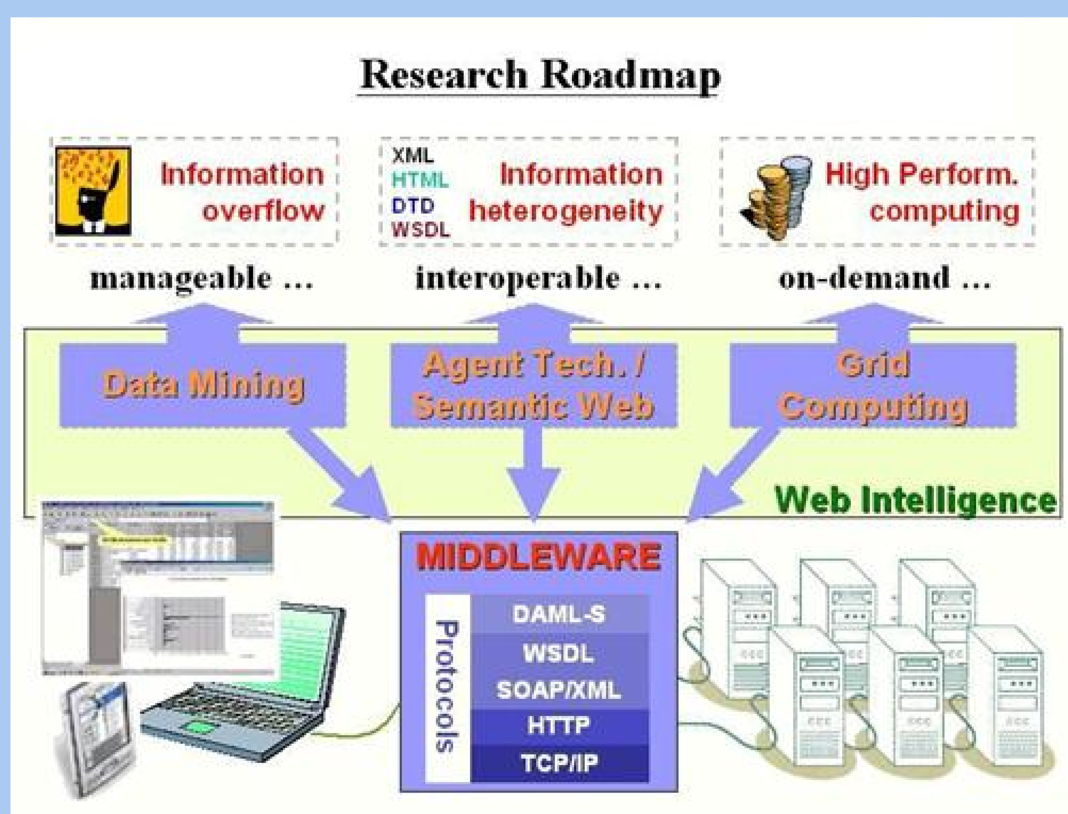
Available online at www.sciencedirect.com
ScienceDirect
Journal of Computer and System Sciences
www.elsevier.com/locate/jcss

Topological analysis of AOCD-based agent networks and experimental results

Hao Lan Zhang *, Clement H.C. Leung, Gitesh K. Raikundalia

School of Computer Science and Mathematics, Victoria University, PO Box 14428, Melbourne City, MC 8001, Australia

Received 15 June 2006; received in revised form 31 October 2006



Feature Selection with Transductive Support Vector Machines

Zhili Wu[1] and Chunhung Li[2]

[1] Department of Computer Science, Hong Kong Baptist University
vincent@comp.hkbu.edu.hk
[2] Department of Computer Science, Hong Kong Baptist University
chli@comp.hkbu.edu.hk

Summary. SVM-related feature selection has shown to be effective, while feature selection with transductive SVMs has been less studied. This paper investigates the use of transductive SVMs for feature selection, based on three SVM-related feature selection methods: filtering scores + SVM wrapper, recursive feature elimination(RFE) and multiplicative updates(MU). We show transductive SVMs can be tailored to feature selection by embracing feature scores for feature filtering, or acting as wrappers and embedded feature selectors. We conduct experiments on the feature selection competition tasks to demonstrate the performance of Transductive SVMs in feature selection and classification.

1 Introduction

SVMs have been studied to work with different divisions of feature selection methods, like wrappers, embedded methods, and filters. For example, the SVM as a wrapper can be used to select features, while the feature set quality is indicated by the performance of the trained SVM (Yu and Cho, 2003). Feature selection can also be conducted during the process of training SVMs. This induces some embedded feature selection methods (Brank et al., 2002, Guyon et al., 2002, Weston et al., 2003, 2000, Guyon et al., 2003, Perkins et al., 2003). SVMs are also useful for filter methods. Although filters often score or rank features without utilizing a learning machine, they can utilize a SVM as the final predictor for classification. Moreover, filters are often integrated as a preprocessing step into wrappers and embedded methods, such that they can help feature selection of wrappers or embedded methods.

The development of SVM-related feature selection methods motivates us to explore the role of Transductive SVMs (TSVMs) in feature selection. Transductive SVMs are a type of transductive learning (Vapnik, 1998) machine. They aim to build SVM models upon both labeled and unlabeled data. Transductive SVMs, as generalized from inductive SVMs, inherit the advantages of inductive SVMs such as the large margin (Boser et al., 1992) and regularization formulation as well as kernel mapping. Besides, TSVMs are suitable for the tasks we consider here, which are characterized

Applied Intelligence 22, 37–46, 2005
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Guided Cluster Discovery with Markov Model*

C.H. LI
Department of Computer Science, Hong Kong Baptist University, Kowloon Tong, Hong Kong
chli@comp.hkbu.edu.hk

Abstract. Cluster discovery is an essential part of many data mining applications. While cluster discovery process is mainly unsupervised in nature, it can often be aided by a small amount of labeled data. A probabilistic model on the clustering structure is adopted and a new unified energy equation for clustering that incorporates both labeled data and unlabeled data is introduced. This formulation is inspired by a force-field model integrating labeling constraint on labeled data and similarity information on unlabeled data for joint estimation. Experimental results show that good clusters can be identified using small amount of labeled data.

Keywords: clustering semi-supervised learning, Markov model

A Novel Fractal Image Watermarking

Ming Hong Pi, Chun Hung Li, Member, IEEE, and Hua Li, Member, IEEE

Agent-Based Load Balancing on Homogeneous Minigrids: Macroscopic Modeling and Characterization

Jiming Liu, Senior Member, IEEE, Xiaolong Jin, and Yuanshi Wang

Index Terms—Homogeneous minigrids, load balancing, task distribution, agents, macroscopic modeling, steady states, convergence, grid simulation.

1 Background

Agents, Machine-learning, and Data-mining

Toward Nature-Inspired Computing

NIC-based systems utilize autonomous entities that self-organize to achieve the goals of systems modeling and problem solving.

By Jiming Liu and K.C. Tsui

Characterizing Web Usage Regularities with Information Foraging Agents

Jiming Liu, Senior Member, IEEE, Shiwu Zhang, and Jie Yang

Equilibria, Prudent Compromises, and the "Waiting" Game

Kwang Mong Sim

Continuous-Time Negotiation Mechanism for Software Agents

Bo An, Kwang Mong Sim, Liang Gui Tang, Shuang Qing Li, and Dai Jie Cheng

A Survey of Bargaining Models for Grid Resource Allocation

KWANG MONG SIM

Department of Computer Science, Hong Kong Baptist University, Kowloon Tong, KLN, Hong Kong. Email: prof_sim_2002@yahoo.com

Negotiation Agents that Make Prudent Compromises and are Slightly Flexible in Reaching Consensus

Kwang Mong Sim

Grid Commerce, Market-Driven G-Negotiation, and Grid Resource Management

Kwang Mong Sim

A Pilot Study on the Impact of the Web-based Essay Critiquing System on Writing at the Tertiary Level

Kelvin C.K. Wong, Fion S.L. Lee, Cynthia F.K. Lee, William K.W. Cheung, Anders I. Mørch and Jiming Liu

Department of Computer Science, Hong Kong Baptist University

AMD3

Department of Computer Science

Hong Kong Baptist University

Networking and Multimedia

Department of Computer Science

NM1

Hong Kong Baptist University

Dynamic Routing and Wavelength Assignment in the Presence of Wavelength Conversion for All-Optical Networks

Xiaowen Chu, *Member, IEEE*, and Bo Li, *Senior Member, IEEE*

Wavelength Converter Placement Under Different RWA Algorithms in Wavelength-Routed All-Optical Networks

Xiaowen Chu, *Student Member, IEEE*, Bo Li, *Senior Member, IEEE*, and Imrich Chlamtac, *Fellow, IEEE*

Resource Management in An Integrated Optical Network

Kazem Sohraby, *Senior Member, IEEE*, Zhensheng Zhang, *Senior Member, IEEE*, Xiaowen Chu, *Member, IEEE*, and Bo Li, *Senior Member, IEEE*

Provision of Continuous VCR Functions in Interactive Broadcast VoD Systems

W.-F. Poon, K.-T. Lo, and J. Feng

Standards

John R. Smith
IBM

Multimedia Retrieval Benchmarks

Paul Over, National Institute of Standards and Technology

Clement Leung, Victoria University, Australia

Horace Ip, City University of Hong Kong

Michael Grubinger, Victoria University, Australia

Information Sciences 157 (2003) 33–71

The impact of load balancing to object-oriented query execution scheduling in parallel machine environment

David Taniar [a,*], Clement H.C. Leung [b]

[a] School of Business Systems, Monash University, P.O. Box 63B, Clayton, Vic. 3800, Australia
[b] School of Communication and Informatics, Victoria University of Technology, P.O. Box 14428 MCMC, Melbourne 8001, Australia

Received 19 February 2003; received in revised form 16 March 2003; accepted 2 May 2003

Abstract

Skewness has been one of the major problems not only in parallel relational database systems, but also in parallel object-oriented database systems. To improve performance of object-oriented query processing, a careful and intelligent skew handling for load balancing must be established. Depending on the parallel machine environment, whether it is a shared-memory or a shared-nothing architecture, load balancing can be achieved through "physical" or "logical" data re-distribution. It is not the aim of this paper to propose or to investigate skew handling methods, but rather to analyze the impact of load balancing to query execution scheduling strategies. Our analysis shows that when load balancing is achieved, "serial" execution scheduling is preferable to "parallel" execution scheduling strategy. In other words, allocating full resources to a sub-query seems to be better than dividing resources to multiple sub-queries.

Keywords: Query access plans; Execution scheduling; Serial and parallel execution scheduling; Inter/intra-operation parallelization; Parallel query processing; Parallel object-oriented databases

* Corresponding author. Tel.: +61-3-99059693; fax: +61-3-99055159.
E-mail addresses: david.taniar@infotech.monash.edu.au (D. Taniar), clement@matilda.vu.edu.au (C.H.C. Leung).

0020-0255/$ - see front matter © 2003 Elsevier Inc. All rights reserved.
doi:10.1016/S0020-0255(03)00152-X

COMPARATIVE EVALUATION OF WEB IMAGE SEARCH ENGINES FOR MULTIMEDIA APPLICATIONS

Keon Stevenson
Clement Leung
School of Computer Science and Mathematics
Victoria University, Footscray, Vic 3011, Aus

Information Sciences 157 (2003) 33–71

The impact of load balancing to object-oriented query execution scheduling in parallel machine environment

David Taniar [a,*], Clement H.C. Leung [b]

Lightpath Concentrators for All-Optical Networks

Yiu-Wing Leung, *Senior Member, IEEE*

Networking and Multimedia

Department of Computer Science

NM2

Hong Kong Baptist University

IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO. 1, JANUARY 2002

Design of Node Configuration for All-Optical Multi-Fiber Networks

Yiu-Wing Leung, *Senior Member, IEEE*, Gaoxi Xiao, *Member, IEEE*, and Kwok-Wah Hung

IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART A: SYSTEMS AND HUMANS, VOL. 35, NO. 5, SEPTEMBER 2005

Assignment of Movies to Heterogeneous Video Servers

Yiu-Wing Leung, *Senior Member, IEEE*, and Ricky Yuen-Tan Hou, *Member, IEEE*

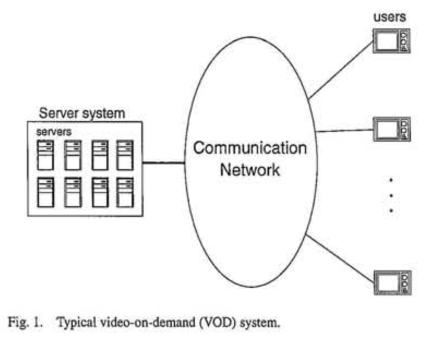


Fig. 1. Typical video-on-demand (VOD) system.

IEEE TRANSACTIONS ON MULTIMEDIA, VOL. 5, NO. 1, MARCH 2003

Design of an Interactive Video-on-Demand System

Yiu-Wing Leung, *Senior Member, IEEE*, and Tony K. C. Chan

IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 52, NO. 10, OCTOBER 2004

Some Results on the Self-Similarity Property in Communication Networks

Shibin Song, Joseph Kee-Yin Ng, *Senior Member, IEEE*, and Bihai Tang

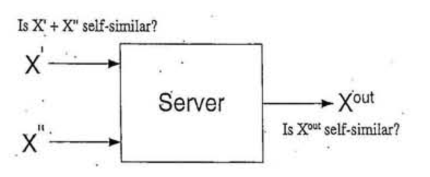
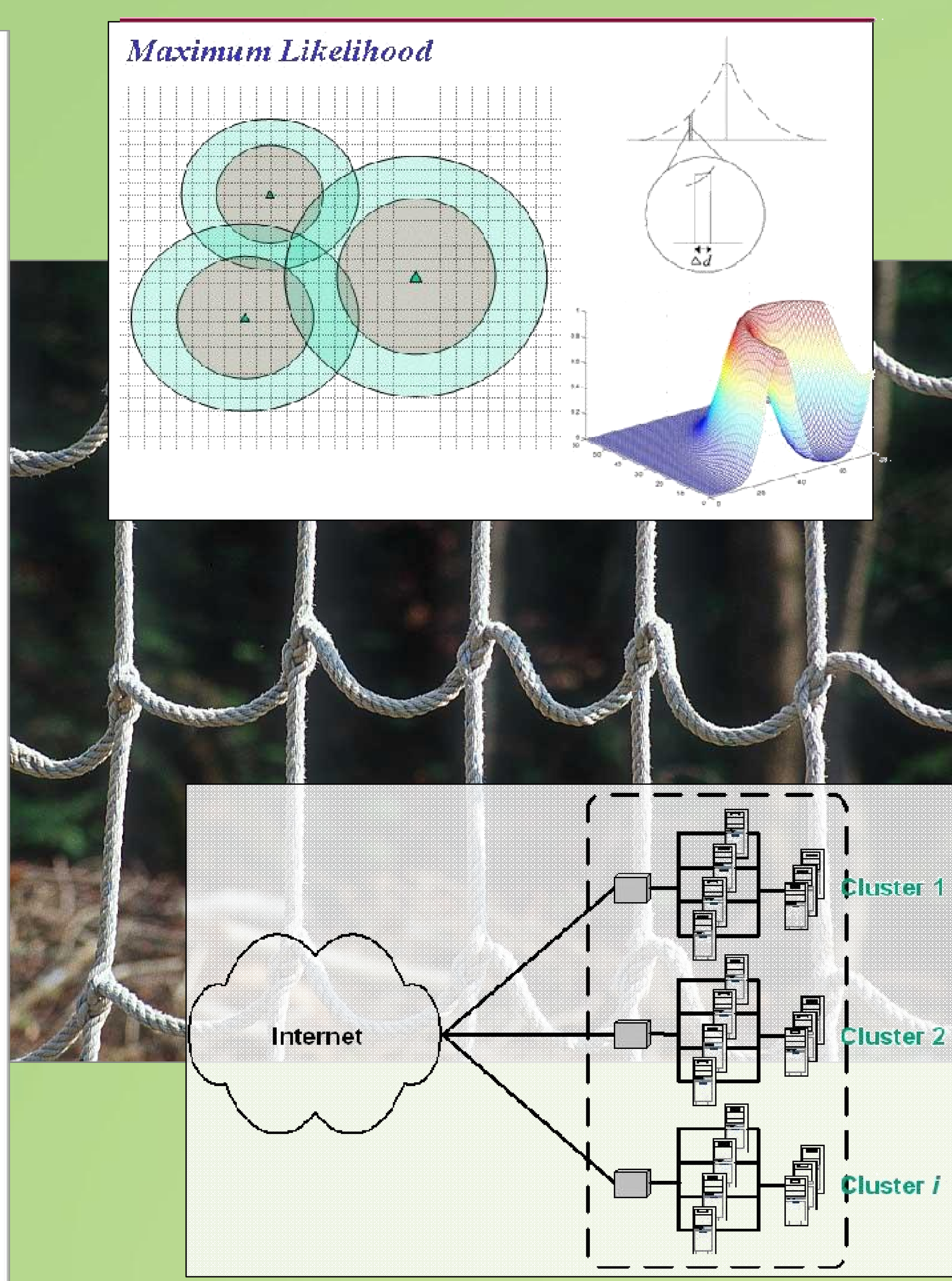


Fig. 1. Self-similarity properties.



IEEE TRANSACTIONS ON MOBILE COMPUTING, VOL. 6, NO. 3, MARCH 2007

Location Estimation via Support Vector Regression

Zhi-Li Wu, Chun-hung Li, *Member, IEEE*, Joseph Kee-Yin Ng, *Senior Member, IEEE*, and Karl R.P.H. Leung, *Senior Member, IEEE*

Real-Time Systems, 30, 217–256, 2005
© 2005 Springer Science + Business Media, Inc. Manufactured in The Netherlands.
DOI: 10.1007/s11241-005-1401-1

A QoS-Enabled Transmission Scheme for MPEG Video Streaming*

JOSEPH KEE-YIN NG jng@comp.hkbu.edu.hk
Department of Computer Science, Hong Kong Baptist University, Kowloon, Hong Kong

KARL R.P.H. LEUNG kleung@computer.org
Department of Information & Communications Technology, Hong Kong Institute of Vocational Education (Tsing Yi), Tsing Yi Island, Hong Kong

CALVIN KIN-CHEUNG HUI kchui@comp.hkbu.edu.hk
Department of Computer Science, Hong Kong Baptist University, Kowloon, Hong Kong

Real-Time Syst (2006) 34:83–99
DOI 10.1007/s11241-006-7982-5

Scheduling real-time requests in on-demand data broadcast environments*,†

Victor C. S. Lee · Xiao Wu · Joseph Kee-Yin Ng

Published online: 15 May 2006
© Springer Science + Business Media, LLC 2006

Abstract On-demand broadcast is an attractive data dissemination method for mobile and wireless computing. In this paper, we propose a new online preemptive scheduling algorithm, called PRDS that incorporates urgency, data size and number of pending requests for real-time on-demand broadcast system. Furthermore, we use pyramid preemption to optimize performance and reduce overhead. A series of simulation experiments have been performed to evaluate the real-time performance of our algorithm as compared with other previously proposed methods. The experimental results show that our algorithm substantially outperforms other algorithms over a wide range of workloads and parameter settings.

Keywords Real-time scheduling algorithm · On-demand broadcast · Preemption · Mobile computing

1. Introduction

With the increasing availability of high bandwidth links as well as the popularity of portable wireless devices, such as notebook computers and PDA, mobile and wireless computing

*The work described in this paper was partially supported by grants from CityU (Project No. 7001841) and RGC CERG Grant No. HKBU 2174/03E.

†This paper is an extended version of the paper "A preemptive scheduling algorithm for wireless real-time on-demand data broadcast" that appeared in the 11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications.

V. C. S. Lee (✉) · X. Wu
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IEEE TRANSACTIONS ON MULTIMEDIA, VOL. 8, NO. 5, OCTOBER 2006

Fine-Grained Scalable Video Caching for Heterogeneous Clients

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Networking and Multimedia

Department of Computer Science

NM3

Hong Kong Baptist University

IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. X, NO. X, MONTH 200X

Optimizing Lifetime for Continuous Data Aggregation with Precision Guarantees in Wireless Sensor Networks

Xueyan Tang, *Member, IEEE*, and Jianliang Xu, *Member, IEEE*

IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING, VOL. 18, NO. 3, MARCH 2006

An Error-Resilient and Tunable Distributed Indexing Scheme for Wireless Data Broadcast

Jianliang Xu, *Member, IEEE*, Wang-Chien Lee, *Member, IEEE*, Xueyan Tang, *Member, IEEE*, Qing Gao, and Shanping Li

IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING, VOL. 19, NO. 6, JUNE 2007

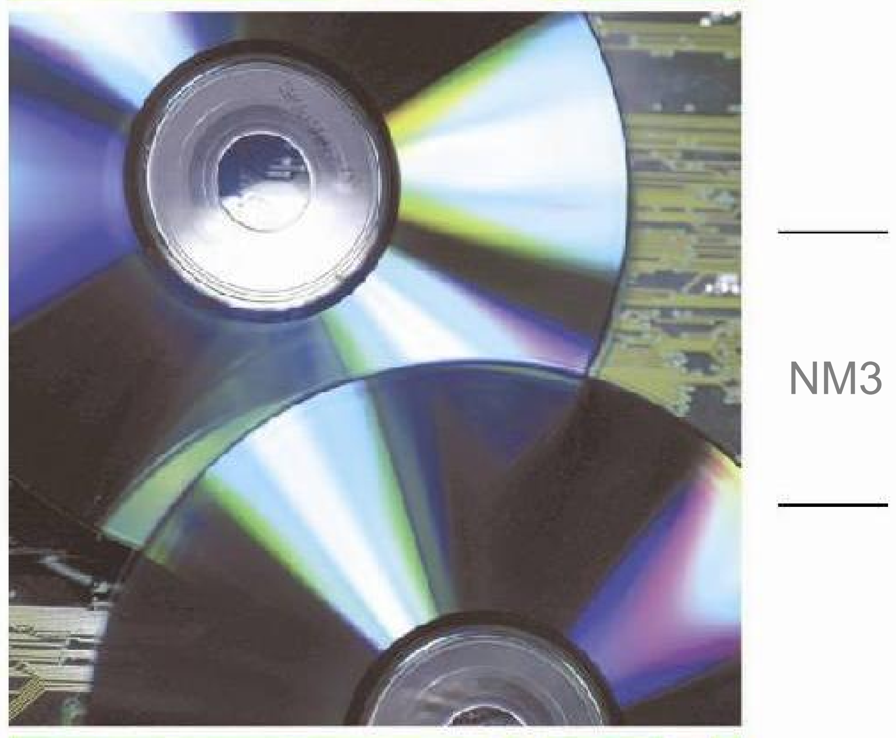
Top-*k* Monitoring in Wireless Sensor Networks

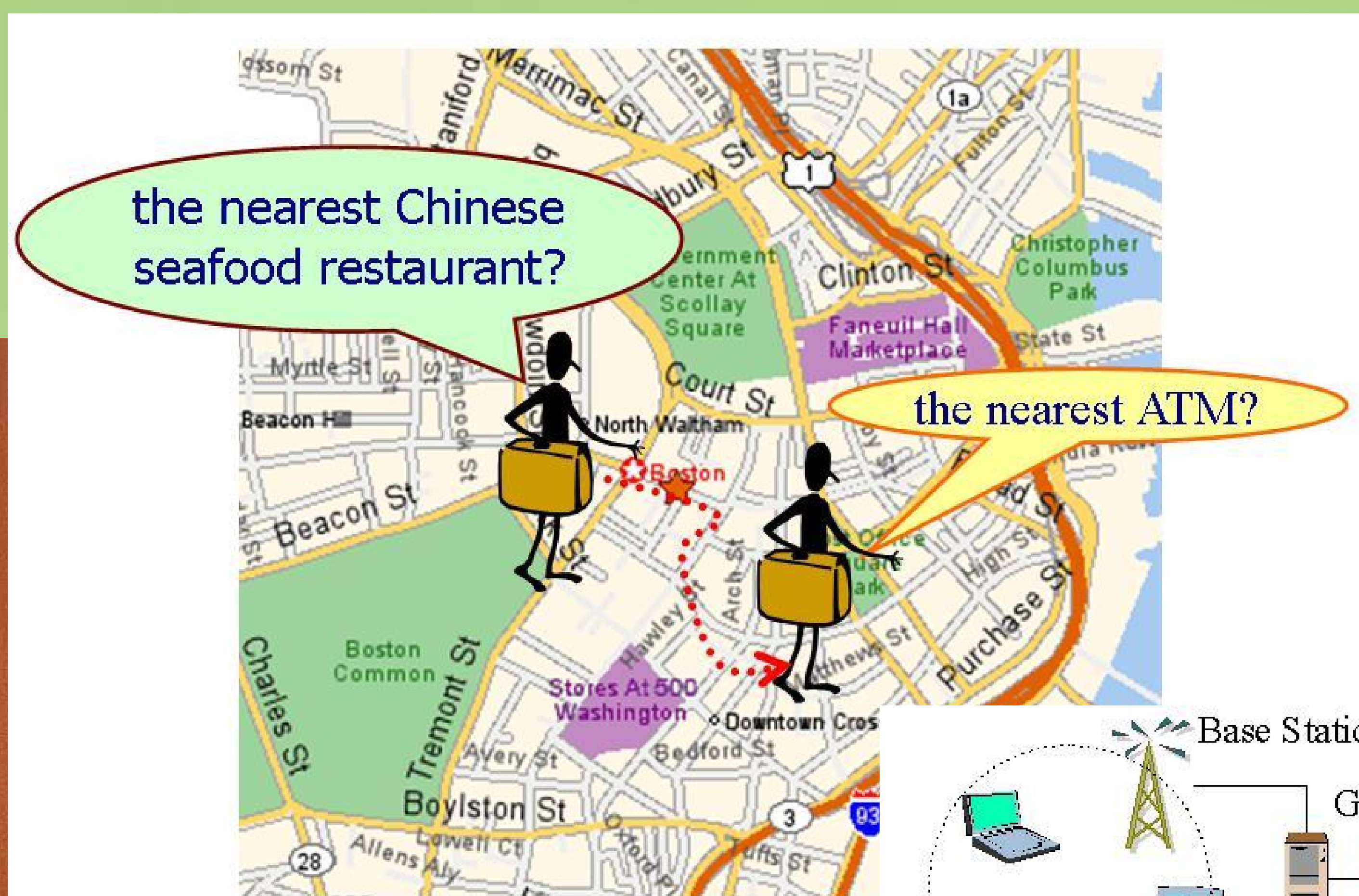
Minji Wu, *Student Member, IEEE*, Jianliang Xu, *Member, IEEE*, Xueyan Tang, *Member, IEEE*, and Wang-Chien Lee, *Member, IEEE*

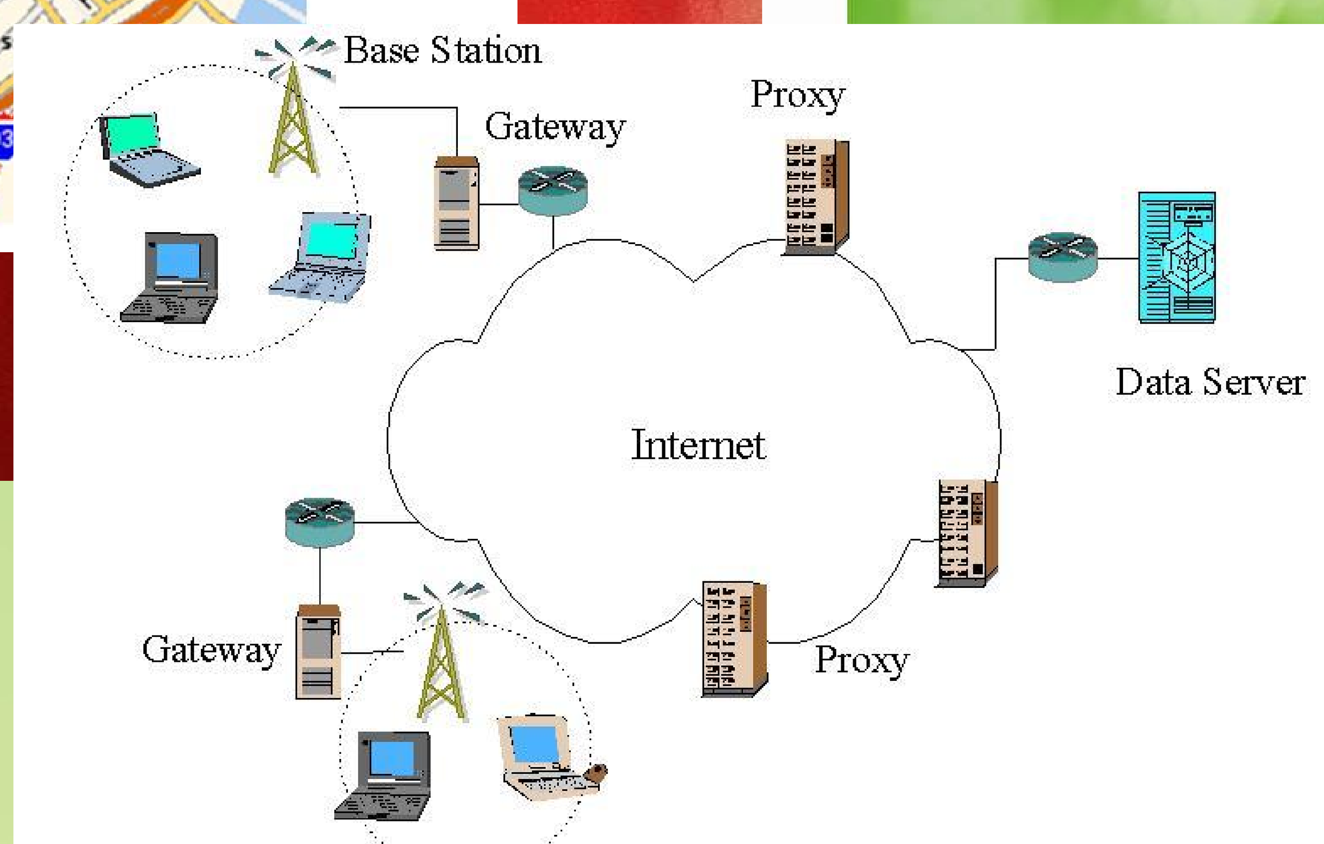
IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS, VOL. 17, NO. 1, JANUARY 2006

Time-Critical On-Demand Data Broadcast: Algorithms, Analysis, and Performance Evaluation

Jianliang Xu, *Member, IEEE*, Xueyan Tang, *Member, IEEE*, and Wang-Chien Lee, *Member, IEEE*







eCX: a secure infrastructure for e-course delivery

Joe C.K. Yau, Lucas C.K. Hui, Bruce Cheung and S.M. Yiu

Trustworthy Browsing – A Secure Web Accessing Model

Joe C.K. Yau, Lucas C.K. Hui, Bruce S.N. Cheung, S.M. Yiu, Y. Woo, K.W. Lau, Eric H.M. Li

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School of Professional And Continuing Education, The University of Hong Kong

International Journal of Network Security, Vol.2, No.1, PP.21–28, Jan. 2006

Towards a Secure Copyright Protection Infrastructure for e-Education Material: Principles Learned from Experience

Joe Cho-Ki Yau, Lucas Chi-Kwong Hui, Siu-Ming Yiu and Bruce Siu-Ning Cheung

Pattern Recognition

Department of Computer Science

PR1

Hong Kong Baptist University

Color Image Indexing Using BTC

Guoping Qiu

Abstract—This paper presents a new application of a well-studied image coding technique, namely block truncation coding (BTC). It is shown that BTC can not only be used for compressing color images, it can also be conveniently used for content-based image retrieval from image databases. From the BTC compressed stream (without performing decoding), we derive two image content description features, one termed the block color co-occurrence matrix (BCCM) and the other block pattern histogram (BPH). We use BCCM and BPH to compute the similarity measures of images for content-based image retrieval applications. Experimental results are presented which demonstrate that BCCM and BPH are comparable to similar state of the art techniques.

Index Terms—Block truncation coding (BTC), color quantization, content-based image retrieval, image coding, image database.

I. Introduction

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Pattern Recognition 40 (2007) 1711–1721
www.elsevier.com/locate/pr

Visual guided navigation for image retrieval

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Received 12 April 2006; accepted 27 September 2006

Abstract

In this work, we are interested in technologies that will allow users to actively browse and navigate large image databases and to retrieve images through interactive fast browsing and navigation. The development of a browsing/navigation-based image retrieval system has at least two challenges. The first is that the system's graphical user interface (GUI) should intuitively reflect the distribution of the images in the database in order to provide the users with a mental picture of the database content and a sense of orientation during the course of browsing/navigation. The second is that it has to be fast and responsive, and be able to respond to users actions at an interactive speed in order to engage the users. We have developed a method that attempts to address these challenges of a browsing/navigation based image retrieval systems. The unique feature of the method is that we take an integrated approach to the design of the browsing/navigation GUI and the indexing and organization of the images in the database. The GUI is tightly coupled with the algorithms that run in the background. The visual cues of the GUI are logically linked with various parts of the repository (image clusters of various particular visual themes) thus providing intuitive correspondences between the GUI and the database contents. In the backend, the images are organized into a binary tree data structure using a sequential minimal information coding algorithm and each image is indexed by an n-bit binary index thus making response to users' action very fast. We present experimental results to demonstrate the usefulness of our method both as a pre-filtering tool and for developing browsing/navigation systems for fast image retrieval from large image databases.
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Keywords: Image database; Image retrieval; Browsing/navigation; Entropy; Information theory; Color

1. Introduction

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doi:10.1016/j.patcog.2006.09.020

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Compressing histogram representations for automatic colour photo categorization

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Received 12 September 2003; received in revised form 8 March 2004; accepted 8 March 2004

Abstract

Organizing images into semantic categories can be very useful for searching and browsing through large image repositories. In this work, we use machine learning to associate low level colour representations of digital colour photos with their high level semantic categories. We investigate the redundancy and performance of a number of histogram-based colour image content representations in the context of automatic colour photo categorization using support vector machines. We use principal component analysis to reduce the dimensionality of (high dimensional) histogram based colour descriptors and use support vector machines to learn to classify the images into various high level categories in the histograms subspaces. We present experimental results to demonstrate the usefulness of such an approach to organizing colour photos into semantic categories. Our results show that the colour content descriptors constructed in different ways perform quite differently and the performances are data dependent hence it is difficult to pick a "winning" descriptor. Our results demonstrate conclusively that all descriptors studied in this paper are highly redundant and that regardless of their performances, the dimensionalities of these histogram based colour content descriptors can be significantly reduced without affecting their classification performances.
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Keywords: Color histogram; Content-based indexing and retrieval; PCA; SVM

1. Introduction

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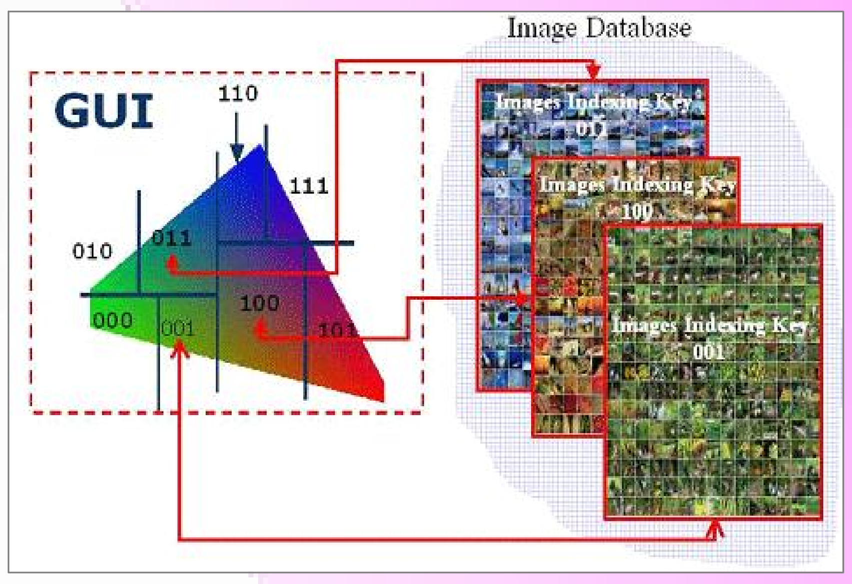
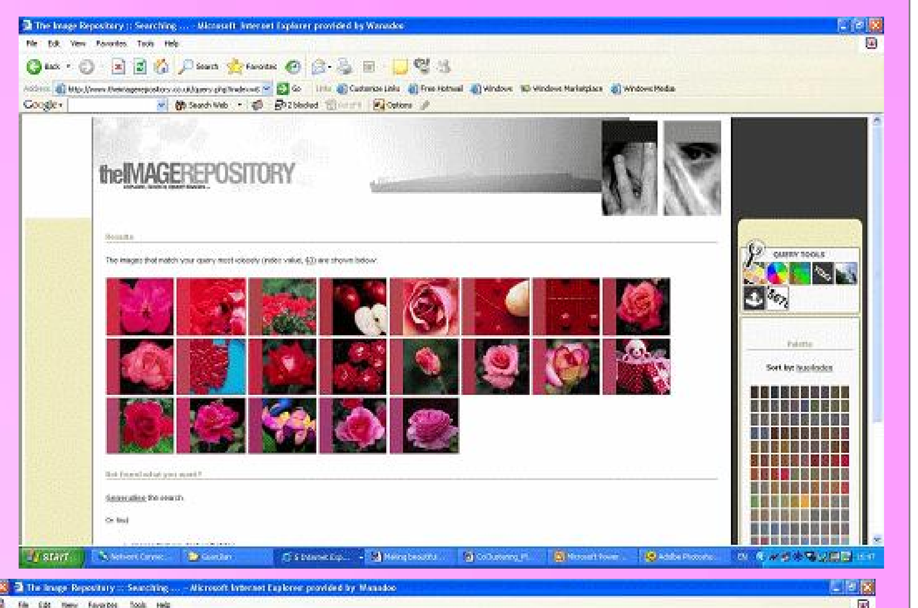
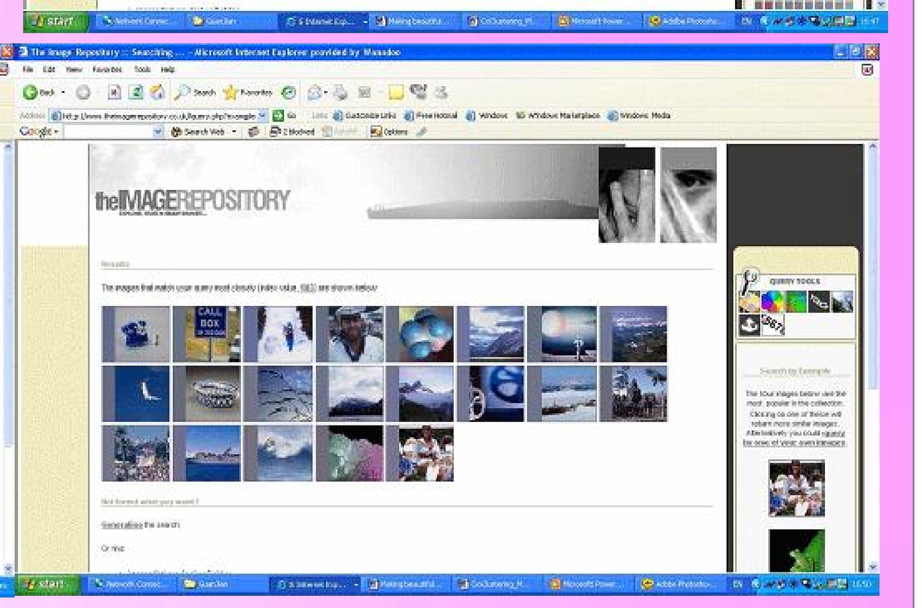
doi:10.1016/j.patcog.2004.03.006







Conservation laws for two (2+1)-dimensional differential-difference systems

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Abstract

Two integrable differential-difference equations are considered. One is derived from the discrete BKP equation and the other is a symmetric (2+1)-dimensional Lotka-Volterra equation. An infinite number of conservation laws for the two differential-difference equations are deduced.

I Introduction

Institute of Physics Publishing — Journal of Physics A: Mathematical and General
J. Phys. A: Math. Gen. 39 (2006) 3367–3373 — doi:10.1088/0305-4470/39/13/014

On the nonisospectral Kadomtsev–Petviashvili equation

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Received 8 December 2005
Published 15 March 2006
Online at stacks.iop.org/JPhysA/39/3367

Abstract

In this paper, we first present the Grammian determinant solutions to the nonisospectral Kadomtsev–Petviashvili (KP) equation. Then, by using the Pfaffianization procedure of Hirota and Ohta, an integrable coupled system is generated. Moreover, Gramm-type Pfaffian solutions to the Pfaffianized system are proposed.

PACS numbers: 02.30.Ik, 02.30.Jr, 05.45.Yv
Mathematics Subject Classification: 35Q58, 37K40

1. Introduction

0305-4470/06/133367+07$30.00 © 2006 IOP Publishing Ltd Printed in the UK 3367

Spectral radius analysis of matrices and their association with integrable systems*

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2 Information School, Shandong University of Science and Technology, Qingdao Huangdao 266510, P.R.China

Abstract

This paper begins with an isospectral problem and analyzes the spectral radius of its corresponding spectral matrix. This work enlightens us to set up a higher-dimensional isospectral problem whose compatibility condition gives rise to a (2+1)-dimensional zero curvature equation. From this equation a (2+1)-dimensional Lax integrable soliton equation hierarchy with constraints of potential functions, along with 5 parameters, is generated. The reduced cases of the (2+1)-dimensional hierarchy give three (2+1)-dimensional integrable systems, namely, the AKNS hierarchy, the Levi hierarchy and the D-AKNS hierarchy. Extending the above Lie algebra into more complicated ones, two integrable couplings of the (2+1)-dimensional hierarchy are derived. One of the two couplings has Hamiltonian structure by employing the quadratic-form identity. The corresponding integrable couplings of the reduced systems are also obtained. Finally, as a comparison study for generating expanding integrable systems, an antisymmetric Lie algebra and its corresponding loop algebra are constructed. From this Lie algebra a great many enlarging integrable systems can be generated. In addition, their Hamiltonian structures can be computed by the trace identity.

Keywords: spectral radius analysis, integrable couplings, Lie algebra, Hamiltonian structure

*This work was supported by the Hong Kong Research Grant Council under grant number HKBU2016/05P and the National Science Foundation of China under grant number 10471139.

Pattern Recognition

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IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 16, NO. 5, MAY 2007

Wavelet-Based Approach to Character Skeleton

Xinge You, Member, IEEE, and Yuan Yan Tang, Fellow, IEEE

IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, VOL. 25, NO. 9, SEPTEMBER 2003

Skeletonization of Ribbon-Like Shapes Based on a New Wavelet Function

Yuan Yan Tang, Senior Member, IEEE, and Xinge You

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Pattern Recognition 38 (2005) 323–339

PATTERN RECOGNITION

Directed connection measurement for evaluating reconstructed stroke sequence in handwriting images

K.K. Lau*, Pong C. Yuen, Yuan Y. Tang

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Optical Engineering 44(5), 057002 (May 2005)

Component-based subspace linear discriminant analysis method for face recognition with one training sample

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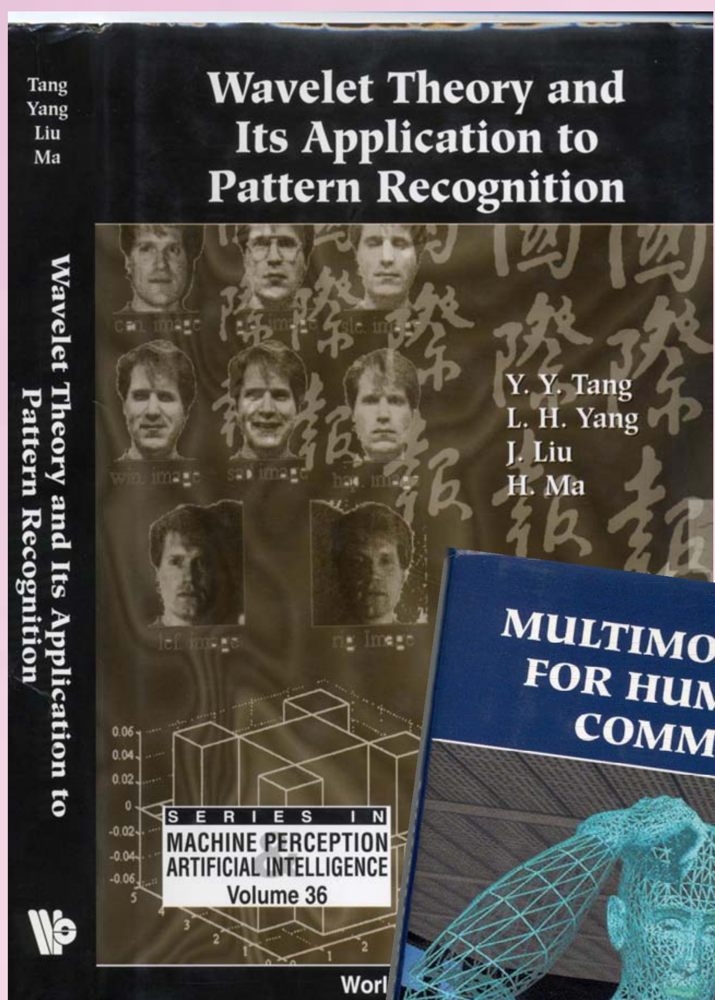

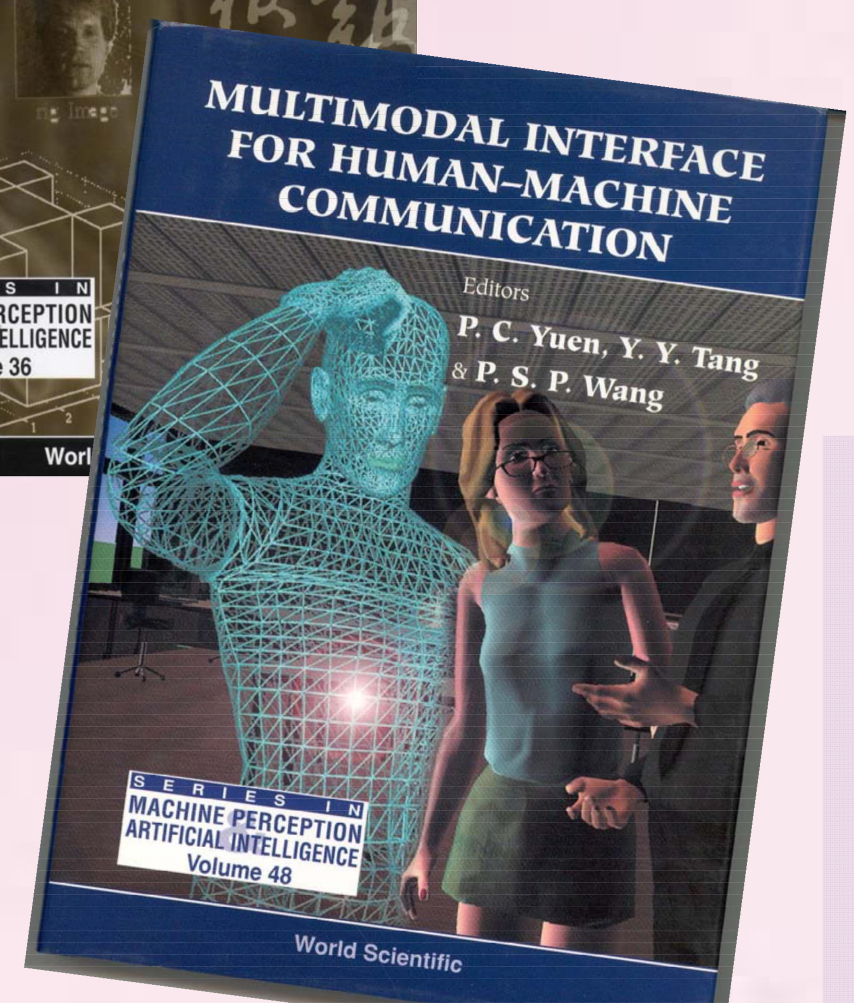

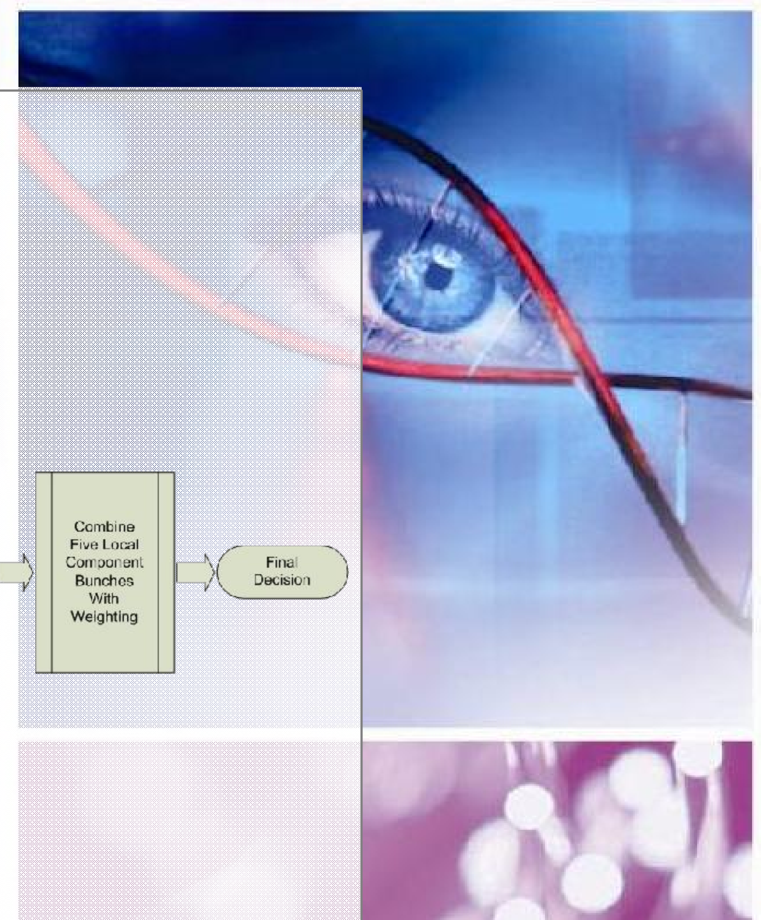

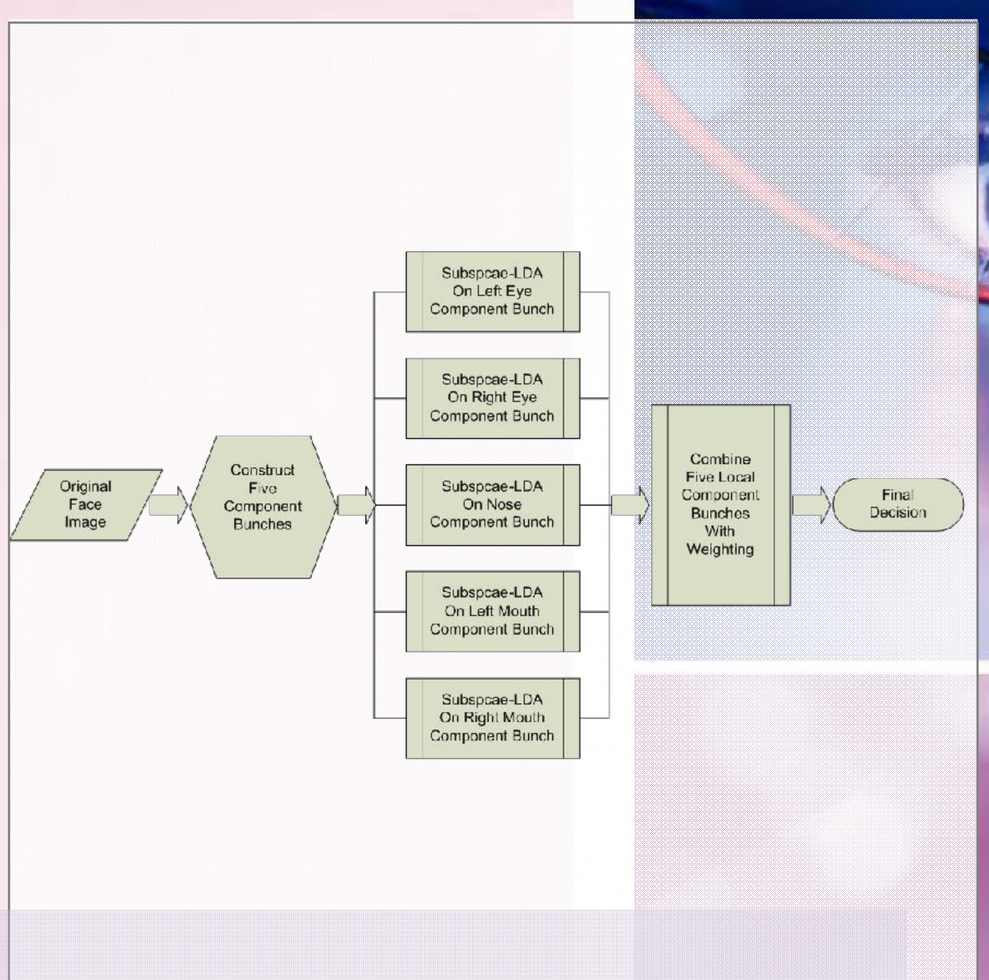

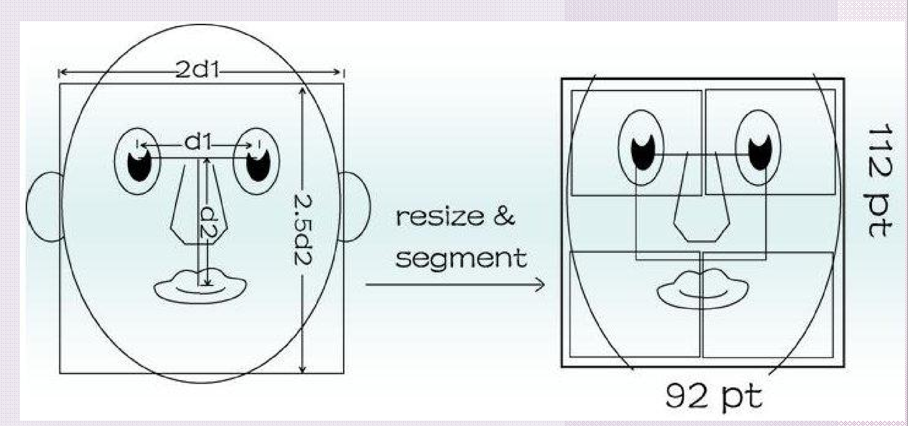

IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART B: CYBERNETICS, VOL. 35, NO. 5, OCTOBER 2005

GA-Fisher: A New LDA-Based Face Recognition Algorithm With Selection of Principal Components

Wei-Shi Zheng, Jian-Huang Lai, and Pong C. Yuen

IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART B: CYBERNETICS, VOL. 36, NO. 4, AUGUST 2006

A Novel Incremental Principal Component Analysis and Its Application for Face Recognition

Haitao Zhao, Pong Chi Yuen, Member, IEEE, and James T. Kwok, Member, IEEE

IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART B: CYBERNETICS, VOL. 35, NO. 4, AUGUST 2005

Kernel Machine-Based One-Parameter Regularized Fisher Discriminant Method for Face Recognition

Wen-Sheng Chen, Pong C. Yuen, Jian Huang, and Dao-Qing Dai