Advanced Web Technologies and Applications

6th Asia-Pacific Web Conference, APWeb 2004
Hangzhou, China, April 14-17, 2004
Proceedings
Table of Contents

Keynote Papers

Monitoring Continual Range Queries ........................................... 1
  Philip S. Yu, Kun-Lung Wu, Shyh-Kwei Chen

The Next Generation Messaging Technology –
Makes Web Services Effective .................................................. 13
  Maria E. Orlowska

Web Searching and $\Sigma_2$ Queries .......................................... 20
  Arun Sharma

Invited Papers

Secure Information Caching on the Web ....................................... 24
  Hui-I Hsiao, Karen W. Brannon

Multiresolution Spatial Databases: Making Web-Based Spatial
Applications Faster ................................................................. 36
  Xiaofang Zhou, Sham Prasher, Sai Sun, Kai Xu

A Query-Dependent Duplicate Detection Approach
for Large Scale Search Engines ............................................... 48
  Shaozhi Ye, Ruihua Song, Ji-Rong Wen, Wei-Ying Ma

Web Semantics

A Semantic Approach for Web Indexing ..................................... 59
  B. Wang, G.R. Brookes

Semantic, Hierarchical, Online Clustering of Web Search Results ....... 69
  Dell Zhang, Yisheng Dong

SIMON: A Multi-strategy Classification Approach Resolving
Ontology Heterogeneity on the Semantic Web ............................. 79
  Leyun Pan, Shui Yu, Fanyuan Ma

Web Personalization

Support Vector Machines Learning for Web-Based Adaptive
and Active Information Retrieval ............................................. 89
  Zhaofeng Ma, Boqin Feng
### Constructing User Profiles for Collaborative Recommender System
Qing Li, Byeong Man Kim

### Unloading Unwanted Information:
From Physical Websites to Personalized Web Views
Zehua Liu, Wee Keong Ng, Ee-Peng Lim, Yangfeng Huang, Feifei Li

### Web Intelligence

**iSurfer: A Focused Web Crawler Based on Incremental Learning from Positive Samples**
Yunming Ye, Fanyuan Ma, Yiming Lu, Matthew Chiu, Joshua Huang

**Identifying Parallel Web Documents by Filenames**
Jisong Chen, Chung-Hsing Yeh, Rowena Chau

**Reflective Web Interface Agent**
Xue Li

**A Finite State Mobile Agent Computation Model**
Yong Liu, Congfu Xu, Zhaohui Wu, Weidong Chen, Yunhe Pan

### XML Processing I

**Improving XML Query Performance Using Social Classes**
Weining Zhang, Douglas Pollok

**Answering XML Twig Queries with Automata**
Bing Sun, Bo Zhou, Nan Tang, Guoren Wang, Ge Yu, Fulin Jia

**Labeling and Querying Dynamic XML Trees**
Jiaheng Lu, Tok Wang Ling

### XML Processing II

**Scalable XSLT Evaluation**
Zhimao Guo, Min Li, Xiaoling Wang, Aoying Zhou

**Algebraic Transformation and Optimization for XQuery**
Damien Fisher, Franky Lam, Raymond K. Wong

**Efficient Incremental Pattern Mining from Semi-structured Dataset**
Qi Wang, Enhong Chen, Shu Wang

**Efficient Query Routing for XML Documents Retrieval in Unstructured Peer-to-Peer Networks**
Deqing Yang, Linhao Xu, Wenyuan Cai, Shuigeng Zhou, Aoying Zhou
## XML and Database

- Generalized Inclusion Dependencies in XML ................................. 224  
  *Millist W. Vincent, Michael Schrefl, Jixue Liu, Chengfei Liu, Solen Dogen*

- Graphical Representation of XML Schema ................................. 234  
  *Flora Dilys Salim, Rosanne Price, Maria Indrawan, Shonali Krishnaswamy*

- M Trie: A Scalable Filtering Engine of Well-Structured XML Message Stream ......................................................... 246  
  *Weixiong Rao, Yingjian Chen, Xinquan Zhang, Fanyuan Ma*

- Issues in Cache-Answerability for XML Queries on the Web .......... 252  
  *Jung Kee Park, Hyunchul Kang*

### P2P Systems and Applications I

- Towards Adaptive Probabilistic Search in Unstructured P2P Systems ................................................................. 258  
  *Linhao Xu, Chenyun Dai, Wenyuan Cai, Shuigeng Zhou, Aoying Zhou*

- Cell Abstract Indices for Content-Based Approximate Query Processing in Structured Peer-to-Peer Data Systems .......... 269  
  *Chaokun Wang, Jianzhong Li, Shengfei Shi*

- A Distributed Ranking Strategy in Peer-to-Peer Based Information Retrieval Systems ............................................. 279  
  *Zhiguo Lu, Bo Ling, Weining Qian, Wee Siong Ng, Aoying Zhou*

- PeerSDI: A Peer-to-Peer Information Dissemination System ...... 285  
  *Keoping Zhao, Shuigeng Zhou, Linhao Xu, Wenyuan Cai, Aoying Zhou*

### P2P Systems and Applications II

- PWSD: A Scalable Web Service Discovery Architecture Based on Peer-to-Peer Overlay Network .................................... 291  
  *Yin Li, Futai Zou, Zengde Wu, Fanyuan Ma*

- Efficient Community Management and Optimization Strategies of Web Services in Peer-to-Peer Environments .................. 301  
  *Zhiming Pan, Yizhong Wu, Kun Yue, Xiaoling Wang, Aoying Zhou*

- Towards Load Balancing in Peer-to-Peer Environment of Web Services ............................................................... 311  
  *Yang Yuan, Zhimao Guo, Xiaoling Wang, Aoying Zhou*
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Computing and Networking</td>
<td></td>
</tr>
<tr>
<td>Research on Service Model of Content Delivery Grid</td>
<td>321</td>
</tr>
<tr>
<td>ZhiHui Lv, ShiYong Zhang, YiPing Zhong</td>
<td></td>
</tr>
<tr>
<td>Performance-Driven Task and Data Co-scheduling Algorithms</td>
<td>331</td>
</tr>
<tr>
<td>for Data-Intensive Applications in Grid Computing</td>
<td></td>
</tr>
<tr>
<td>Changqin Huang, Deren Chen, Yao Zheng, Hualiang Hu</td>
<td></td>
</tr>
<tr>
<td>On Analysis and Comparison Performance of TCP in Wireless Network</td>
<td>341</td>
</tr>
<tr>
<td>ShiNing Li, JiPing Fang, Fan Yu</td>
<td></td>
</tr>
<tr>
<td>Web-Based Query Processing</td>
<td></td>
</tr>
<tr>
<td>Web Based Question Answering with Aggregation Strategy</td>
<td>353</td>
</tr>
<tr>
<td>Dell Zhang</td>
<td></td>
</tr>
<tr>
<td>Web Query Refinement without Information Loss</td>
<td>363</td>
</tr>
<tr>
<td>Chaoyuan Cui, Hanziong Chen, Kazutaka Furuse, Nobuo Ohbo</td>
<td></td>
</tr>
<tr>
<td>An Efficient Multidimensional Data Model for Web Usage Mining</td>
<td>373</td>
</tr>
<tr>
<td>Edmond H. Wu, Michael K. Ng, Joshua Z. Huang</td>
<td></td>
</tr>
<tr>
<td>Advanced Query Processing</td>
<td></td>
</tr>
<tr>
<td>Advanced Query Processing I</td>
<td></td>
</tr>
<tr>
<td>ANNE: An Efficient Framework on View Selection Problem</td>
<td>384</td>
</tr>
<tr>
<td>Yong Yan, Peng Wang, Chen Wang, Haofeng Zhou, Wei Wang, Baile Shi</td>
<td></td>
</tr>
<tr>
<td>Using Relational Database Constraints to Design Materialized Views in Data Warehouses</td>
<td>395</td>
</tr>
<tr>
<td>Taehee Lee, Jae-young Chang, Sang-goo Lee</td>
<td></td>
</tr>
<tr>
<td>Collaborative Filtering Algorithm Based on Mutual Information</td>
<td>405</td>
</tr>
<tr>
<td>Wang Ziqiang, Feng Boqin</td>
<td></td>
</tr>
<tr>
<td>Advanced Query Processing II</td>
<td></td>
</tr>
<tr>
<td>Clustering Data Streams On the Two-Tier Structure</td>
<td>416</td>
</tr>
<tr>
<td>Zhe Wang, Bin Wang, Chunguang Zhou, Xinjuan Xu</td>
<td></td>
</tr>
<tr>
<td>An Incremental Updating Method for Support Vector Machines</td>
<td>426</td>
</tr>
<tr>
<td>Yangguang Liu, Qi Chen, Yongchuan Tang, Qiming He</td>
<td></td>
</tr>
<tr>
<td>Spatio-Temporal Reasoning Based Spatio-Temporal Information Management Middleware</td>
<td>436</td>
</tr>
<tr>
<td>Sheng-sheng Wang, Da-you Liu, Zhe Wang</td>
<td></td>
</tr>
</tbody>
</table>
Inter-relevant Successive Trees Model and Its Implementation .......... 442
Yongdan Liu, Zhan Shen, Jianhui Wang, Yunfa Hu

Advanced Applications

Predicting Typical User Preferences Using Entropy
in Content Based Collaborative Filtering System .................. 447
Su-Jeong Ko

UPnP Home Networking-Based IEEE1394
Digital Home Appliances Control .................. 457
Seung-Hak Rhee, Soo-Kyung Yang, Seung-Jin Park,
Jong-Hun Chun, Jong-An Park

A Simple Client-Based Hybrid Robust Hash Routing
Web Caching System (2HRCS) .................. 467
Jong Ho Park, Kil To Chong

KGTutor: A Knowledge Grid Based Intelligent Tutoring System .......... 473
Hai Zhuge, Yanyan Li

Knowledge Discovery and Pattern Recognition

An Incremental Updating Technique for Discovering Frequent
Traversal Patterns .................. 479
Show-Jane Yen, Yue-Shi Lee

A Knowledge-Based Data Model and Query Algebra
for the Next-Generation Web .................. 489
Qiu-Jian Sheng, Zhong-Zhi Shi

Conditional Evidence Theory and Its Application
in Knowledge Discovery .................. 500
Yongchuan Tang, Shouqian Sun, Yangguang Liu

An Efficient Method for Quantitative Association Rules
to Raise Reliance of Data .................. 506
Hye-Jung Lee, Won-Hwan Park, Doo-Soon Park

Web Mining

Web Usage Mining: Sequential Pattern Extraction
with a Very Low Support .................. 513
F. Masseglia, D. Tanasa, B. Trousse

CS-Mine: An Efficient WAP-Tree Mining for Web Access Patterns ...... 523
Baoyao Zhou, Siu Cheung Hui, ACM Fong

Efficient Frequent Pattern Mining on Web Logs .................. 533
Liping Sun, Xiuzhen Zhang
Data Mining and Data Analysis

Mining the Predisposing Factor and Co-incident Factor among Numerical Dynamic Attributes in Time Series Data Set 543
Suwimon Kooptiwoot, M. Abdus Salam

Query Modification by Discovering Topics from Web Page Structures 553
Satoshi Oyama, Katsumi Tanaka

Similarity Pattern Discovery Using Calendar Concept Hierarchy in Time Series Data 565
Sungbo Seo, Long Jin, Jun Wook Lee, Keun Ho Ryu

Loss Minimization Based Keyword Distillation 572
Jie Tang, Juan-Zi Li, Ke-Hong Wang, Yue-Ru Cai

Text Mining

Using Maximum Entropy Model for Chinese Text Categorization 578
Ronglu Li, Xiaopeng Tao, Lei Tang, Yunfa Hu

A Comparative Study on Feature Weight in Text Categorization 588
Zhi-Hong Deng, Shi-Wei Tang, Dong-Qing Yang, Ming Zhang, Li-Yu Li, Kun-Qing Xie

User-Focus Based Personalization Recommendation for Text Information Retrieval 598
Zhenya Zhang, Enhong Chen, Jin Wang, Xufa Wang

Information Retrieval

Topic-Structure Based Complementary Information Retrieval for Information Augmentation 608
Qiang Ma, Katsumi Tanaka

Similarity Retrieval of Web Documents Considering Both Text and Style 620
Chao-Chun Chen, Yu-Chi Chung, Cheng-Chieh Chien, Chiang Lee

Knowledge Retrieval Using Bayesian Associative Relation in the Three Dimensional Modular System 630
JeongYon Shim

User-Oriented Adaptive Web Information Retrieval Based on Implicit Observations 636
Kazunari Sugiyama, Kenji Hatano, Masatoshi Yoshikawa, Shunsuke Uemura
# Web Services and Computing

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Availability with Clusters of Web Services</td>
<td>644</td>
</tr>
<tr>
<td><em>Julio Fernández Vilas, José Pazos Arias, Ana Fernández Vilas</em></td>
<td></td>
</tr>
<tr>
<td>Critical Points for Interactive Schema Matching</td>
<td>654</td>
</tr>
<tr>
<td><em>Guilian Wang, Joseph Goguen, Young-Kwang Nam, Kai Lin</em></td>
<td></td>
</tr>
<tr>
<td>Algorithm for Web Services Matching</td>
<td>665</td>
</tr>
<tr>
<td><em>Atul Sajjanhar, Jingyu Hou, Yanchun Zhang</em></td>
<td></td>
</tr>
<tr>
<td>A Grid Middleware for Aggregating Scientific Computing Libraries and Parallel Programming Environments</td>
<td>671</td>
</tr>
<tr>
<td><em>Xiaolin Gui, Qingjiang Wang, Depei Qian</em></td>
<td></td>
</tr>
</tbody>
</table>

# Web Safety

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe Web Queries</td>
<td>677</td>
</tr>
<tr>
<td><em>Hong-Cheu Liu, Weifa Liang</em></td>
<td></td>
</tr>
<tr>
<td>Specifying Role-Based Access Constraints with Object Constraint Language</td>
<td>687</td>
</tr>
<tr>
<td><em>Hua Wang, Yanchun Zhang, Jinli Cao, Jian Yang</em></td>
<td></td>
</tr>
<tr>
<td>Engineering Safe and Efficient Shareability within Web Systems</td>
<td>697</td>
</tr>
<tr>
<td><em>Travis Olds, Henry Detmold, Katrina Falkner, David S. Munro</em></td>
<td></td>
</tr>
</tbody>
</table>

# Web Technologies I

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Comparative Study of Web Application Design Models Using the Java Technologies</td>
<td>711</td>
</tr>
<tr>
<td><em>Budi Kurniawan, Jingling Xue</em></td>
<td></td>
</tr>
<tr>
<td>On Reducing Dynamic Web Page Construction Times</td>
<td>722</td>
</tr>
<tr>
<td><em>Suresha, Jayant R. Haritsa</em></td>
<td></td>
</tr>
<tr>
<td>WIEAS: Helping to Discover Web Information Sources and Extract Data from Them</td>
<td>732</td>
</tr>
<tr>
<td><em>Liyu Li, Shiwei Tang, Dongqing Yang, Tengjiao Wang, Zhuhong Deng, Zhihua Su</em></td>
<td></td>
</tr>
<tr>
<td>Aspect Discovery: Web Contents Characterization by Their Referential Contexts</td>
<td>738</td>
</tr>
<tr>
<td><em>Koji Zettsu, Yutaka Kidawara, Katsumi Tanaka</em></td>
<td></td>
</tr>
</tbody>
</table>

# Web Technologies II

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Page Fragmentation and Content Manipulation for Constructing Personalized Portals</td>
<td>744</td>
</tr>
<tr>
<td><em>Ioannis Misedakis, Vaggelis Kapoulas, Christos Bouras</em></td>
<td></td>
</tr>
</tbody>
</table>
Template-Based Runtime Invalidation for Database-Generated Web Contents .................................................. 755
Chun Yi Choi, Qiong Luo

Clipart Image Retrieval System Using Shape Information ................................................................. 765
Chang-Gyu Choi, Seongil Cheong, Yongseok Chang, Sung-Ho Kim

Web Caching and Moving Objects

Coordinated En-Route Web Caching in Transcoding Proxies ................................................................. 772
Keqiu Li, Hong Shen

Indexing for Efficient Managing Current and Past Trajectory of Moving Object ..................................... 782
Lee Eung Jae, Keun Ho Ryu, Kwang Woo Nam

A Specification of a Moving Objects Query Language over GML for Location-Based Services ............. 788
Warnill Chung, Hae-Young Bae

Workflow Management

Effective Visualisation of Workflow Enactment ......................................................................................... 794
Yun Yang, Wei Lai, Jun Shen, Xiaodi Huang, Jun Yan, Lukman Setiawan

Verification of Temporal Constraints for Concurrent Workflows ......................................................... 804
Hongchen Li, Yun Yang

E-commerce

Research on Partner-Choosing and Web Services Composition for B2B E-commerce in Virtual Enterprises ................................................................. 814
Chao Young, Showjian Yu, Jiajin Le

A Verification Model for Electronic Transaction Protocols ..................................................................... 824
Qingfeng Chen, Chengqi Zhang, Shichao Zhang

An Ontology-Oriented Approach for Virtual Enterprises ........................................................................ 834
Li Li, Baolin Wu, Yun Yang

Industrial Papers

Customer Behavior Pattern Discovering with Web Mining ........................................................................ 844
Xiaolong Zhang, Wenjuan Gong, Yoshihiro Kawamura

DM-XIDS – An Application-Layer Router of Incoming XML Streams ..................................................... 854
Hao Gui, YuCai Feng, Huayang Li
Developing a Main Memory Moving Objects DBMS for High-Performance Location-Based Services ........................... 864
   Kwang Woo Nam, Jai Ho Lee, Seong Ho Lee, Jun Wook Lee, Jong Hyun Park

Poster Papers

A Detection Model of Direction Relations for Spatial and Spatiotemporal Objects ........................................ 874
   Bao-Lin Yi, Yu-Cai Feng

A Proactive Web Agent for Information Browsing and Extracting ........... 879
   Hongen Lu

Effective Indexing of Web Images with Keyword Positioning .................. 883
   Lakshman Jayaratne, Athula Ginige, Zhuhan Jiang

Design and Simulation of Multicast Routing Protocol for Mobile Internet ........................................ 887
   Yuan Zhou, Guangsheng Li, Qirong Mao, Yongzhao Zhan, Yibin Hou

Java-Based Single Sign-On Library Supporting SAML (Security Assertion Markup Language) for Distributed Web Services ....... 891
   Jongil Jeong, Dongkyoo Shin, Dongil Shin, Kiyoung Moon

Novel SVM Performance Estimators for Information Retrieval Systems ........................................ 895
   Shui Yu, Hui Song, Fan Yuan Ma

Capturing Semantic Hierarchies to Perform Meaningful Integration in HTML Tables ........................................ 899
   Shijun Li, Mengchi Liu, Guoren Wang, Zhiyong Peng

Viewing the Web as a Cube: The Vision and Approach .......................... 903
   Zheng Dong, Xiao-fei Xu, De-chun Zhan

Fuzzy K-Means Clustering on a High Dimensional Semantic Space .......... 907
   Guihong Cao, Dawei Song, Peter Bruza

N-SHOQ(D): A Nonmonotonic Extension of Description Logic SHOQ(D) ........................................ 912
   Songxin Wang, Shuigeng Zhou, Fei Wang, Aoying Zhou

A Highly Adaptable Web Information Extractor Using Graph Data Model ........................................ 916
   Qi Guo, Lizhu Zhou, Zhiqiang Zhang, Jianhua Feng

Mining Web Sequential Patterns Using Reinforcement Learning ............. 920
   Ning Li, Yang Gao, Guifeng Tang, Shifu Chen
XXII Table of Contents

Early Experience in QoS-Based Service Grid Architecture ................................................................. 924
   Hanhua Chen, Hai Jin, Minghu Zhang, Pengliu Tan, Deqing Zou, Pingpeng Yuan

A Multi-tier Structured Tool for Requirements Engineering Process Development ............................................. 928
   Li Jiang, Armin Eberlein, Behrouz Homayoun Far

Author Index ........................................................................................................................................ 933