

# **2010 Eleventh International Conference on Mobile Data Management**

**(MDM 2010)**

**Kansas City, Missouri, USA  
23 – 26 May 2010**



IEEE Catalog Number: CFP10299-PRT  
ISBN: 978-1-4244-7075-4

# **Eleventh International Conference on Mobile Data Management**

---

***MDM 2010***

## **Table of Contents**

<b>Message from the General Chairs.....</b>	xii
<b>Message from the Program Chairs.....</b>	xiii
<b>MDM 2010 Conference Officers.....</b>	xv
<b>MDM 2010 Workshops Organization.....</b>	xvi
<b>External Reviewers.....</b>	xx
<b>Keynote Speaker Abstracts.....</b>	xxi
<b>Invited Talk Abstract.....</b>	xxii
<b>Invited Seminar Abstracts.....</b>	xxiv
<b>Industry Seminar/Demonstration Abstract.....</b>	xxvii
<b>Message from the Industry Track Chairs.....</b>	xxviii
<b>Message from the Demonstration Program Chairs.....</b>	xxix
<b>Message from the PhD Forum Chairs.....</b>	xxx
<b>RoSOC-M Workshop Preface.....</b>	xxxi
<b>M-PDMST Workshop Preface.....</b>	xxxiii
<b>UMMM Workshop Preface.....</b>	xxxiv
<b>MCC Workshop Preface.....</b>	xxxv
<b>SeNTIE Workshop Preface.....</b>	xxxvi
<b>MDM 2010 Sponsors.....</b>	xxxvii

---

### **Research Session 1: Localization and Location-Based Services**

A Generic Platform for Efficient Processing of Spatial Monitoring Queries in Mobile Peer-to-Peer Networks .....	1
<i>Patricio Galdames, Kihwan Kim, and Ying Cai</i>	
Low Cost Region Detection from Distributed Sensor Observations .....	11
<i>Chengyang Zhang and Yan Huang</i>	

diffeRS: A Mobile Recommender Service .....	21
<i>Lucia Del Prete and Licia Capra</i>	
Learning Location Correlation from GPS Trajectories .....	27
<i>Yu Zheng and Xing Xie</i>	

## **Research Session 2: GIS, Multimedia, and Storage**

ACR: An Adaptive Cost-Aware Buffer Replacement Algorithm for Flash Storage Devices .....	33
<i>Xian Tang and Xiaofeng Meng</i>	
An Interactive-Voting Based Map Matching Algorithm .....	43
<i>Jing Yuan, Yu Zheng, Chengyang Zhang, Xing Xie, and Guang-Zhong Sun</i>	
Mobile Metadata for Web-Based Image Query Services .....	53
<i>Daniel Beatty and Noé Lopez-Benitez</i>	
Mobile Multimedia Management for Community-Aware Storytelling .....	59
<i>Yiwei Cao, Anna Hannemann, Ralf Klammer, Dejan Kovachev, and Dominik Renzel</i>	

## **Research Session 3: Privacy and Trust Management**

Privacy-Aware Location-Aided Routing in Mobile Ad Hoc Networks .....	65
<i>Gabriel Ghinita, Mehdi Azarmi, and Elisa Bertino</i>	
Private and Flexible Proximity Detection in Mobile Social Networks .....	75
<i>Laurynas Šikšnys, Jeppe Rishede Thomsen, Simona Šaltenis, and Man Lung Yiu</i>	
Coping with Node Misbehaviors in Ad Hoc Networks: A Multi-dimensional Trust Management Approach .....	85
<i>Wenjia Li, Anupam Joshi, and Tim Finin</i>	

## **Research Session 4: Query Processing for Location-Based Services**

Query m-Invariance: Preventing Query Disclosures in Continuous Location-Based Services .....	95
<i>Rinku Dewri, Indrakshi Ray, Indrajit Ray, and Darrell Whitley</i>	
Processing Approximate Rank Queries in a Wireless Mobile Sensor Environment .....	105
<i>Antoniya Petkova, Kien A. Hua, and Soontharee Koompairojn</i>	
Efficient Evaluation of k-Range Nearest Neighbor Queries in Road Networks .....	115
<i>Jie Bao, Chi-Yin Chow, Mohamed F. Mokbel, and Wei-Shinn Ku</i>	

## **Research Session 5: Wireless Networks**

A NATed Mobility Management Scheme for PMIPv4 on Wireless LANs .....	125
<i>Wen-Kang Jia and Yaw-Chung Chen</i>	
ParTAC: A Partition-Tolerant Atomic Commit Protocol for MANETs .....	135
<i>Brahim Ayari, Abdelmajid Khelil, and Neeraj Suri</i>	

Resource Discovery Protocols for Bluetooth-Based Ad-hoc Smart Spaces: Architectural Considerations and Protocol Evaluation .....	145
---	-----

*Andreas Brodt, Alexander Wobser, and Bernhard Mitschang*

Towards Adaptive Sensor Data Management for Distributed Fire Evacuation Infrastructure .....	151
---	-----

*Andrii Cherniak and Vladimir Zadorozhny*

## **Research Session 6: Query Processing in Wireless Sensor Networks**

A Cross Pruning Framework for Top-k Data Collection in Wireless Sensor Networks .....	157
--	-----

*Xingjie Liu, Jianliang Xu, and Wang-Chien Lee*

A Distributed Technique for Dynamic Operator Placement in Wireless Sensor Networks .....	167
---	-----

*Georgios Chatzimilioudis, Nikos Mamoulis, and Dimitrios Gunopulos*

Online Time Interval Top-k Queries in Wireless Sensor Networks .....	177
--	-----

*Baichen Chen, Weifa Liang, and Jeffrey Xu Yu*

Cost-Efficient Data Collection Approach Using K-Nearest Neighbors in a 3D Sensor Network .....	183
---	-----

*Prem Prakash Jayaraman, Arkady Zaslavsky, and Jerker Delsing*

## **Research Session 7: Moving Objects**

Ad-hoc OLAP on Trajectory Data .....	189
--------------------------------------	-----

*Gerasimos Marketos and Yannis Theodoridis*

Uncertain Range Queries for Necklaces .....	199
---	-----

*Goce Trajcevski, Alok Choudhary, Ouri Wolfson, Li Ye, and Gang Li*

Supporting Continuous Range Queries in Indoor Space .....	209
---	-----

*Wenjie Yuan and Markus Schneider*

## **Poster Session**

Dessy: Search and Synchronization on the Move .....	215
---	-----

*Eemil Lagerspetz, Sasu Tarkoma, and Tancred Lindholm*

On the Evaluation of Caching in Vehicular Information Systems .....	218
---	-----

*Nicholas Louloudes, George Pallis, and Marios D. Dikaiakos*

Mobility-Awareness for Information Sharing in MANETs .....	221
--	-----

*Addisalem Negash Shiferaw, Lionel Brunie, Vasile-Marian Scuturici, and Yaser Fawaz*

Ensuring Privacy and Security for LBS through Trajectory Partitioning .....	224
---	-----

*Heechang Shin, Jaideep Vaidya, Vijayalakshmi Atluri, and Sungyong Choi*

Adapting Batch Learning Algorithms Execution in Ubiquitous Devices .....	227
--	-----

*Andrea Zanda, Santiago Eibe, and Ernestina Menasalvas*

## **Industrial Session I: Mobile Security and Architecture**

TANGO: A Flexible Mobility-Enabled Architecture for Online and Offline Mobile Enterprise Applications .....	230
<i>Huaigu Wu, Louenias Hamdi, and Nolwen Mahe</i>	

## **Industrial Session II: Tracking and Sensing Quality**

Querying Spatio-temporal Patterns in Mobile Phone-Call Databases .....	239
<i>Marcos R. Vieira, Enrique Frías-Martínez, Petko Bakalov, Vanessa Frías-Martínez, and Vassilis J. Tsotras</i>	
Scalable, Real-Time Map-Matching Using IBM's System S .....	249
<i>Eric Bouillet and Anand Ranganathan</i>	
The Boomerang Protocol: Tieing Data to Geographic Locations in Mobile Disconnected Networks .....	258
<i>Bin Zan, Tingting Sun, Marco Gruteser, and Yanyong Zhang</i>	
An Ontology-Based Framework for Designing a Sensor Quality of Information Software Library .....	264
<i>Jerrid Mathews, Chatschik Bisdikian, Lance M. Kaplan, and Tien Pham</i>	

## **Demonstration Session**

A New Approach for Spatiotemporal Pattern Queries in Trajectory Databases .....	270
<i>Mahmoud Sakr and Ralf Hartmut Güting</i>	
Pcube: A System to Evaluate and Test Privacy-Preserving Proximity Services .....	273
<i>Dario Freni, Sergio Mascetti, Claudio Bettini, and Marco Cozzi</i>	
A Flash-Aware Random Write Optimized Database .....	276
<i>Da Zhou and Xiaofeng Meng</i>	
Data-Based Agreement for Inter-vehicle Coordination .....	279
<i>Brahim Ayari, Abdelmajid Khelil, Kamel Saffar, and Neeraj Suri</i>	
Efficient Simulation Architecture for Routing and Replication in Mobile Peer to Peer Network of UAVs .....	281
<i>Hemanth Meka, Sanjay Madria, Mohan Kumar, Mark Linderman, and Sharma Chakravarthy</i>	
Dessy: Demonstrating Mobile Search and Synchronization .....	284
<i>Eemil Lagerspetz, Sasu Tarkoma, and Tancred Lindholm</i>	

## **PhD Forum Session**

Context Elements for Transportation Services .....	287
<i>Dana Popovici</i>	
Malware Detection on Mobile Devices .....	289
<i>Asaf Shabtai</i>	
Dynamic Approximative Data Caching in Wireless Sensor Networks .....	291
<i>Nils Hoeller</i>	

Gossip-Based Data Fusion Framework for Radio Resource Map .....	293
<i>Jin Yang</i>	
Dynamic Social Grouping Based Routing in a Mobile Ad-hoc Network .....	295
<i>Roy Cabaniss, Sanjay Madria, George Rush, Abby Trotta, and Srinivasa S. Vulli</i>	
MobileSOA Framework for Context-Aware Mobile Applications .....	297
<i>Aaratee Shrestha</i>	
Performance Analysis of Secure Hierarchical Data Aggregation in Wireless	
Sensor Networks .....	299
<i>Vimal Kumar and Sanjay Madria</i>	
A Communication Efficient Framework for Finding Outliers in Wireless	
Sensor Networks .....	301
<i>Dylan McDonald, Stewart Sanchez, Sanjay Madria, and Fikret Ercal</i>	
Self Synchronization of Mobile Objects .....	303
<i>Amol Khekdar and Vijay Kumar</i>	
Security in Pervasive Health Care Networks: Current R&D and Future	
Challenges .....	305
<i>Debargha Acharya</i>	
Real-Time Data Compression in Wireless Sensor Networks .....	307
<i>Tommy Szalapski and Sanjay Madria</i>	
A Peer to Peer Based Information Sharing Scheme in Vehicular Ad Hoc	
Networks .....	309
<i>Neelanjana Dutta</i>	
<b>Workshop Session: RoSOC-M</b>	
SMBots - An Architecture to Manage Dynamic Services Based on SMS .....	311
<i>Mauricio Tia Ni Gong Lin, Thomaz Philippe Cavalcante Silva, Roberto Oliveira dos Santos, and André Ferreira da Silva Neto</i>	
Mobile Communities in Developing Countries .....	314
<i>Jari Veijalainen and Waseem Rehmat</i>	
Supporting Location-Based Services through Composable Stream-Processing	
Flows .....	320
<i>Anand Ranganathan</i>	
<b>Workshop Session: M-PDMST</b>	
Energy Efficient Data Access in Mobile Ad Hoc Networks .....	326
<i>Takahiro Hara</i>	
Sensing, Triggers and Mobile (Meta)Data .....	331
<i>Goce Trajcevski, Alok Choudhary, and Peter Scheuermann</i>	
Defending Wireless Sensor Networks against Adversarial Localization .....	336
<i>Neelanjana Dutta, Abhinav Saxena, and Sriram Chellappan</i>	
Interest-Awareness for Information Sharing in MANETs .....	342
<i>Addisalem Negash Shiferaw, Vasile-Marian Scuturici, and Lionel Brunie</i>	

CReAM: User-Centric Replication Model for Mobile Environments .....	348
<i>Zeina Torbey, Nadia Bennani, Lionel Brunie, and David Coquil</i>	

## **Workshop Session: UMMM**

Finding One-Of Probably Nearest Neighbors with Minimum Location Updates .....	354
<i>Mitzi McCarthy, X. Sean Wang, and Zhen He</i>	
Situation-Aware Data Stream Mining Service for Ubiquitous Applications .....	360
<i>João Bárto Gomes, Ernestina Menasalvas, and Pedro A.C. Sousa</i>	
Protecting Privacy in Location-Based Services Using K-Anonymity without Cloaked Region .....	366
<i>Zhenqiang Gong, Guang-Zhong Sun, and Xing Xie</i>	
PATS: A Framework of Pattern-Aware Trajectory Search .....	372
<i>Ling-Yin Wei, Wen-Chih Peng, Bo-Chong Chen, and Ting-Wei Lin</i>	

## **MCC Workshop Session I: Privacy and Access**

Mobility Can Help: Protect User Identity with Dynamic Credential .....	378
<i>Sheng Xiao and Weibo Gong</i>	
In-Device Spatial Cloaking for Mobile User Privacy Assisted by the Cloud .....	381
<i>Song Wang and X. Sean Wang</i>	
Access Schemes for Mobile Cloud Computing .....	387
<i>Andreas Klein, Christian Mannweiler, Joerg Schneider, and Hans D. Schotten</i>	

## **MCC Workshop Session II: New Applications in MCC**

Mobile Community Cloud Computing: Emerges and Evolves .....	393
<i>Dejan Kovachev, Dominik Renzel, Ralf Klamma, and Yiwei Cao</i>	
A Mobile-Cloud Collaborative Traffic Lights Detector for Blind Navigation .....	396
<i>Pelin Angin, Bharat Bhargava, and Sumi Helal</i>	

## **Workshop Session: SeNTIE**

Use of Data Warehouse to Manage Data from Wireless Sensors Networks That Monitor Pollinators .....	402
<i>Ricardo Augusto Gomes da Costa and Carlos Eduardo Cugnasca</i>	
An Examination of Sensor Data Collection Method for Spatial Interpolation on Hierarchical Delaunay Overlay Network .....	407
<i>Jun Shinomiya, Yuuichi Teranishi, Kaname Harumoto, Susumu Takeuchi, and Shojiro Nishio</i>	
A-SAS: An Adaptive High-Availability Scheme for Distributed Stream Processing Systems .....	413
<i>Hiroaki Shiokawa, Hiroyuki Kitagawa, and Hideyuki Kawashima</i>	
Timing and Radius Considerations for Maintaining Connectivity QoS .....	419
<i>Richard Tynan, G.M.P. O'Hare, Michael J. O'Grady, and Conor Muldoon</i>	

Measurement-Based Admission Control in Wireless Sensor Networks ..... 426  
*Ibrahim Orhan and Thomas Lindh*

**Author Index** ..... 432