2026 27th IEEE International Conference on Mobile Data Management (MDM 2026)

Athens, Greece
29 June - 2 July 2026

IEEE Catalog Number: CFP26299-POD
ISBN: 979-8-3195-4543-5

IEEE Advancing Technology for Humanity

Copyright © 2026, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP26299-POD
ISBN (Print-On-Demand):	979-8-3195-4543-5
ISBN (Online):	979-8-3195-3310-4
ISSN:	1551-6245

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA

Phone:	(845) 758-0400
Fax:	(845) 758-2633
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

CURRAN ASSOCIATES INC. proceedings .com

TABLE OF CONTENTS

RL-MINDS: Reinforcement Learning for Mobility-Induced Duty-Cycles in WSN for Underground Mines 1
Manish Anand Yadav, Mohamed Elmahallawy, Sanjay Madria, Samuel Frimpong

GeoBenchr: An Application-Centric Benchmarking Suite for Spatiotemporal Database Platforms 12
Tim C. Rese, Nils Japke, Diana Baumann, Natalie Carl, David Bermbach

Graph-Conditioned Mixture of Graph Neural Network Experts for Traffic Forecasting 19
Amirhossein Ghaffari, Saeid Sheikhi, Ekaterina Gilman

Duration-Constrained Interval Joins 28
Naoya Ehara, Daichi Amagata

Understanding Artifacts of Parallel Micro-Traffic Simulation 39
Joon-Seok Kim, Gautam Malviya Thakur, Carter Christopher

Indexing and Search Algorithms for Large Language Models on the Edge 49
Stelios Christou, Konstantin Krasovitskiy, Andreas Konstantinidis, Demetrios Zeinalipour-Yazti

General Semantic Knowledge Infusion for Spatio-Temporal Traffic Forecasting 60
Mattis thor Straten, Yannick Wölker, Steffen Strohm, Prathvish Mithare, Ralf Krestel, Matthias Renz

A Collision-Risk-Aware Skyline Routing Framework for Maritime Navigation 68
Patrik Thomas Michalski, Niko Preuß, Matthias Renz, Andreas Tritsarolis, Nikos Pelekis Yannis Theodoridis

Context-Enriched Natural Language Descriptions of Vessel Trajectories 74
Kostas Patroumpas, Alexandros Troupiotis-Kapeliaris, Giannis Spiliopoulos, Panagiotis Betchavas Dimitrios Skoutas, Dimitris Zissis, Nikos Bikakis

PoGTR: A Game-Theoretic Blockchain Consensus for SLA Management in Edge-IoT Systems 85
Tasneem Muneera Prottyasha, Sanjay Madria

RouteGenllm: Road-Aware Realistic Trajectory Generation Using Large Language Models 96
Apratim Sen, Reza Safarzadeh, Jeong-Woo Kim, Xin Wang

TrajGen: Approaches to the Artificial Generation of Trajectory Datasets 107
Paul Walther, Balthasar Teuscher, Xuanshu Luo, Martin Werner

Learning Displacement-Robust Representations for Landslide Early Warning Under Rainfall Forecast Uncertainty 115
Ren Ozeki, Hamada Rizk, Hirozumi Yamaguchi

Semantically Diverse Convoys 122
Abdullah Shamail, Goce Trajcevski, Ashfaq Khokhar, Andreas Züfle

TrajGenAgent: A Hierarchical LLM Agent for Human Mobility Trajectory Generation 134
Siyu Li, Toan Tran, Lingyi Zhao, Khurram Shafique, Li Xiong

Quantifying the Robustness of Smart Street Parking Assignment to Sensor Noise 148
Behafarid Hemmatpour, Javad Dogani, Nikolaos Laoutaris

Human-Flow Digital Twin for Predicting the Effects of Mobility Introduction on Visitor Circulation 159
Chiharu Shima, Haruki Yonekura, Fukuharu Tanaka, Tatsuya Amano, Hirozumi Yamaguchi

WaveSpec-DeiT: A Wavelet-Inspired Spectral Transformer for RF-Based UAV Identification 169
Prajoy Podder, Maciej Zawodniok, Sanjay Madria

MambaLoc: Lightweight Indoor Localization Using Cross-Modal Knowledge Distillation 179
Mohab Bahnassy, Omar Saqr, Hamada Rizk, Moustafa Youssef

Surrogate-Guided Graph Policy Learning for Real-Time Coordination of Mobile Agents 186
Hamada Rizk, Yui Maruyama, Akira Uchiyama, Akihito Hiromori, Hirozumi Yamaguchi, Sumio Morioka Takahiro Inagawa

CoBlockGCL: Community-Aware Block-Spectral Graph Contrastive Learning for POI Recommendation 195
Jiqiang Wang, Kei Hirose

Adaptive Edge Context Caching Framework for Context-Aware Mobile IoT Applications 207
Ashish Manchanda, Prem Prakash Jayaraman, Abhik Banerjee, Arkady Zaslavsky

Temporal Tracking of Ocean Eddies with Vortex Correlation Clustering 218
Nelson Tavares de Sousa, Yannick Wölker, Matthias Renz

PLA-Mux: Multiplexing Piece-Wise Linear Approximations on Edge-Assisted Sensor Networks 229
Xenophon Kitsios, Panagiotis Liakos, Katia Papakonstantinopoulou, Yannis Kotidis

Exploring Learned Data Reduction for Energy Savings on Battery-Powered Devices 237
Kartik Hans, Brian T. Nixon, Panos K. Chrysanthis

Coordinated Server-Side GNSS Sampling 246
Rodrigo Sasse David, Kristian Torp, Anders Zinck Justesen, Mahmoud Sakr, Esteban Zimányi

SPADE: Activity-Aware Place Discovery from Human Mobility Trajectories 257
Licia Amichi, Gautam Malviya Thakur

Embedding-Based SQL Query Similarity for Spatiotemporal Data Exploration 269
Evangelos Karageorgos, Alexandros Labrinidis

Privacy Preserving Personalized Next Location Prediction Via Encrypted Shuffled Federated Learning and Fuzzy Clustering 281
Saloua Bouabba, Karine Zeitouni, Bassem Haidar, Nazim Agoulmine, Zaineb Chelly Dagdia

Distributed Data Migration and Allocation at the Edge: A Graph Clustering Approach 292
Athanasios Koukosias, Vasileios Tzanidakis, Athanasios Tziouvaras, Kostas Kolomvatsos

Diffusion-Based Discovery of Spatio-Temporal Flow Patterns 299
Niehao Chen, Reynold Cheng, Songyi Cui, Yong-Hong Kuo

Temporal Record Linkage Using Time Decay Models Applied to Vessel Data 306
Victor Litoux, Cyril Ray

Seagull: Data-Driven Maritime Traffic Analysis 312
Christian S. Jensen, Hengyu Liu, Kasper F. Pedersen, Kristian Torp, Ove Andersen, Jonas Madsen Niels B. Nielsen

EcoCharge^{+}: A Platform for Sustainable EV Charging Using Microgrids 316
Eleni Michala, Soteris Constantinou, Constantinos Costa, Andreas Konstantinidis, Mohamed F. Mokbel Demetrios Zeinalipour-Yazti

Tackling Data Scarcity: A Controllable Synthetic Data Generation Framework for Force–Displacement Curves 320
Patrik Thomas Michalski, Frederik Fonger, Daniel Luca Hahn, Verena Kräusel, Agnes Koschmider Matthias Renz

A Comparative Study of MLM BERT-Based Models for Trajectory Representation Learning 324
Amir Badawi, Ana-Maria Olteanu-Raimond, Arnaud Le Guilcher, Karine Zeitouni

A Taxonomy-Driven Visual Analytics System for Exploring Unlabeled Trajectory Data 328
Ivan A. H. Cozzetti, Benjamin Powley, Rafael M. Martins, Andreas Kerren, Claudio D. G. Linhares Amilcar Soares

A User-Configurable Navigation System for Wideness and Turn-Aware Routing 332
Kousik Kumar Dutta, Venkata M. V. Gunturi

VFWR: Charting the Optimal Voyage 336
Aikaterini Karampasi, Andreas Kouvaras, Dimitris Stavropoulos, Alexander Artikis

FL-Net-Sim: A Practical Framework for Scalable Network Simulation of Federated Systems 340
Panagiotis Sklavos, Antonios Deligiannakis

LOMAD: Local Anomaly Detection in Maritime Trajectories Using LSTM Prediction and Visual Analytics 344
Martim R. Teixeira, Gabriel Spadon, Claudio D. G. Linhares, Amilcar Soares

The CoDiet Messaging App: A Mobile App for Transmitting Personalized Dietary Event Alerts 348
Michail Tsenos, Christos Gunopulos, Vana Kalogeraki

HFedBike: A Hybrid Federated Learning System for Urban Bike-Sharing Demand Forecasting 352
Nikos Andrianopoulos, Andreas Komninos, Spyros Sioutas, Gerasimos Vonitsanos

ShrinkLLM: Automated LLM Compression via AI Agents 356
Gyanko Issah Yussif, Tasnia Sultana, Mohamed Ali, Abdeltawab Hendawi

TrajGen: Demonstrating a Tool for Interactive Trajectory Generation in the Browser 360
Paul Walther, Xuanshu Luo, Balthasar Teuscher, Martin Werner

Spatial Fairness in Algorithmic Decision Making: Concepts, Detection, and Mitigation 364
Dimitris Kyriakopoulos, Dimitris Sacharidis, Giorgos Giannopoulos

Human-enabled Edge Computing: Convergence of Mobile CrowdSensing and Multi-access Edge Computing for Next-Generation Smart Systems 368
Luca Foschini, Michele Girolami

Optimized Edge-To-Cloud Complex Event Recognition and Forecasting on Altair AI Studio 372
Ourania Ntouni, Dimitrios Banelas, Elias Alevizos, Nikos Giatrakos

Brix Index and Anthocyanin Prediction in Grapes Using Multispectral Imaging with MobileViT: An Application Case From Edge to Cloud and MLOps 380
Arnab Ghosh Chowdhury, Sascha Niemann, Amos Smith, Martin Atzmueller

Memory-Aware Federated Learning for Anomaly Detection Over IoT Data Streams 388
Raafat Osman, Zahraa El Attar, Nikolaos Papadakis, Georgios Bouloukakis

Multimodal Sensing via Cost–Aware Progressive Inference for Stress Detection in Wearables 396
Sarun Varghese, Kumar Sai Jonnala, Myra Spiliopoulou

"One Table to Rule Them All": How a Single Table can Enable Extensive Insights, Analytics and Assessment on Human Mobility Data 404
Debraj De, Kevin Sparks, Elizabeth C. McBride, Annetta Burger, James D. Gaboardi, Jesse McGaha Chance Brown, Xiuling Nie, Todd Thomas, Carter Christopher, Gautam Malviya Thakur

Efficient Shortest Path Queries on Triangular Irregular Networks and Point Clouds 412
Yinzhao Yan, Raymond Chi-Wing Wong

Federated Learning Systems for Mobile Data 415
Xiaopeng Jiang

Semantic Enrichment and Summarization Methods for Mobility Data 418
Chiara Pugliese

Spatio-temporal Learning of Vessel Mobility Patterns for Proactive Collision Avoidance 421
Md Mahbub Alam

Trustworthy Data Paths for Sensitive Smartphone Workloads 424
Zhihao Yao

Using Data-Driven Simulation Models for Deep Reinforcement Learning Based HVAC Control 427
Ferran Aran

Privacy Preserving Federated Learning for Banking and Energy Efficient Enterprise Systems 430
Pablo Fraile Alonso

Quantifying Navigational Safety Around Planned Human Modified Environment with a Multi-Agent Simulator for Multiple Perspectives 433
Victor Litoux

Trajectory-Aware Adaptive Inference in Object Detection Models 436
Grigorios Papanikolaou, Ioannis Kontopoulos, Giannis Spiliopoulos, Dimitris Zissis, Konstantinos Tserpes

Human Mobility Prediction with POI-Enhanced Representation and Time-Slot Weighted Masking 442
Jikyoung Hong, Jeeyoung Kim, Taehoon Kim, Kyoung-Sook Kim

Privacy Evaluation of Generative Models for Trajectory Generation 448
Stavros Bouras, Ioannis Kontopoulos, Chiara Pugliese, Francesco Lettich, Emanuele Carlini Hanna Kavalionak, Chiara Renso, Konstantinos Tserpes

Trajectory Imputation Using Computer Vision Models 454
Panagiotis Betchavas, Alexandros Troupiotis-Kapeliaris, Kostas Patroumpas, Giannis Spiliopoulos Dimitrios Skoutas, Dimitris Zissis, Nikos Bikakis

Video Reconstruction Using Diffusion-Based Image-to-Video Generation with Trajectory Guidance 458
Stelio Bompai, Ioannis Kontopoulos, Giannis Spiliopoulos, Dimitris Zissis, Konstantinos Tserpes

Detecting AIS Transmission Gaps Using Spatio-Temporal Kinematics of Marine Trajectories 464
Yağız Çimen, Engin Demir

Toward a General Graph-Based Abstraction Approach for Urban Trajectory Generation 470
Hanna Kavalionak, Chiara Pugliese, Emanuele Carlini, Chiara Renso, Thierry Chevallier Guillaume Vangilluwen, Vincent Delmas

Learning Compressed AIS Trajectories with VQ-VAE for Activity Classification 476
Christos Chronis, Spyridon Chatziargyros, Magdalini Eirinaki, Konstantinos Tserpes, Iraklis Varlamis

Leveraging Retrieval-Augmented Generation for Lightweight Geo-Location Modeling 482
John Violos, Georgios Vasileiadis, Aris Leivadeas

Sustainable Indoor Trajectory Modeling Through Participatory Sensing and WiFi Signal Fusion 488
Konstantinos Vogklis, Ioannis Nasios, Anastasia Vayona, Vasilis Katos

Transportation Mode Classification from GPS Trajectories Using Graph Attention Networks 494
Sangrez Khan, Umar Farooq, John Violos, Hanna Kavalionak, Emanuele Carlini, Aris Leivadeas

Rank-Revealing Nonnegative Block-Term Tensor Decomposition for Incomplete Trajectory Data Mining 500
Eleftherios Kofidis

Graph-Based Risk Modeling in Food Supply Chains with Digital Product Passports 506
Spyridon Evangelatos, Amalia Ntemou, Angelina Katsifaraki, Paraskevas Bourgos, Nikoleta Tsampanaki Nikos Kefalakis, Themistoklis Anagnostopoulos, Pantelis Lappas

Leader Election Algorithms for Vehicle Platooning: A Survey Focusing on Resilience to Member Failures 511
Chinmay Shrivastav, Francesco Castorini, Alessio Masola, Paolo Burgio, Roberto Cavicchioli

Resources and Events Management in Synchromodal Logistic Operations 517
Panagiotis Fountas, Nikolaos Tymplalexis, Konstantinos Ntatis, Christos Kylafas, Anestis Papakotoulas Vassilis Papataxiarhis, Kostas Kolomvatsos, Stathes Hadjiefthymiades

A Distributed Semantic Layer for Logistics Data Integration 523
Anestis Papakotoulas, Vassilis Papataxiarhis, Stathes Hadjiefthymiades, Savvas D. Apostolidis Theofilos Triommatis

Design and Implementation of a Serverless MapReduce Framework for Scalable Data Pipelines 529
Angelos Dorotheos Chatzopoulos, Babis Andreou, Kakia Panagidi, Stathes Hadjiefthymiades

Secure Mobile Communications: A Spatially Sensitive Approach 535
Dimitra Zisimopoulou, Maria Trivli, Stathes Hadjiefthymiades

TwinLoop: Simulation-in-the-Loop Digital Twins for Online Multi-Agent Reinforcement Learning 539
Nan Zhang, Zishuo Wang, Shuyu Huang, Georgios Diamantopoulos, Nikos Tziritas, Panagiotis Oikonomou Georgios Theodoropoulos

Integrating Heterogeneous Digital Twins in Federated Ecosystems 545
Christian Vergara-Marcillo, Rami Bahsoon, Nikos Tziritas, Wendy Yanez-Pazmino, Panagiotis Oikonomou Georgios Theodoropoulos

Enabling Adversarial Robustness in AI Models Through Kubeflow MLOps 551
Stavros Bouras, Ioannis Korontanis, Antonios Makris, Konstantinos Tserpes

MEDIATE: Multi-Faceted Implementation of a Mixed Software/Hardware-Based Zero Trust Framework for the Computing Continuum 557
Apostolos P. Fournaris, Evangelos Haleplidis, Shahin Abdoul-Soukour, Chih-Kai Huang, Niemat Khoder Georgios Bouloukakis, Andreas Brokalakis, Konstantinos Georgopoulos, Sotiris Ioannidis

Spatial Analysis on Value-Based Quadtrees of Rasterized Vector Data 563
Diana Baumann, Nils Japke, Tim C. Rese, David Bermbach

Verifiable Data Sovereignty for Vulnerable Populations in Participatory Data Spaces 569
Panagiotis Katrakazas, Antonios Ntib