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Database and Expert Systems Applications

36th International Conference, DEXA 2025 Bangkok, Thailand, August 25–27, 2025 Proceedings, Part II

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Preface

We present the proceedings of the 36th International Conference on Database and Expert Systems Applications (DEXA 2025). DEXA was established in 1990 under the name International Conference on Database and Expert Systems Applications, which has persisted until today. The conference has been running annually without a break for over three decades, serving as a premier international forum for researchers, practitioners, and industry experts in the fundamental fields of data modeling, databases and data storage systems, data engineering, data analytics, data science, and recently - machine learning and artificial intelligence, for standard and big data.

This year, DEXA was held on 25–27 August, 2025 in Bangkok, Thailand. The conference received 123 submissions. From this set, 35 were accepted as regular papers (giving an acceptance rate of 28%).

DEXA 2025 is proud to have accepted also 22 short papers. They offer a vital platform for presenting innovative projects and preliminary results, novel ideas, ongoing research, or concise technical contributions that may not yet be mature enough for a full paper but have significant potential for future development and promise vibrant discussions. The inclusion of short papers encourages broader participation and facilitates the timely dissemination of emerging research.

The selection of all papers was based on evaluations by the Program Committee members. Each paper was single-blindly evaluated by three members. Here we express our gratitude to the PC members of DEXA 2025, for their timely and thorough evaluations.

As in the past, the DEXA 2025 proceedings consist of two volumes with regular and short papers. The accepted papers cover a variety of research topics on both theoretical and practical aspects. The papers cover among others the following topics: (1) large language models, (2) data quality, (3) applications of machine learning and artificial intelligence, (4) classification techniques, (5) image processing, analytics, and vision systems, (6) recommender techniques, (7) data integration techniques, (8) optimization methods, (9) graph applications, (10) data analytics methods, (11) security and privacy, and (12) benchmarks and surveys.

This year, DEXA introduced so-called short invited talks, with the goal to present trends in data and knowledge engineering in a less formal setting. Four such talks were accepted for the conference.

Also, this year, for the first time, the best papers will be published in a special issue of the Data & Knowledge Engineering (DKE, Elsevier) journal, entitled *Integrating Machine Learning and Data Engineering for Advanced Data Science.* This special issue will also include the best papers from the DAWAK 2025 conference. Taking the opportunity, the PC-chair would like to thank the DKE Editor-in-Chief, Carson Woo, for his approval of the special issue. Special gratitude goes to Ismail Khalil - a Steering Committee member of DEXA/DAWAK and the main organiser of these events. His invaluable

help in all tasks related to organizing DEXA 2025 materialized in these two volumes of the proceedings and the event itself.

August 2025,

Robert Wrembel
Gabriele Kotsis
A Min Tjoa
Ismail Khalil

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From Data Silos to Data Mesh: A Case Study in Financial Data Architecture (Industrial Talk)

Mariusz Sienkiewicz

Director of Supervisory Data Analysis Center, Polish Financial Supervision Authority, Poland

Abstract. Successful data analytics implementation requires seamless access to both data and related metadata. In many organizations, analytics challenges arise from Data Silos, which impede cross-functional access to data and knowledge sharing across the organization. This talk presents practical insights from a data architecture transformation project conducted at a large institution with over 1,400 employees and overseeing over 2,000 market entities. The organization faced significant analytical and operational challenges due to the presence of Data Silos—isolated repositories associated with specific business areas. To address these limitations, the institution initiated a transition to a Data Mesh architecture to improve data availability and enhance analytical capabilities. This talk explains the rationale behind the persistence of silos, evaluates alternative architectural models, and justifies the choice of Data Mesh based on organizational context. Key elements of the transformation include developing a data management framework, implementing a data catalog, creating a data lake to provide data input flexibility, and establishing a common analytics platform based on Data Domains. While the project is still ongoing, the talk describes the methods being implemented and shares early results, key learnings, and practical recommendations for institutions undertaking similar architectural transitions.

Invited Talks

Blending Contextual Data with Heterogeneous Time Dimensions for Improved Time Series Analysis

Anton Dignös

Free University of Bozen-Bolzano, Italy

Abstract. In modern industrial settings, sensors continuously generate vast amounts of time series data critical for automation and process optimization. However, analyzing this data in isolation limits its effectiveness, as it often lacks integration with contextual factors that influence outcomes but are not directly observable. While traditional data fusion techniques aim at combining multimodal data such as images or videos, contextual factors in industrial environments frequently differ not in modality but in temporal structure. We identify four distinct time dimensions - constant, time series, events, and intervals - that commonly characterize contextual data in these settings. By transforming diverse time structures into a unified format, we enable the application of conventional machine learning techniques, enhancing the depth and accuracy of industrial data analysis. This talk presents a case study and initial work on a foundational approach for systematically integrating such temporally heterogeneous contextual factors into time series analysis.

A Hybrid Data Model to Support Transportation Analytics of Emergency Service Vehicles

Carson K. Leung

University of Manitoba, Winnipeg, Canada

Abstract. Using a single type of database solution to support real-world applications is becoming more and more challenging because of the volume and variety of data. For instance, the data collected for the transportation industry comprise both structured and unstructured data. Using solely a single type of database solution—relational database system-only or graph database-only—to store and manage data can be challenging. As real-world applications ask even more complex questions related to data, the database solution should be able to facilitate answering these questions in a reasonable time. Hence, in this talk, I present a hybrid model, which integrates data to support transportation analytics. The model consists of relational databases and non-relational databases (namely, graph databases), pooling their strengths to support the demands of the modern application. I also demonstrate this hybrid data model as a practical solution with a case study on improving emergency services—such as emergency medical services (EMS)—response times by having the support of the presented platform.

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