

Commit2Data

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■ Preface

Commit2Data is the Dutch research and innovation program on the topic of big data analytics and applications; it was executed in the period 2016–2024. The program not only addresses use-inspired research on big data and applications, it also specifically addresses valorization and dissemination of results.

This book presents some highlights of the Commit2Data (C2D) program, with emphasis on its research projects. In the book a selection of eight research projects is presented, together with a description of the program as a whole, thus nicely giving an overview of the broadness of the program. We are grateful that this book is published by Dagstuhl Publishing, in its Open Access Series in Informatics (OASICs).

The papers in this book were selected after an open call for contributions that was issued in the summer of 2022. We specifically called for project overview papers, that is, not papers that describe a single technical aspect, but papers that describe the whole set-up of a project, enhanced with some technical highlights. The call was open to projects outside of the Commit2Data program, however, it did not attract such contributions. In the cause of 2022, some projects within Commit2Data were already finished, others were still ongoing; it turned out difficult to attract contributions from projects that were already finished. After a review, selection and revision process that took place in 2023 and for which we used the EasyChair platform, we are now happy to present this selection of project descriptions.

The opening paper “The Public-Private Research and Innovation Program Commit2Data” by Haverkort *et al.* presents the overall set-up of the Commit2Data program, with ample attention for its public-private character and the involvement of many different application sectors. Specific attention is paid to the “C2D approach” to valorize research results, as well as to lessons learned from the program as a whole.

The subsequent three papers then address the health and vitality domain. In “Building a Digital Health Twin for Personalized Intervention: the EPI project”, Alsayed Kassem *et al.* discuss their EPI (Enabling Personalized Interventions) project. The authors integrated research on data science, software-defined network infrastructure, and secure and trustworthy data sharing in the healthcare domain, using the digital twin paradigm. They also point to the challenges including strict data sharing policies, complex legal and privacy requirements, and infrastructure limitations, and discuss their solutions.

In the paper “Helping Cancer Patients to Choose the Best Treatment: Towards Automated Data-Driven and Personalized Information Presentation of Cancer Treatment Options”, Kraemer *et al.* describe their interdisciplinary approach to automatically generate personalized treatment descriptions for cancer patients using data from the Netherlands Cancer Registry and the (so-called) PROFILES dataset. By presenting this information in verbal, numerical, and narrative formats, the project facilitates shared decision-making between doctors and patients about treatments. The paper discusses the strengths, limitations, and broader applicability of this approach.

In the paper “SeNiors empOWred via Big Data to Joint-Manage Their Medication-Related Risk of Falling in Primary Care: The SNOWDROP Project”, Westerbeek *et al.* give an overview of the SNOWDROP project. This project developed and evaluated data-driven methods to predict individualized fall risks for elderly people. By creating validated prediction models from electronic health records, a clinical decision support system, and a patient portal, the project seeks to improve shared decision-making, medication management, and patient outcomes.

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The paper “Real-time Data-Driven Maintenance Logistics: a Public-Private Collaboration” by Van Jaarsveld *et al.* addresses real-time data-driven maintenance logistics. The project aimed to innovate maintenance logistics through data-driven decision making by collaborating with three innovative companies and researchers from two leading knowledge institutions. The authors review innovations inspired by practice, their materialization, and their impact on practice.

Within the theme of sports, the paper “WheelPower: Wheelchair Sports and Data Science Push It to the Limit” by Vegter *et al.* provides a comprehensive overview of their project, which aims to improve the power output of athletes in sport-specific wheelchairs for better competition performance. The project brought together data scientists and all major Paralympic wheelchair sports, and integrated three recent measurement innovations to monitor wheelchair athletes. The data collected is used in feedback tools for athletes, trainers, and coaches, and enables them to optimize training and wheelchair settings for better performance.

In the domain of Energy, the paper “Improving Power System Resilience with Enhanced Monitoring, Control, and Protection Algorithms”, Veera Kumar *et al.* presents key applications of so-called synchrophasors for enhancing the reliability and resilience of future power systems, covering real-time data-driven disturbance detection and blackout prevention.

In the paper “RATE-Analytics: Next Generation Predictive Analytics for Data-Driven Banking and Insurance”, Collaris *et al.* present their collaboration between two universities, a bank and an insurance company. The overall goal of this project was to develop foundations and techniques for next generation big data analytics in banking and insurance. The main challenge of existing approaches is the lack of reliability and trustworthiness: if experts do not trust a model or its predictions they are much less likely to use and rely on that model. Hence, the project proposes solutions that bring the human-in-the-loop, enabling the diagnostics and refinement of models, and support in decision making and justification.

The final paper of the book, “Digital Art Technical Sources for the Netherlands: Integration and Improvement of Sources on Glass for a Sustainable Future – Art DATIS” by Capurro *et al.*, provides an overview of their Art DATIS project, through which they explore methods for the automatic transcription and documentation of diverse archival materials, focusing on the archive of Dutch glass artist Sybren Valkema. By digitizing documents and making their content searchable, the project aims to uncover how traditional glass making knowledge and practices evolved during the twentieth century.

It has been a pleasure for us to work with outstanding authors who enthusiastically contributed to this volume. Their dedication and open-mindedness have made this project rewarding and successful. We would also like to express our gratitude to the the members of the program committee and the reviewers, as well as to the Dagstuhl Publishing team, in particular Michael Wagner, for their support.

Boudewijn R. Haverkort, Aldert de Jongste, Pieter van Kuilenburg, Ruben D. Vromans.
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