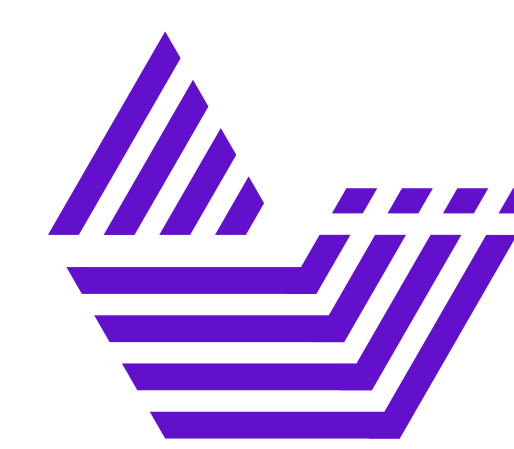


AI4DiTraRe: how significant and influential is AI in the Digital Transformation of Research?



Leibniz ScienceCampus
Digital Transformation
of Research

A multilevel interdisciplinary approach

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<https://ditrare.de/en>

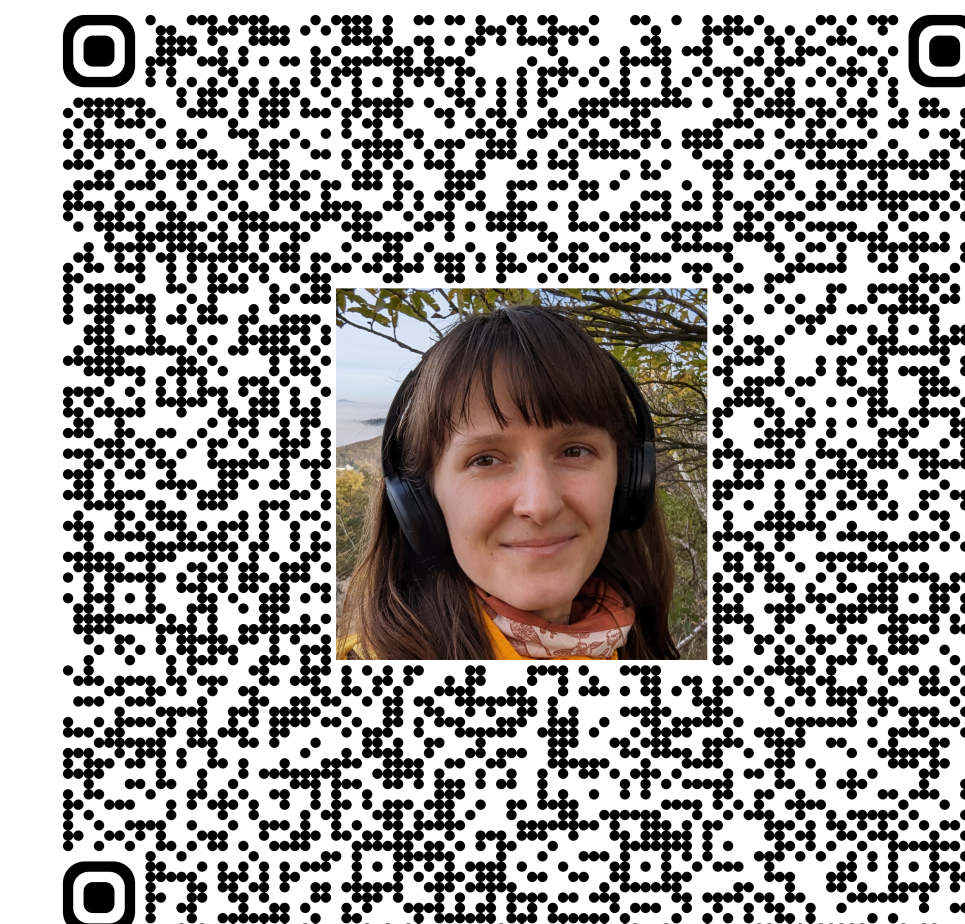
← keep an eye on our website!

DiTraRe

Abstract

The recently established Leibniz Science Campus “Digital Transformation of Research” (DiTraRe) is a collaboration between Karlsruhe Institute of Technology (KIT) and FIZ Karlsruhe – Leibniz Institute for Information Infrastructure and provides an environment which enables exchange between researchers and supports development of specific as well as generalised solutions. Within DiTraRe we investigate the effects and potential of the increasing digitalisation of scientific work in four interdisciplinary research clusters with a special focus on information/data infrastructures and AI. We study the current possibilities and challenges concerning usage of AI in specific research environments as well as in academia in general.

Make sure to attend our **talk in session 12F** on Thursday!



← get in touch!

Introduction

The expanding digital transformation affects all disciplines of science and strongly impacts research results as well as methods used to obtain them. It goes hand in hand with the ‘datafication’ of research, where currently numerous research questions are data-driven. The amount of quantitative and qualitative data available for analysis is constantly growing. As a result, research practices and methodologies are changing fundamentally. The ways in which we can employ AI in the digital transformation need to be studied in more detail to understand scientific and cultural implications and possible effects on scientific findings and their interpretation. In the ever-changing world of scientific data and the quickly-expanding AI domain, multiple challenges arise and many questions remain unanswered.

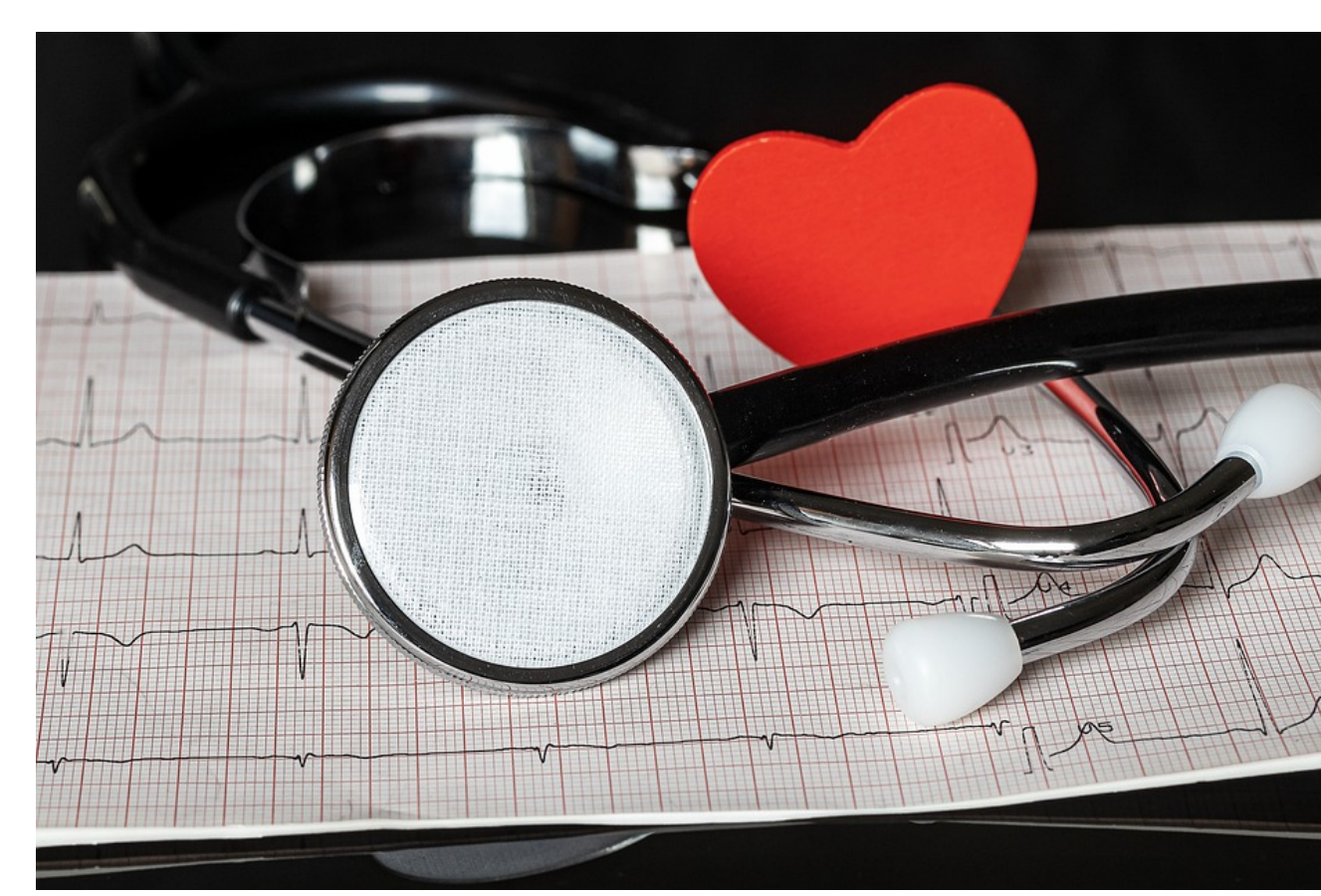
DiTraRe Use Cases



Sensitive data in sports science
KIT Institute of Sports and Sports Science



Chemotion Electronic Lab Notebook
KIT Institute of Biological and Chemical Systems



AI in biomedical engineering
KIT Institute of Biomedical Engineering

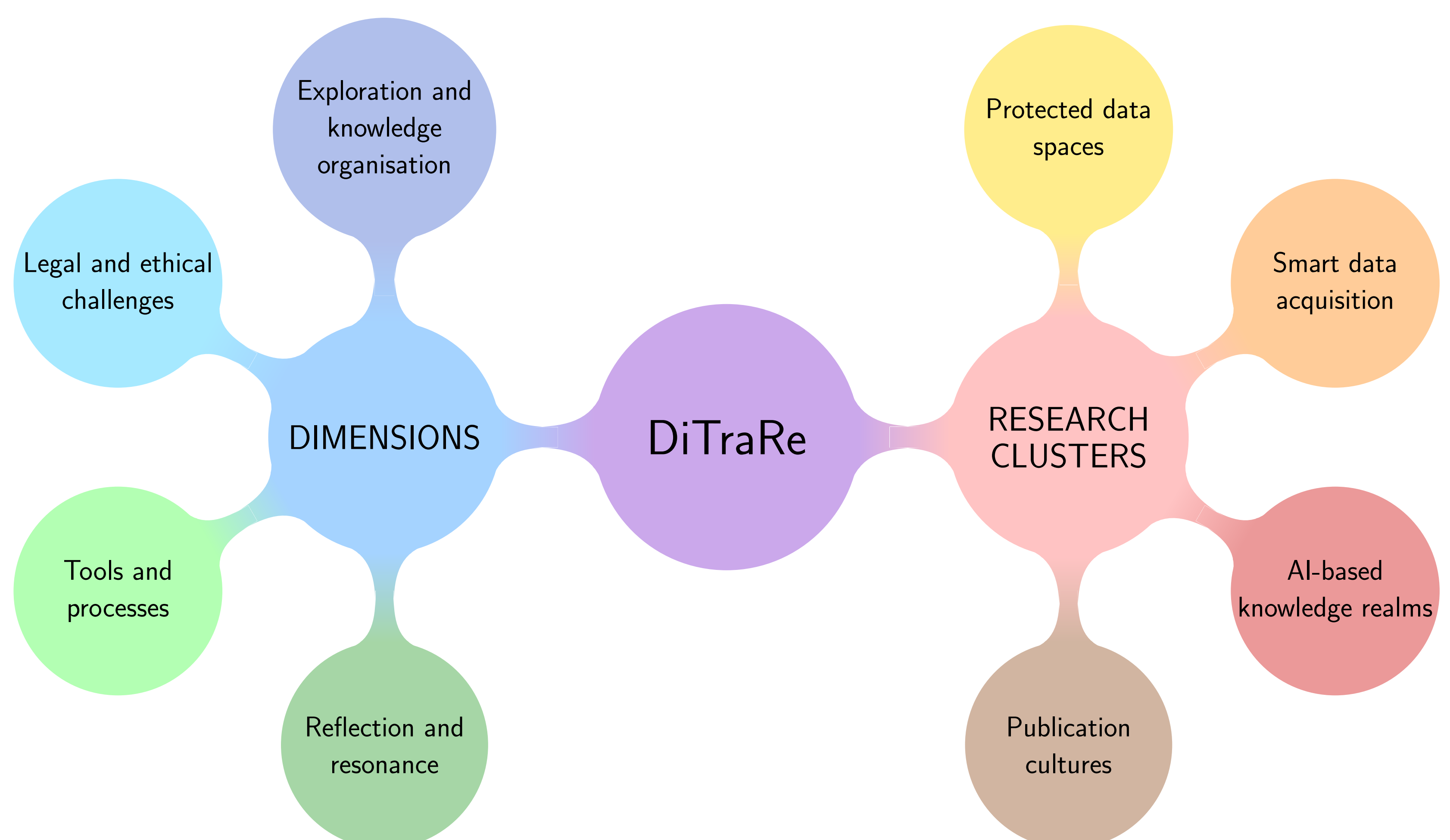


Publication of large datasets
KIT Institute of Meteorology and Climate Research

From Use Cases to Research Clusters: a Generalisation

DiTraRe concept and work plan:

- We start with specific **use cases** who bring their well-defined research questions. Our four use cases originate from different areas of research.
- Each use case is investigated within four **dimensions** to tackle the problem from different perspectives. We study technical, legal and societal aspects.
- **Specific solutions** to solve our partners’ research questions are being developed.
- Use cases are **generalised** into research clusters which concern a broader concept.
- **New use cases** are added.
- **Generalised solutions** to solve broadly-formulated research questions are being developed.
- **Synergies** between research clusters are studied.
- **Spin-off projects** are to be carried out in the future (full implementation of the solutions).



Exploration and Knowledge Organisation: Applied AI



The Information Service Engineering (ISE) Group led by Prof. Dr. Harald Sack at FIZ Karlsruhe is responsible for the dimension “Exploration and knowledge organisation” in DiTraRe. Our tasks within each use case are described below.

- Sensitive data in sports science: develop a knowledge graph which will enable sports scientists to easily analyse their data and make predictions. Expand their motor performance database with social and behavioural data. Challenge: limited access to protected data.
- Chemotion Electronic Lab Notebook: support the process of automatization of Chemotion. Concentrate on reaction description module which contains free text input by the user, use large language models. Challenge: complexity.
- AI in biomedical engineering: reinforce the model predicting length of intensive-care unit stay and mortality by using a raw electrocardiogram and only a few external parameters. Use large language models. Challenge: use publicly available multi-modal large language model.
- Publication of large datasets: construct a feature to support the process of creation of a uniform platform to increase the re-use and availability of earth science data. Explore the utility of AI in structuring datasets, preprocessing data, and standardising metadata. Challenge: extremely large size of datasets.