

General Information

<i>i-Space Name</i>	Smart Data Innovation Lab (SDIL)
<i>Label Category</i>	Silver



The Smart Data Innovation Lab (SDIL) offers big data researchers unique access to a large variety of big data and in-memory technologies. Industry and science collaborate closely to find hidden value in big data and generate smart data. Projects focus on the strategic research areas of Industry 4.0, Energy, Smart Cities and personalized Medicine.

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<i>Partner organizations</i>	Bayer Technology Services GmbH, Robert Bosch GmbH, Deutsches Forschungszentrum für Künstliche Intelligenz GmbH, EnBW Energie Baden-Württemberg AG, IBM Deutschland GmbH, Karlsruher Institut für Technologie (KIT), Fraunhofer Institut Intelligente Analyse- und Informationssysteme IAIS, Huawei Deutschland, Forschungszentrum Jülich GmbH, SAP SE, Siemens AG, Software AG, TRUMPF Werkzeugmaschinen GmbH + Co. KG.
<i>Web site</i>	http://www.sdil.de/

Platform and Services Information

Platforms

Resource	Value
SAP HANA	Cores: 320 (4 servers with 80 cores each), RAM: 4TB (each server hosts 1TB of RAM, Disk Space: 80TB (each server hosts 20TB of disk space, Network: 10Gbit/s Ethernet. Software: SAP HANA Database System, Predictive Analysis Library, Business Function Library, etc
Software AG Terracotta	Cores: on request, RAM: on request, Disk Space: on request. Software BigMemory Max
IBM Watson Foundation Power 8	Cores: 140 (7 servers with 20 cores each), RAM: 4TB, Disk Space: 300TB, Network: 40Gbit/s Ethernet. Software: IBM Open Platform with Hadoop/Spark, SPSS Modeler, SPSS Analytic Server, DB2 with BLU Acceleration

Huawei FusionInsight	Cores: 356 (13 servers), RAM: 5TB, Disk Space: 362TB, Network: 10Gbit/s Ethernet. Software: Hadoop, Spark, Storm, Hive
System: HTCondor	Cores: 32 x 4 = 128, RAM: 1TB, Network: 1Gbit/s Ethernet. Software: RapidMiner, Python, R, Matlab

Provided Services

Infrastructure providing: The infrastructure, including technical support, is provided free-of-charge by the SDIL operation partners to any SDIL project.

Communities: SDIL provides access to experts and domain-specific skills within Data Innovation Communities fostering the exchange of project results. They further provide the possibility for open innovation and bilateral matchmaking between industrial partners and academic institutions.

Data curation: The SDIL guarantees a sustainable invest to all partners by curating industrial data sources, best practices, and code artefacts, that are contributed on a fair share basis.

Data Anonymization: The SDIL offers various anonymization tools to its projects which are applicable to data from research and industrial sources.

Selected Projects and/or Success Stories

Condition monitoring and prediction of sealing systems. The Industrie 4.0 project was carried by Trelleborg Sealing Solutions, IBM, Karlsruhe Institute of Technology (KIT) and SDIL. Trelleborg Sealing Solutions is a world-leading developer, manufacturer and supplier of precision seals. The company is continuously working on the measuring and predicting of the condition of seals and it therefore runs a wide variety of instrumented tests on its test rigs. Measurements such as temperatures, speed, pressures and vibration are captured in very high frequencies. By leveraging Big Data Technology from its partners, Trelleborg is applying advanced machine learning in order to gain new insights, reduce testing costs and lay the foundation for advanced condition monitoring of sealing solutions in the field.

VDAR: Distributed Decentralized Autonomous Control Systems for Distributed Energy Markets. In this project, the energy data from electricity grid and electricity market are analysed for evaluating the concept of a decentralized electricity market. Within the scope of the VDAR-research project, control concepts have been explored that combine the economic system of the electricity market and the physical system of the electricity grid in a decoupled control circuit. The application increased the control speed of the physical electricity grid and the decentralized energy market. Therefore, the availability of energy has been being ultimately improved.

Condition-Based Maintenance. The enterprise “TRUMPF Machine Tools” is the global leader in the production of machine tools for sheet metal forming. At specified, but irregular intervals a “digital image” in the form of a data collection of logging and configuration information is created in a TRUMPF machine tool. Using these data, the project aimed at detecting deviations (anomalies) from the so-called “normal operation”. For example, it can be detected if the safety devices, such as guard door monitors, are not

working properly because they were electrically bridged. The project also enables prediction of critical states in the machine.

Association Rule Mining for High Dimensional Master Data. Master Data are a key asset for enterprises today. The quality of Master Data is of critical importance for organizations since business decisions depend on it. Therefore, much effort goes into ensuring high-quality Master Data. The SDIL project leveraged rule-based approaches combined with supervised machine learning to discover interesting patterns in a unique industrial data set provided by SAP within the SDIL

Smart Air Quality Network. Air quality and the associated subjective and health-related quality of life are one of the great themes of our time. Nonetheless, it is very difficult for many cities to take action on today's mobility, living and working needs because a consistent data base with fine-grained data on the action chains is lacking. However meanwhile, both basic data as well as promising measuring approaches would be available. The project "Smart Air Quality Network" (SmartAQnet) is based on a pragmatic, data driven approach since the existing data treasures of mcloud.de are combined for the first time and linked with a networked mobile measurement strategy. By combining open data, such as weather or map data with new mobile measurement approaches, such as "scientific scouts" and lightweight UAVs, a new analysis concept is tested within the model region of Augsburg. In addition, a technology stack is to be created prototypically, as modern analysis methods combined with Big Data and IoT technologies create a scalable, comprehensive application.

Ports as Intelligent Logistics Hubs. This project is part of the Transforming Transport EU lighthouse project that aims to demonstrate, in a realistic, measurable, and replicable way the transformative effects that Big Data will have to the mobility and logistics market. Transforming Transport brings together knowledge, solutions and impact potential of major European ICT and Big Data technology providers with the competence and experience of key European industry players and public bodies in the mobility and logistics domain. This project should demonstrate how solutions for objectives of a seaport pilot can be replicated and reused for the more challenging setting of an inland port. Compared to seaport, the added complexity in inland port stems e.g. from the fact that the port is situated in the middle of large city and at the centre of large metropolitan area. This means that it has a multitude of roads, tracks and water ways that serve as entry and exist points for containers to and from the actual terminals and ports. In addition, roads need to be shared with many other cars within the metropolitan area. This task will extend the results of a large national innovation project on logistics control towers and enhances it with advanced Big Data analytics and visualization capabilities that integrate the various relevant data sources from the port and terminals.