

Pressemitteilung

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH, DFKI

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07.04.2021

<http://idw-online.de/de/news766321>

Forschungs- / Wissenstransfer, Forschungsprojekte
Gesellschaft, Informationstechnik, Maschinenbau, Umwelt / Ökologie, Wirtschaft
überregional



DFKI at HANNOVER MESSE 2021 Digital Edition

Hybrid robotic teams in dynamic industrial environments, smart services for the generation and exploitation of data products, comprehensive perception of complex situations in environmental, agricultural and business processes, AI in medicine, for education and training, logistics and retail - at HANNOVER MESSE 2021 (April 12-16), DFKI will present innovations, project results and research prototypes for the entire entrepreneurial value chain - 100% digital.

The world's leading trade fair for industry is dominated by the key theme of "Industrial Transformation". This year, DFKI is looking back on 10 years of "INDUSTRIE 4.0". Industrial transformation is advancing, accelerated by the megatrends of digitalization, individualization and climate protection. DFKI and its project partners address key issues with their application-oriented research and present industry-oriented results from the AI research fields of Deep Learning, Robotics, Sensor Technology, Human-Robot Collaboration, Language Technology, Education Technology, GreenTech, Smart Services in Industrial and Business Processes, Gaia-X, Explainability and Trustworthiness of AI Systems.

Visit us at HANNOVER MESSE 2021 Digital Edition. Register for a free trade visitor ticket from our contingent. All exhibits, livestreams, dates and trade visitor tickets at: <https://www.dfki.de/en/hm21>

The exhibits in detail:

AdEPT – Augmented reality and AI-based learning, teaching and collaboration tool for corporate education and training
The AdEPT project is creating an augmented reality-based learning and teaching tool for corporate education and training. Included is an AI-based peer tutoring functionality that can dynamically and context-sensitively initiate learning partnerships between students in training workshops or classrooms.

BIONIC – Intelligent sensor networks reduce physical stress in the workplace
Smart workwear uses sensors to record the physical strain on workers. Sensors worn on the body determine data on heart and breathing rates or body posture. The analysis is performed on an intelligent chip on the body. Local real-time processing of the data directly at the source gives the user full control over how the data is used. Novel risk analysis methods allow immediate feedback on stresses and incorrect postures. Playful applications and a training app motivate to counteract one-sided loads and provide personalized and medical assistance for training at home.

CHIM – Chatbots in the museum

The "Chatbot in the Museum" is a learning, multimodal dialog system and a potential "game changer". In CHIM, a learning, conversational museum tour for interactive knowledge transfer is to be developed. The project aims to provide an economically viable solution. It is to be ensured that CHIM is connected to various knowledge transfer systems and at the same time offers users comprehensible information. The structuring of the data on the basis of adequate dialog strategies as well as the possibility of multimodal intention recognition are technical pillars of the project.

CLAIRE Innovation Network – AI made in Europe

CLAIRE stands for AI for the benefit of society, especially by contributing to the realization of the UN Sustainable Development Goals (AI for Good) and AI for All (AI for All). CLAIRE's goal is global brand awareness for "AI made in Europe". The Confederation of Laboratories for Artificial Intelligence Research in Europe (CLAIRE AISBL) was founded in 2018 by the European AI community to strengthen European excellence in AI research and innovation, with a particular focus on human-centered AI.

Now it is joined by a similar community of commercial companies, startups and entrepreneurs - the CLAIRE Innovation Network. Both networks represent different perspectives to address the needs of their respective stakeholders. CLAIRE represents the entire community, where Research and Innovation Network work closely together to realize the ambitious vision and foster the connection between research and industry.

CoMem – AI to assist daily work in the enterprise

The CoMem enterprise memory unlocks the potential inherent in corporate data using AI methods and embeds it in employees' work environments. CoMem provides extensive knowledge about data and information spaces, tasks and processes, about experiences and decisions made by users and the company in comparable situations. For this purpose, distributed and heterogeneous sources are integrated, linked in knowledge graphs, aggregated, enriched and refined. Knowledge services are realized on this data treasure and integrated into the workplace as knowledge-based assistance. Embedded in daily work, CoMem creates clear contexts, enables intelligent searches or provides recommendations for upcoming tasks. CoMem thus offers an ecosystem of knowledge services and interfaces for more efficient information and knowledge work.

Cyber-Physical Systems – Verification and virtual Prototyping for RISC-V Systems

At the Hannover Messe, Bremen's Cyber-Physical Systems research area is showcasing work in the area of RISC-V - an innovative, open-source and increasingly widespread computer architecture that provides an independent and cost-effective alternative to large chip manufacturers.

Using formal verification tools and an industry-standard verification platform based on SystemC, scientists are working on the correctness of RISC-V-based systems in order to be able to write and test software for the processors of the future even before they are manufactured. This will benefit not only German industry, but also start-ups.

Franco-German cooperation in AI – Inria and DFKI

Inria and DFKI are collaborating on a joint strategic research and innovation agenda in AI for INDUSTRIE 4.0, AI infrastructures, AI and cybersecurity, human-robot collaboration, wearables and other areas. Also at the core of the agreement is a strong joint commitment to the European AI initiative CLAIRE (Confederation of Labs for AI Research in Europe) to more closely connect European AI researchers and jointly advance European research for AI that benefits humans while respecting core European values.

DFKI4planet – AI for environment and sustainability

Sustainable AI key technologies help to develop and advance solutions for global challenges such as climate protection, energy transition and resource conservation. In order to map the potential of DFKI in this field, the competence center "Artificial Intelligence for Environment and Sustainability", in short "DFKI4planet", was established. This pools the expert knowledge of the various research areas in order to jointly develop ideas and concepts for the responsible and sustainable use of AI. In addition, it serves as a contact point for interested scientists, environmental organizations and companies as well as for the exchange with politics, authorities and the public.

European Language Grid – Cloud platform for multilingual Europe

European Language Grid (ELG) aims to counter the fragmentation of the European market by establishing a central platform for language technology in Europe. The ELG is a scalable cloud platform that provides access to hundreds of commercial and non-commercial language technologies for all European languages. This includes tools and services as well as datasets and language resources. European stakeholders can easily upload their technologies and datasets to

the ELG, share them, and link them to other resources.

EVAREST – Generation and exploitation of data products in the food industry

The (legally) secure utilization of data as an economic good as well as the provision of user-specific smart services for various stakeholders is to be enabled by the cross-manufacturer EVAREST data platform. The exhibit shows how a data product is created and further exploited by combining data streams from two raw material producers.

Commodity producer A has historical data on quantities and prices of its offered commodities (e.g., cocoa beans). Via the EVAREST platform, he additionally buys volume and price data from commodity producer B as well as a smart analytics service. The result is a forecast of commodity volumes and prices for the next six months. Commodity producer A can offer this data product for purchase through the EVAREST data marketplace. Food producers, such as confectionery manufacturers, can purchase this data product. In this way, they improve planning reliability with regard to price and availability of the required raw materials, save costs in production and increase their turnover by selling data products. Predictive production reduces food waste and protects the climate.

IIP-EXTREM – Individualized implants and prosthetics for the lower extremities

The IIP-EXTREM project (Individualized Implants and Prostheses for Lower Extremity Care) started on June 1, 2016, with the aim of improving the treatment of fractures of the lower leg. State-of-the-art techniques in 3D imaging, segmentation, mechanical simulation and laser sintering are combined for a workflow that enables and produces a patient-specific implant.

InGewA – The integrated business tax assistant

DFKI and DeepReader GmbH, together with the energy service provider enviaM, have developed a generic application on their technology platform for the intelligent processing of trade tax notices. The integrated trade tax assistant "InGewA" is characterized by high performance and process integration. Depending on the company's strategy, InGewA can be installed in the company's own environment or operated in the cloud. Generic integration into company-specific processes can be realized via standard interfaces.

Innovative Retail Laboratory (IRL) – Application-oriented research for the retail of the future

The Innovative Retail Laboratory (IRL) of the German Research Center for Artificial Intelligence (DFKI) has been providing a visionary view of the retail trade of the future since 2007. Only by linking information from different data sources and interpreting it semantically can knowledge be generated from information. The development of corresponding, intelligent assistance systems for customers and retail employees is the core vision of the IRL.

KI-Campus – The Learning Platform for Artificial Intelligence

The digital learning platform addresses students of different disciplines, professionals and other lifelong learners. The goals are to address the acute shortage of skilled workers and to promote a mature approach to AI in civil society. The learning offers of the KI-Campus originate from the DFKI or are created in the context of competitions and cooperations. The basis for all learning offers is a content catalog and a competence framework. This ensures that all offerings fit into a demand-oriented curriculum and feature high-quality technical content. The developed modules follow a sequential structure and serve to teach basic competencies, domain-specific and interdisciplinary competencies (e.g. AI in medicine or ethical and legal issues). DFKI is developing AI-based functionalities and applications that enable a personalized and adaptive learning experience as well as a multimodal interface for mobile and dialogic interaction with the platform.

The world's first Production Level 4 demonstrator

The use case: A customer orders an individually configurable USB stick in the form of a nub brick. Different colors are available to him, as well as a selection of data that can be stored on the stick. Additional capabilities required by the demonstrator can be provided depending on the configuration. The system is connected to the European cloud platform Gaia-X, which is currently under development. It is used to securely exchange production data or to activate the production of a missing component at another site, which is then delivered.

Robotics Innovation Center – Intelligent robotics – for land, water, space and humans

The DFKI research area Robotics Innovation Center (RIC) combines AI methods with state-of-the-art robotics and researches mobile systems for a wide range of applications: Rovers for exploring foreign planets and autonomous underwater vehicles for shallow to deep waters are part of the RIC's repertoire, as are robots on wheels or on two to six legs that explore the earth's surface, support humans in production and maintenance, or are used in dangerous situations. Also, with the help of exoskeletons for physical rehabilitation, smart electromobility, and safe human-machine interaction, RIC is working to make AI and robotics applicable to humans.

Smart Construction – Artificial Intelligence in Construction

The project developed a web platform based on INDUSTRIE 4.0 technologies that enables digital information exchange between all parties involved in construction and realizes intelligent planning and control services as well as continuous quality assurance and documentation processes. It will be shown how automatic condition recording, remote management and predictive maintenance can be realized on the construction site. Intelligent and networked sensors in construction materials, in the construction site environment or on machines support the AI technologies used.

SPAICER – Smart Resilience Services in the Manufacturing Industry

The aim of the SPAICER project is to develop a data-driven ecosystem based on lifelong, collaborative and low-threshold Smarter Resilience Services (SRS) by using AI technologies and INDUSTRIE 4.0 standards. This should enable disruptions to be foreseen (anticipation) and production plans to be adapted (response). The SPAICER team shows first project results of an AI-based wear prediction for resilience optimization of production machines in the context of fineblanking as well as glass production. By means of Smarter Resilience Services, sensor data streams of production machines as well as quality data of tools and raw materials are analyzed, for example. Based on this, recommendations for action can be provided for parameter optimization, planning of maintenance intervals or the precautionary abort of a production run. This reduces production errors due to machine wear and avoids cost-intensive production downtimes.

TexaS – Modular system for multifunctional textile-adapted electronic systems

Contacting and power supply solutions are a prerequisite for the successful and reliable integration of existing and future electronic systems in textiles. The main objective of the project is to advance the research field of electronic textiles and thus microsystems technology in the textile sector in line with INDUSTRIE 4.0. The goals are increased functionality, energy and resource efficiency through cost-effective processes and use of alternative materials and long-term stability. The topics covered are: Hybrid integration of different substrate materials and functionalities, multifunctional and active interposers, alternative materials for interposers, embedding and contacting with advancing miniaturization, functional and application-oriented packaging.

TRACTAT, CAMELOT, RICAIP – Transfer of control in distributed INDUSTRIE 4.0 applications

Autonomous robots can adapt their behavior to the current context of action. If they get into a situation where they need help, e.g. by a human, a transfer of control can be initiated. The robot gives up autonomy and transfers control to a human until the human has rectified the situation. A transport robot notifies a human in a situation that cannot be resolved by itself and provides the human with as comprehensive an overview as possible. With the help of other technical options for analysis, e.g. the bird's-eye view of a camera drone, the human rectifies the problem by taking control and safely controlling the robot remotely from any location.

In the opposite case, a human may want to temporarily hand over part of his or her workflow to a robot to prevent a complete production shutdown. The robot may not be able to work as fast as the human. In a robot teach-in based on a multimodal dialog system, a human gives a robot a new job using speech and gestures. The robot proactively asks the human for missing parameters and then begins its work.

XAINES – Explaining AI with Narratives

The goal in the XAINES project is to ensure AI explainability and to generate explanations (narratives). The researchers are investigating the central question of whether the AI can justify in one sentence why it acted the way it did or whether it has to explain it interactively to the user. One project focus is to explore narrative and interactive explanations, which are particularly useful when using AI systems to facilitate the assimilation of complex facts. To generate explanatory narratives, (speech-)labeled sensor data streams and predictive models are used. Sensor information is combined with speech information, from which the AI system develops an understanding of the scene, whereby explanations can then be generated.

More information

<https://www.dfki.de/en/hm21>

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12 - 16 APRIL 2021

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Human centric AI



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