NEWS

GERMAN RESEARCH CENTER FOR ARTIFICIAL INTELLIGENCE

25 Years Innovation at its Best

25 Years DFKI – 25 Years Innovation at its Best

SmartF-IT – The IT for INDUSTRIE 4.0

META-FORUM 2013 – DFKI Leads Largest Multilingual Language Technology Alliance

iGreen Brings Knowledge-based Hightech to Agriculture

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2/2013

Two Selected Landmarks

Germany
Land of Ideas
Selected Landmark 2013/14

Talking Places – Sightseeing With Wonder Glasses

Photo: SMI

New Technology Turns City Tour Into Virtual Eye-Candy

Look around and enjoy: Future visitors to Kaiserslautern will not just get information from a travel guide or via their smart phones. The details about various places and buildings throughout the city are received through a pair of data goggles. For any of the major attractions, you just have to fix your eyes on the object and the appropriate audio and video information is presented. The system provides people with a totally new doorway to the urban landscape. The inventor of the city guide, which is based on eye-tracking technology, is DFKI. The basic research focus is on the extent to which eye-tracking devices can be used for the interactive control of computers.

http://talkingplaces.dfki.de

Talking Places is honored as a "Selected Landmark in the Land of Ideas" on January 27, 2014.

Mobia – Mobility for Seniors

Photo: Saarbahn GmbH

Rapid Assistance Away from Home

Bus and rail transportation is now easier for seniors and people with handicaps through mobility guides.

The elderly often encounter difficulties in the use of public transportation. Automated ticket machines are complicated to use, schedules are confusing to read, and without help, the entry or exit from a bus or train with a rollator or a wheel chair is next to impossible. Things are different in Saarbrücken, where the Saarbahn public company has implemented "Mobia – Mobility for Seniors." Guides are available on site to help when obstacles appear insurmountable. An uncomplicated request for help can be sent using a new smart phone app from DFKI. The guides themselves are using the technology to coordinate their services.

www.mobia-saar.de

Mobia is honored as a "Selected Landmark in the Land of Ideas" on January 30, 2014.

25 Years DFKI – 25 Years Innovation at its Best

On July 4, 25 years ago, the founding partners signed a consortial agreement that established DFKI in Kaiserslautern and defined a set of standard operating conditions for the company. Since then, the DFKI model – a non-profit, public-private partnership for innovation in IT – has come to be seen both nationally and internationally as a groundbreaking approach for leading edge research. It is an extraordinary example for the small and mid-sized research companies, which in addition to the universities and major research facilities form the third pillar of the scientific establishment in Germany.

The success of DFKI would not have been possible without the many government and private partners and financial sponsors throughout the years that supported the continuous development. It would also be unimaginable if not for the dedicated employees, now numbering more than 4,500, in all the research departments and administrative offices. All have approached their jobs during the past 25 years with a spirit of creativity, enthusiasm, and responsibility and many have used DFKI as a career stepping stone.

DFKI was established in July 1988 and later that same year, the first company locations were opened in Kaiserslautern and Saarbrücken. DFKI Bremen Lab joined in 2006 and was expanded to become the third DFKI location in 2009. The DFKI Project Office in Berlin opened for business and the Innovative Retail Lab (IRL) – a Living Lab joint venture with Globus SB-Warenhaus-Holding, began its work in St. Wendel in 2007. The branch of DFKI Robotics Innovation Center in Osnabrück, Lower Saxony was opened in September 2011. Our current staff hails from more than 50 countries and more than 60 of these top researchers have been offered positions here and abroad as university professors over the years. Our scientific directors support government research policy commissions through their expert contributions at both the national and the European levels. From the departments and working groups of DFKI's professors, more than 1,700 new, high-tech jobs have already been created through the establishment of more than 60 spin-off companies and the expansion of new departments in existing enterprises. Of course, this is only a partial selection of DFKI success stories. It would be just as appropriate to mention the many outstanding scientific achievements and the high measure of esteem for DFKI and its staff from customers, venture partners, and the general public.

After 25 successful years, DFKI is acknowledged as the leading business-oriented research institute in Germany and the world's largest AI research center in terms of innovative software technologies based on Artificial Intelligence. Besides the federal states of Rhineland-Palatinate, Saarland, and Bremen, the DFKI partner list includes many highly respected high tech companies in Germany and abroad that represent a wide spectrum of industry and benefit from our award winning innovative strengths.

On this, the occasion of the 25th anniversary of DFKI, we express our appreciation to our sponsors and partners, research friends, and our current and former staff for their outstanding work and contributions. We wish them all and DFKI continued success in the future!

By the way, in related news: An official celebration event with friends, partners, supporters, and alumni of DFKI is being planned to mark the 30th Anniversary date in 2018!

Prof. Dr. Dr. h.c. mult. Wolfgang Wahlster
Chief Executive Officer

Dr. Walter Olthoff
Chief Financial Officer

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Foto: digipen technologies

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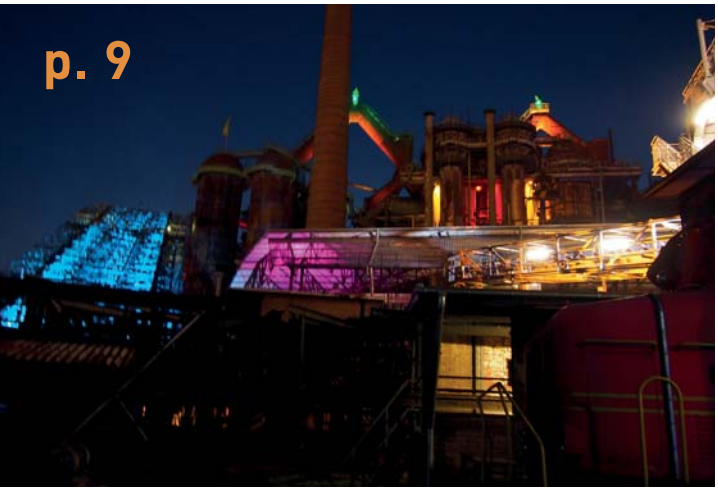

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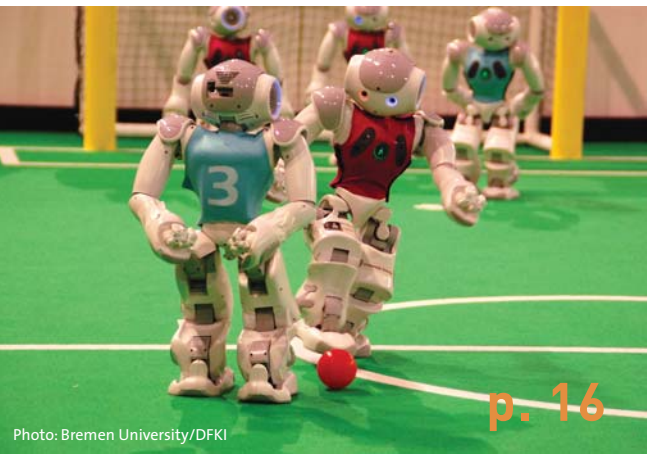

Photo: Bremen University/DFKI

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iGreen Brings Knowledge-based Hightech Standards to Agriculture

Final Presentation of Research Results and Developments

The iGreen logo will be symbol of cross-brand, knowledge-based, high-tech standards in agriculture: in the future, the label will identify products that meet the iGreen specifications.

Weather, microclimates, soil conditions, pests and diseases, information about cultivated varieties, seeds, or the markets for agricultural products – successful farming takes many factors into account. Where some of these are entered in publically accessible databases, others are based on many years of experience, personally handed down over generations.

The combining of these various, distributed public or private sources of information into one location-specific service and knowledge network was one of the top-level goals of the iGreen project. To mark the successful project conclusion, the group, under the lead management of DFKI, met on April 25-26, 2013 in the city of Damme, Westphalia. The close cooperation among the 23 participants, who represent all the players in the agricultural value adding chain plus applied IT research, resulted in the successful integration of Web 3.0 technologies and the Internet of Things for the agriculture sector.

Open interfaces, data formats, terminology, and communication structures enable the effective exchange of data and services for all participants in the business of agricultural production. The project results have been incorporated into the major standards and will be further developed in sustainable regional pilot applications, the products of the project partners, open-source prototypes, and by newly established companies.

Through the iGreen network, known information can be expanded with the data collected in ongoing production processes, made publically available, and used in downstream production steps. The demonstrators and reference applications developed in iGreen are provided to the public as open source to facilitate further development of the applications to make them available to farmers for location-specific information and local decision support. The infrastructure developed by the project creates the conditions for offering services over mobile devices such as smartphones or tablets.

In the past, the integration of existing information with field data failed because of the proprietary solutions used by the different equipment manufacturers. The software specification developed in the iGreen project, the iGreen machine-connector, enables vendor-independent compatibility of communications within the equipment fleet and creates a standard exchange format for agricultural related data.

An appropriate interface was created and standardized so that current information and specific online knowledge could be expanded. The extension of the ISOBUS standard ISO 11783-10 enables semantic annotations. Some individual suppliers have already incorporated this method into specific products. The assistance systems GRIMME iSystems, KRONE iCan, or LEMKEN FieldTronic are examples of these products.

The results from iGreen, such as the geodata infrastructure, the mobile Geobox, and the MapChat application are being actively distributed in the Rhineland-Palatinate and adjacent regions by the BLU (National Association of Agricultural Contractors) and are already in use at numerous companies. Mobile decision support aids are used intensively in the pilot regions of Lower Saxony and Saxon-Anhalt and, increasingly, nationwide as well.

To date, the iGreen project has spun off two companies with the aim of continuing the development of the iGreen results in the areas of semantic search and innovative agrarian-electronics and bringing the products to market.

More information
www.igreen.de

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iGreen project staff at the final review in the conference and exhibition hall at the GRIMME company in Damme

Photo: digipen technologies

Filling out forms with the digipen

Doris Ahnen, State Minister for Education, Science, Further Education and Culture in Rhineland-Palatinate pictured here testing the signature verification function of the digipen as part of a press tour featuring research and technology

Digital Pen Technologies – Successful Start for DFKI Spin-off

In the areas of customer service, field service, or wherever information is locally recorded on paper – manually completed forms are in many business segments still the primary information medium and the legally binding record. By the time the analog data is digitized for further processing, the process is often subject to long periods of interruption. Frequently, manual post-edits, follow-ups, and corrections are required. To make these processes more efficient, DFKI, in association with technology partners, developed a system that can save time and costs: digipen, the digital pen for the automatic recognition of handwritten forms and the creation of legal digital signatures.

Prof. Dr. Andreas Dengel, Head of DFKI Knowledge Management research department said: "Digipen allows handwritten data to be immediately digitized, converted into electronic text and forwarded to various systems for further processing. This is an ideal way to bridge the gap between handwritten records and the existing EDV/IT infrastructure of the company."

How digipen functions is best explained using the example of the advisor-client meeting: Forms are created on the computer prior to the meeting and printed with the existing client data. In this process, the paper is provided a so-called "anoto pattern", an individual, nearly invisible point pattern. This form is then completed during the client session using the "digipen." An integrated infrared-based camera system tracks the position of the pen on the paper and, assisted by the anoto pattern, knows what was written. When coupled to a docking station, the notations made by the pen are transferred to a computer via Bluetooth or USB interface. The handwriting recognition program developed at DFKI analyzes and digitizes the data, before sending it on to the data processing software in the form of an electronic text for further processing. Of course, corrections may still be made to the text.

Automatic signature verification exposes forgeries

Besides the capture of handwritten notes, the advanced digital pen enables a sophisticated electronic signature that is a legally binding digital signature. Automatic signature verification checks using a stored digital biometric reference model to determine if the signatures are valid or, perhaps an attempted forgery.

Successful operation leads to spin-off

Since October 2012, the digipen system has been in operation at 250 work stations at a total of 50 local offices of the Kreissparkasse Kaiserslautern (KSK). This is the first use of an anoto-pen system certified for legally relevant customer signatures in the European banking sector.

"Because each pen can store up to 100 DIN A4 pages and transfer these as an image or an unalterable PDF file, we can save the costs for digitization and central data entry," said Kai Landes, member of the executive board at KSK. "The forms have a legally binding character and the data recognized from the forms is seamlessly integrated in our existing process structures where it can be further processed electronically without any loss of time." The joint project was nominated by the Palatinate regional association for the "Future Prize Palatinate 2013."

The success of the operational testing was the motivation for digipen technologies to establish a company with headquarters in Kaiserslautern. This was a way for the DFKI technology to affirm its place and continue to expand in the marketplace. As a consequence of establishing the new company, the former project partner Bend-IT GmbH merged into digipen technologies. digipen technologies represents the latest link in the continuing chain of successful DFKI spin-offs. In the history of DFKI, more than 60 companies have been spun off creating approximately 1,700 highly qualified jobs.

More information
www.digipen.de

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HORST is different!
Music Recommendations With Semantic Networks and Artificial Intelligence

What musical connections are there between Robbie Williams and Udo Lindenberg? Is there any relationship between Pink Floyd's "Another Brick in the Wall" and the German folk music duo "Wildecker Herzbuben"?

HORST (HOlistic Recommender & Storytelling Technology) is the name of a new prototype music recommendation engine developed by scientists at the DFKI Competence Center "Computational Culture" located in Berlin and Kaiserslautern.

Very often listeners do not know what is current in the music scene and what it is they are actually searching for. However, they do know what they like listening to. Music recommendation engines help these potential buyers to find the suitable offers. Many such services already exist on the Internet, for example, from Amazon or Spotify.

HORST, however, is unique: HORST suggests not only similar artists, titles, or albums to the user, but also provides paths that link musicians and works in the most diverse styles.

In keeping with the introductory question, "Yes!" There really are several connections between Robbie Williams and Udo Lindenberg, for example, via the path from the Paul McCartney song "When I'm Sixty-Four." Other paths lead to Norman Cook, Fatboy Slim, and the song "Sympathy for the Devil" or for the song "Sonderzug nach Pankow" to the "Chattanooga Choo Choo," Glenn Miller, Bill Haley, and "Mack the Knife."

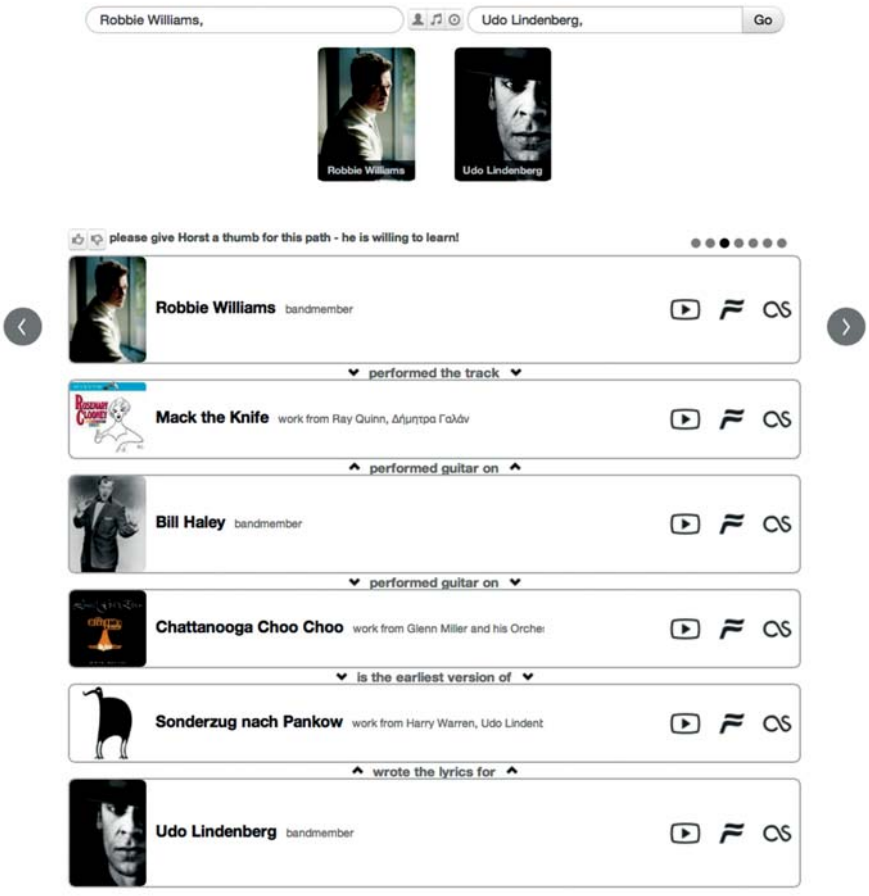
The system uses semantic technologies and methods of Artificial Intelligence to mine publically accessible Internet sources such as "Musicbrainz" or "Freebase" for relationships between artists, songs, and albums, the origins of complete genre taxonomies, and even the linkages among different cultural operators and artifacts in order to compute understandable causal chains and visualize these as paths.

HORST is conceived and designed by Dr. Stephan Baumann, senior researcher at the DFKI Knowledge Management department and Head of the Competence Center Computational Culture: "At the core of the semantic recommendation approach is the idea that music consumers left alone in cyberspace could be invited into a world of new discoveries, just like in the good old days of the record stores. The friendly store employees behind the counter with their vast musical knowledge are virtually brought back to life through the explanation component of the software. If the customer starts this process, the choice of alternatives can then be self-selected according to current tastes and mood. In this way, chance and coincidence can once again play a role in the music selection."

HORST will become even smarter in the future: with the capability of applying user feedback, such as "like" or "dislike", the collations, the edges in the paths, and the search space will be optimized.

Visit http://horst.dfki.de and test HORST for yourself!

More information
www.dfki.de/web/kompetenz/c4



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Interactive Light Show at World Heritage Site "Völklinger Hütte" for Electro Magnetic Festival 2013

On the "Silent Floor" of the Techno and House Festival, visitors became interactive artists controlling the lighting and visual effects through their movements and adding their individual visual interpretations to the DJ's sound mix.

The technology behind the show translates body language into light and color. A Kinect depth sensing camera captures the movement of the dancers and transcribes it into commands for the horizontal and vertical positioning of the spot lights and the projected color spectrum. Therefore the movements of a "light jockey," positioned at the center of the stage between two dueling DJ's, were captured by the Kinect sensors. No other optical markers or additional light sources were required.

The technology is developed at the department of Human Computer Interaction, chaired by Prof. Dr. Andreas Butz at Ludwig-Maximilian University in Munich (LMU) and at the Media Informatics department at Saarland University together with the DFKI working group, chaired by Prof. Dr. Antonio Krüger.

As early as 2010, the LMU and DFKI teams had developed an interactive system using multiple smartphones with public display screens for a performance at the largest European festival of digital art, the Ars Electronica in Linz, Austria. The installation for the Electro Magnetic Festival marks the first time a user could intuitively control medial technology by body movement without any additional instrumentation.

"Both projects represent typical applications of media informatics," according to Prof. Krüger. "The degree program combines the content of the traditional computer science course with the creative aspects of media design and lessons learned from perceptual psychology. The close collaboration of the department with DFKI offers the possibility to test theoretical knowledge in application oriented solutions."

About the Electro Magnetic Festival
The electro magnetic event entered the second round in 2013 as the winner of the coveted award for "Best New European Festival" in 2012. This year, the festival brought together the top acts in the German techno and house scene in front of the impressive setting of the UNESCO world cultural heritage site "Völklinger Hütte."

On a total of six floors – and partly open air – live acts, DJs, light and pyro-artists met at one of the most exciting historical locations in the world.

More information
www.electro-magnetic.de
www.uni-saarland.de/medieninformatik
www.mmi.ifi.lmu.de

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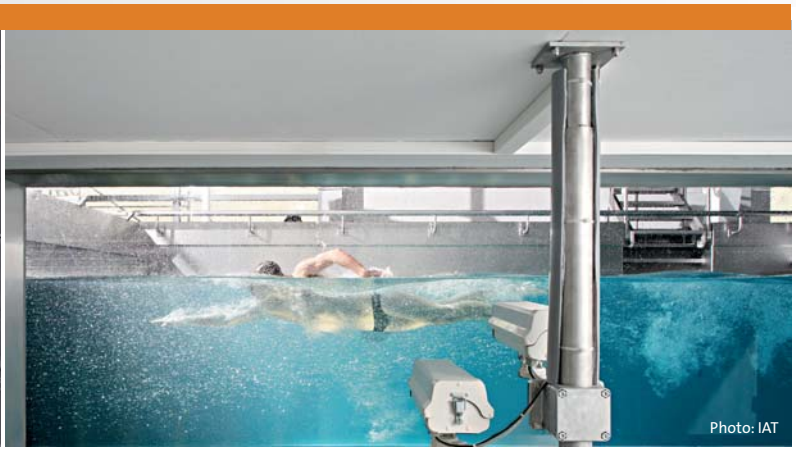
Video-analytic measurement of cause variables



Video recording of swimming motions at IAT

Video Analytics and Mobile Learning for Competitive Sports – Cooperation of DFKI and Institute of Applied Training Sciences (IAT)

DFKI announced a cooperation agreement with the Institute of Applied Training Sciences (IAT) in Leipzig to find ways to apply innovative technologies to competitive sports. The initially 2-year cooperation agreement was signed in June 2013.

"We are very fortunate to have a cooperation partner like DFKI, which has the competencies and know-how to move us forward in the area of information technology as it applies to competitive sports research," said Prof. Dirk Büsch, deputy director, IAT. Together with Dr. Ina Fichtner, head of MINT department (Mathematics, Information systems, Natural sciences, Technology) at IAT Leipzig, the two scientists have great hopes of gaining new impulses for evaluation and preliminary research in addition to the information and knowledge transfer. The major subjects of the agreement are the web applications for video data bases and video assisted feedback procedures for mobile devices. "We hope to make applications that are immediately operative in competitive sports," said Büsch and Fichtner.

The DFKI Augmented Reality research department, headed by Prof. Dr. Didier Stricker, specializes in video analytics and will collaborate with IAT in the area of automatic tracking of motion, games and athletes. The results are expected to yield new image processing methods that measure and process relevant cause variables in movements, for example, jumping height, speed, or acceleration. "The videometric analysis promises great potential for competitive sports research. The measurement of motion can be accomplished by sensors, with no direct physical effect on the athletes, which also applies in competitive situations," according to Prof. Stricker. "Besides the biomechanical measurements, we can also focus on various individual players and analyze the tactics by tracking the targeted object and capturing the game play situations."

The Centre for e-Learning Technology (CeLTech) at DFKI will support IAT in the area of technology-based information and knowledge management as well as in multimodal learning and training processes in competitive and top-level sports through the use of innovative technologies. The aim of the joint research and development effort is to take advantage of mobile devices and cloud technologies, as well as multimodal environments, augmented reality, and intelligent user interfaces to improve top-level sports performance. CeLTech Director, Prof. Dr. Christoph Igel: "IAT is an internationally recognized institute for research and innovation in competitive sports. In addition to the knowledge and technology transfer of pioneering technologies, this partnership gives us the opportunity to explore new areas of research for training support and qualification in sports. This is a very interesting subject for the Centre for e-Learning Technology and the project expands our primary focus on the areas of medicine and healthcare while also having great relevance and promise for the national and international sports scene."

More information
http://av.dfki.de
www.celtech.de
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Learning Safety in Road Traffic With 3-D Learning Environment

Children are especially vulnerable in traffic because their cognitive-coordinative skills are not yet fully developed and they have not been sensitized to dangerous situations. Using virtual surroundings for the practical part of teaching children about traffic dangers is more effective.

Project SafeChild is developing a multimodal, immersive learning environment where safe behavior in street traffic situations can be taught. In place of expensive, special software and hardware, SafeChild uses interface devices from the entertainment electronics sector for the interaction, which equates to significant cost savings and a wide range of use.

A realistic simulation of an urban landscape with traffic lets children familiarize with routine traffic situations. The selection and adjustment of the specific type of problem is managed by an intelligent-tutorial teaching and learning system (ITS) and is based on the individual abilities and learning objectives of each child. The project also studies whether intelligent-tutorial systems make sense in this context and the impact such a system has on the learning success.

The idea for the successful project was submitted by the Software Campus, a graduate training program for young management trainees. The project is being implemented by the Centre for e-Learning Technology (CeLTech) at DFKI and is funded for a two-year period by the Federal Ministry of Education and Research (BMBF). Project SafeChild is also supported by the Land Surveying and Geoinformation Office of the City of Saarbrücken, which provided the 3-D model based on real data of the city for use in the development of the learning environment.

More information
www.softwarecampus.de
www.celtech.de

software campus

CeLTech
Centre for e-Learning Technology

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Better Math Skills Through Innovative Learning Technologies

CelTech Enters Collaboration With Brandenburg University of Applied Sciences in the Competence Bridge Project

Inadequate knowledge and talent in the subject of mathematics increasingly poses a significant obstacle in the degree programs for the MINT disciplines (Mathematics, Information systems, Natural sciences, Technology). Universities of Applied Sciences report a steady dropout rate of up to 40%.

The Competence Bridge project is implemented by the University of Applied Sciences in Brandenburg and the Centre for e-Learning Technology (CeLTech) at DFKI with the specific aim of developing concepts that support students.

Three interfaces comprise the focus of the project: (1) the transition from secondary school to university, (2) during the period of study, and (3) the transition from university to first job. At course begin, the student's initial skill level is determined by assessment testing and, on the basis of these results, the entry classes appropriate for the needs are recommended. Math skills are improved during the course through the provision of supplementary, in-depth learning materials. Online training at the conclusion then facilitates entry into a working environment.

As the single technology partner in the project, DFKI provides an intelligent-adaptive learning environment, which supports the administration and evaluation of the assessment tests. Similarly, the learning environment also supports the use of supplemental training materials and is adaptable to the needs of the individual user. The project is funded by the European Regional Development Fund (EFRE).

KOMPETENZ-BRÜCKEN

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CeLTech
Centre for e-Learning Technology

More information
www.celtech.de

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"Long Live the King" – Smartphone App From DFKI Supports Security Forces During the Coronation of the Dutch King

On April 30, 2013, Queen Beatrix of the Netherlands passed the crown to her son, crown prince Willem-Alexander. More than a million visitors were expected to attend the ceremonial event in Amsterdam. A smartphone app developed by scientists at DFKI provided increased security. The integrated technology in the app enabled the movement of the crowds to be followed in real time and, if necessary, to react immediately to critical safety situations.

The app called "30 APPril", which was offered by the Dutch police, provided visitors with a variety of services related to the coronation, for example, event info, maps showing key addresses, or various Twitter feeds and important safety notices. The voluntary users of the app could send anonymized sensor data from a mobile phone. This data was analyzed, processed, and then detailed on a map. The so called "Heatmap" showed in what direction the crowds were moving and where the concentrations of people were reaching critical dimensions. In this way, the people flows could be tracked, dangerous situations identified early, and visitors could be immediately informed about alternate routes or other recommended actions. For example, if the system showed a large number of users approaching a particular bottleneck, a push message was sent recommending the closest alternate route.

Risk is inherent in any large gathering of people as has been shown over and over again at major events in the past. The dynamics in a crowd of people are difficult to identify and anticipate, while the security forces are hard-pressed to react immediately to critical situations or to communicate with the people. The team at DFKI's Embedded Intelligence research department, headed by Prof. Paul Lukowicz, developed and tested systems that use today's smartphone technologies to insure more safety in such situations.

Crowd monitoring technology has been used in the past at several other major European events, for example, at the Olympic Games 2012 in London. The technology originated under the framework of a 4-year EU project called SOCIONICAL, which united different universities and research institutes in studying the interrelationships of technology and social interaction. The server infrastructure required for the data collections as well as for the processing and visualization methods was supplied by the Wearable Computing Lab at ETH Zurich.

Powerful proposition despite data privacy

The effectiveness of crowd monitoring via mobile phones depends on the number of people who volunteer to participate and send their sensor data. The potential benefit to individual and mutual safety was the key reason that so many of the visitors to past events decided to contribute their data. The application was downloaded for the coronation festivities in Amsterdam more than 70,000 times (as of: 4/29/13), which is an adequate number for representative results.

Such cooperative activity recognition systems also prompt legal and ethical questions, which is why the DFKI researchers pay special attention to the subject of data protection and seek appropriate advice and assessment measures for the project. The app user remains anonymous; the data is encrypted and sent to the server. The transmissions are restricted to a certain range and only activated for critical situations for a defined period and, of course, with the active consent of the user.

More information
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Neurological Disease Therapy in the Virtual World

Neurological diseases such as Parkinson or Alzheimer, diverse fears of everyday situations, or the afflictions of old age with motoric restrictions often cause the victims to withdraw from their social environment.

Scientists and research partners are studying in Project VERVE (Personalized Virtual Reality Scenarios for Groups at Risk of Social Exclusion), how virtual reality scenarios can be used to improve the quality of life of this group of patients.

DFKI, together with neuroscientists at Trinity College in Dublin, has developed a specific training environment to support Parkinson patients, in particular, to move about once again in their real surroundings with the aid of virtual 3-D scenes.

Many Parkinson patients suffer because of sudden, unforeseeable blockages of the movements required for walking. This "freeze" as it is known, can last seconds or minutes and occurs mainly in close quarters like doors or other passageways, in crowded places, or at traffic lights. Psychological stress and physical loads are frequent triggers. The virtual 3-D environment deliberately confronts the patient with situations that may trigger a freeze and, trains the patient step by step to practice counter strategies. In this way, the patient learns how to better cope with the freeze, to decrease their frequency, and to once again move safely in public.

Thanks to XML3D, the training units must not be performed during the stationary hospital stay, but rather in the patient's own home. This 3-D Internet technology was developed by DFKI in collaboration with Intel Visual Computing Institute at Saarland University. A game was built on XML3D (Serious Game) in which the patients walk on a "Wii" balance board to negotiate their way through a virtual labyrinth that contains many different elements designed to provoke a freeze. The game-like nature of the exercise is intended to motivate a continuation of the training beyond the prescribed training schedule. Furthermore, the use of XML3D facilitates the presence of an attendant at the training session and the individual adjustment of the level of difficulty by the attending physician.

Preliminary studies have already begun with a test group of patients at the University Hospital at Trinity College in Dublin, with the use of the method in their homes planned for the end of 2013.

Project VERVE:
Virtual training environment for Parkinson patients

XML3D – Technology for the 3-D Internet

XML3D is used to create three dimensional web sites and can be viewed by nearly every web browser on most PCs or mobile devices. As a minimal and seamless extension of the present HTML standard, there is no need to learn a new technology from the start. The use for games and other product presentations is obvious. There are also many other new and interesting areas of application: Interactive visualization of data sets, collaborative plant design and control (in the context of INDUSTRIE 4.0), emergency response training scenarios for rescue workers, and construction site logistics are just a few of the topics that are being studied at DFKI in the context of industry and research projects.

The fact that the introduction and use of XML3D is not expensive is what makes the technology interesting to the healthcare sector. Supported by the technical know-how from DFKI, the University Clinic at Homburg/Saar has already developed three-dimensional patient information in XML3D for the magnetic resonance imaging (MRT) procedures.

More information
http://verveconsortium.eu
http://xml3d.org

VERVE

FUNDED BY

VERVE is funded under the 7th EU Framework Program for research.

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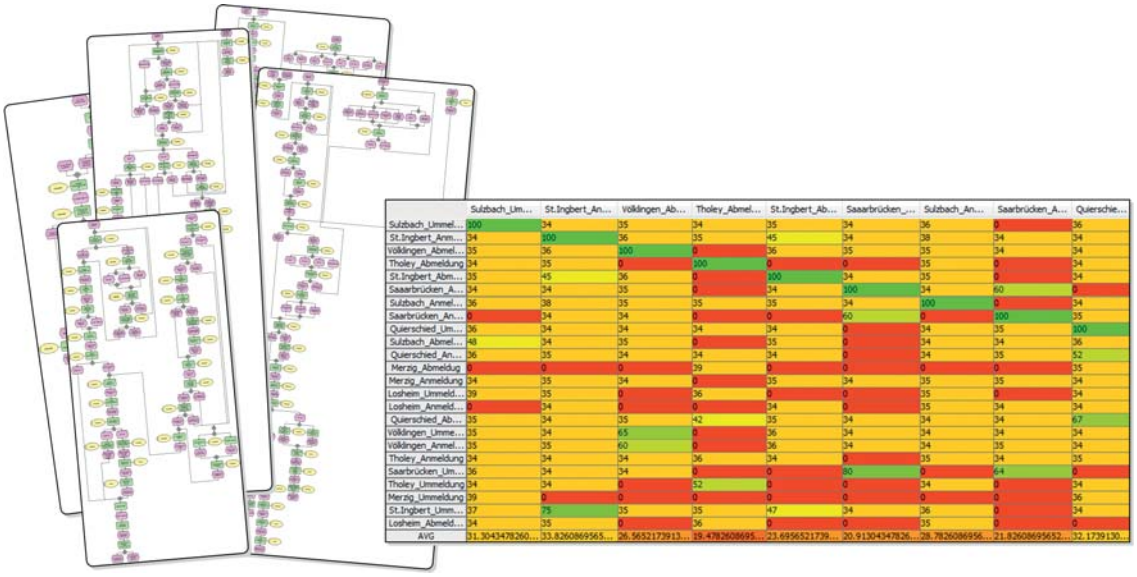

Heatmaps visualize similarities in the models and provide a quick overview

IWi Process Model Corpus – Open Database for Business Process Reference Models

Companies in the manufacturing, trade, or service sectors as well as public administrations all use graphic business process models to describe and design their operations. The creation and update of such models, however, is sometimes expensive and there is a great reliance on the use of so-called reference models.

Reference models are easily reused as process templates, so-called blueprints that contain pre-defined best practice operations within an industry or for separate sub-operations. They represent a very special added value for companies. However, at present there are relatively few readily accessible models.

In this context, the Institute for Information Systems (IWi) some time ago began to create an open access catalog of reference models – the IWi Process Model Corpus (IWi PMC). Today the catalog includes approximately 100 models ("open models"), among them the Y-CIM reference model for production operations, developed by the Institute and capable of serving as a basis for action for manufacturing processes according to INDUSTRIE 4.0 standards. Furthermore, there are also models available for trade, IT service management, or for environmental management.

In the past, the available models were only recorded, listed, and systemized, whereas more recently, the possibility exists to digitally capture the full content of the models. In this way, the available reference models can be read directly into the appropriate business process management tools for further use.

In addition to manufacturing models, the collection includes actual models from Saarland's municipalities such as the models for registration information, business registrations, school book loans, the issuing of citizenship certificates, or the statement of liabilities. The models for a municipal administration are transferable nationwide and contribute to time and cost savings when restructuring an administrative organization.

The updates of the model catalog and the preparation of a new reference model require the identification of similarities, which are abstracted from the respective specifics in the initial models, whereby these are abstracted from the respective specifics. Heatmaps visualize these similarities. Such graphics enable system planners to gain a quick overview. Further steps in the creation process such as clustering, refactoring, the generation of variants or the abstraction of models, or elements of a model then lead to new models. These are in turn incorporated in the catalog and made available to the community.

The provision of such open access catalogs is not only of practical interest, but it is also important to the research itself. This tool facilitates, for example, the evaluation of software specifications by the entire scientific community for functionality or correctness. This further supports the transparency and quality of scientific contributions.

The IWi Process Model Corpus (IWi PMC) is not only freely available to the public, but it also accepts recommendation for the inclusion of other models.

More information
http://rmk.iwi.uni-sb.de
www.dfki.de/iwi

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Improved Quality and Security for Embedded Systems

A project named SPECifIC, being performed at DFKI Cyber-Physical Systems Lab, has the goal over the next three years of developing a new type of design process for the so called embedded and cyber-physical systems. These are electronic systems that are integrated into a device to operate and communicate in combination with one another. An elaborated design process determines how the individual components interact.

Although it sounds complicated, these systems are increasingly defining our daily lives – whether in cars, airplanes, cell phones, or in the home. The varieties of embedded systems that already control so many devices are becoming increasingly complex. "Therein lies the challenge – to meet the growing requirements for quality and security of these systems," explains Professor Dr. Rolf Drechsler, Director, DFKI Cyber-Physical Systems research department. "We want to develop a new kind of design process that improves the quality and security of embedded systems and, in this way, contribute to the discovery of new methods and technologies." The research performed at DFKI-Bremen for this project is especially interesting to the chip industry: The new design process, including software tools, can help reduce the time and cost of chip development. It will someday be possible to test the security and functionality as early as in the design phase.

The smartphones illustrate just how far embedded systems have come in defining our daily lives. Besides telephoning, they enable a variety of other activities – from taking pictures to calendar functions to checking e-mail accounts. The mostly seamless functioning of the embedded systems is made possible by highly complex microprocessors that are only as large as a thumbnail. If an individual component does not function perfectly, tracking the source of the error today is like searching for the infamous needle in the haystack. On top of this, numerous corrections are necessary in the integrated processes because the individual components interact with one another. This is clearly time and cost intensive.

In comparison, the new design process aims for an earlier start. "The introduction of a supplemental, formal specification level is intended to enable testing of embedded systems for correctness and consistency prior to their implementation," according to Rolf Drechsler in describing his team's task. Errors can be detected and corrected at the source – differently than in the past – before flowing into electronic circuits.

The new specification level is just one part of SPECifIC. There is also a continuous change management application being developed that will ensure automatic error remedy throughout the entire design process. The team is studying another research area that concerns the integration of a natural language system specification at the start of design concept. This will facilitate the consistent translation of the system specifications into computer language.

The topic of safety will continue to occupy computer scientists in the future. "One thing is clear: embedded systems are not only becoming more complex, they are being used in more applications," said Rolf Drechsler. This is occurring in applications where safety is a primary concern, such as for communication media as well as in aircraft or medical devices.

DFKI-CPS is collaborating with Bremen University on SPECifIC, more specifically, with the Reinhart-Koselleck Project "Development of a Continuous Verification Flow for ESL (electronic systems level) Design" sponsored by the German Research Foundation (DFG).

Summary of project data

- Sponsor: Federal Ministry of Education and Research (BMBF) (Grant number: 01IW13001)
- Project: SPECifIC – Quality-driven Design Flow Using Formal Specifications and Functional Change Management
- Period: 8/01/2013-7/31/2016

Small chips, complex inner workings: DFKI research team of Prof. Rolf Drechsler is studying a new chip design.

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Federal Ministry of Education and Research

More information
www.dfki.de/cps

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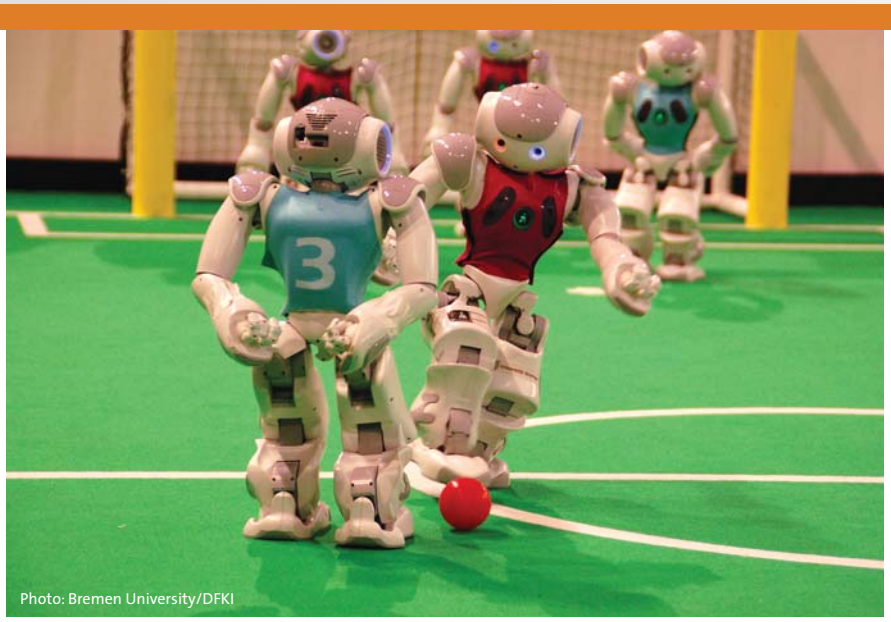

Photo: Bremen University/DFKI

Sure shots:
The B-Human team (in red) taking back the World Cup Title

Robot Soccer World Cup Returns to Bremen

Bremen's "B-Human" team has once again won the world championship in robot soccer. "We are overjoyed at winning the title again," said team manager Dr. Thomas Röfer after the final match of the "RoboCup" World Cup 2013 in Eindhoven, The Netherlands. Last year, his team had to accept defeat in the final round. This year the finals in the Standard Platform League in Eindhoven saw a German-German team match-up with the Nao Team HTWK from Leipzig. "B-Human" – a joint project between Bremen University and DFKI – took the match with a convincing 6:2 score to become world champions for the fourth time in the series that poses increasingly complex requirements each year.

The "B-Human" enters the international competition in the Standard Platform League category, where several additional hurdles were encountered again this year. The robot league playing field, for example, was enlarged to a size of 9 x 6 meters; this effectively doubled the size of the field of play. Accordingly, the number of players was increased from four to five per team. This poses additional challenges for the scientists in terms of the gaming intelligence of the robots – and therefore the software. The robots must negotiate longer distances and the complexity introduced by the fifth player was a major challenge.

With a 6:2 victory, the "B-Human" team expanded their already large trophy collection. The Bremen team can now claim to be the reigning German national and world champions. Besides the competitive game, "B-Human" also impressed the scientific world in all three of the special technical challenges with advanced passing between three robots and the combinations with opposing team robots. The Bremen team managed an impressive first: they were able to demonstrate a corner kick, something which had never been done before in the Standard Platform League. "Every year the game becomes more complex," said DFKI researcher Röfer. "Little by little, we are getting closer to achieving our final goal of being able to challenge human soccer players."

"B-Human" regularly participates in the RoboCup in support of the international initiative to promote research in the areas of Artificial Intelligence and robotics. The common goal of the research is to field a team of autonomous, humanoid robots capable of winning a match against the reigning human championship team by the year 2050. In order to achieve this goal, each league is assigned a different major research focus and the requirements on the teams are continuously increased. The major focus in the Standard Platform League is on software development. The participating teams all field identical two-legged robots (manufactured by Aldebaran Robotics), so the only way to defeat the competitors is through the software. Following each year's competition, "B-Human" releases its software to the public, so that other teams may take advantage of it.

RoboCup Best Paper Award for Felix Wenk and Dr. Thomas Röfer
After winning the title at 17th RoboCup World Championships, the B-Human Team also celebrated an additional success: At the conclusion of the RoboCup 2013 Symposium, Felix Wenk and Dr. Thomas Röfer were honored with the "Best Paper Award for its Engineering Contribution" for their work. The topic: "Online Generated Kick Motions for the NAO Balanced Using Inverse Dynamics".

"B-Human" is a student project performed in the Mathematics and Computer Science departments of the University of Bremen and the DFKI Cyber-Physical Systems group, directed by Prof. Dr. Rolf Drechsler. The 17 member "B-Human" research team consists of students nearing graduation and DFKI researcher support.

More information
www.robocup.org
www.b-human.de

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A Signpost in the German Space Program – BMWi Approves 8 Million Euros for DFKI Flagship Project

Space robotics for underwater exploration, medical rehabilitation, and disaster aid operations: Funding for DFKI's "TransTerrA" project is being provided by the Federal Ministry of Economics and Technology (BMWi) through the German Aerospace Center (DLR) as the first project with the stated aim of transferring aerospace technologies to earthly applications. The 7.9 million euro project was launched in May 2013 by Dr. Sven Halldorn, Head of the BMWi's Office of Technology Policy, Bernd Sommer from the DLR Space Administration, department of General Space Technologies and Robotics, and Prof. Dr. Frank Kirchner, Director, DFKI Robotics Innovation Center in Bremen.

"TransTerrA is a directional marker in the implementation of the national space strategy. We pursue the aim of implementing the core robotic technologies not only for use in space, but also for use in industrial applications on earth. This strengthens the role of Germany as a business and technology center," said Dr. Halldorn at a press conference: "DFKI, with its expertise in robotics, is able to make an outstanding contribution to this research."

Robotic space systems orbiting the earth must endure extreme temperature fluctuations, radioactive bombardment, and vacuum conditions. "Logically, they are perfectly suited for difficult access areas on earth," explained Bernd Sommer of the DLR Space Administration: "The huge transfer potential of robotic space systems is due to their ruggedness and automation. They function independently as well as being maintenance free over long periods and distances."

For example, they are perfect for missions on the ocean floor where extreme pressure and limited communication possibilities complicate the maintenance of the units used in oil and gas exploitation. Furthermore, repairs to a damaged nuclear power plant – contaminated by radiation and inaccessible to humans – can be assumed by an autonomous, reliable robot. In the field of medical rehabilitation intelligent human-machine-interfaces, like the exoskeletons used in the remote control of systems in space, can help stroke patients to relearn muscle control. "At DFKI we develop technologies that provide a direct benefit to humans in a variety of application scenarios: from outer space to the surface of the earth to the deepest ocean floor," said Prof. Frank Kirchner.

The Sherpa moon rover, the walking robot Asguard, and communication modules (l.-r.) are among the DFKI systems being developed in the "TransTerrA" project and transferred to application fields on earth.

Since 2009, space robotics has been a priority in the national strategy for research and innovation, with its implementation incumbent on the DLR Space Administration. A second focus, in addition to the development of technologies for missions in space, is the transfer potential of space robotics. "TransTerrA" is a 4-year project with the purpose of realizing this potential.

Public funding authority for "TransTerrA" is the German Aerospace Center – Space Administration (DLR). Funding ID: 50RA1301.

Supported by:

Federal Ministry of Economics and Technology

on the basis of a decision by the German Bundestag

More information
www.dfki.de/robotics

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Prof. Frank Kirchner, Dr. Sven Halldorn, and Bernd Sommer (l.-r.) launch the TransTerrA project in DFKI's Space Exploration Hall

Annegret Kramp-Karrenbauer, Minister President of Saarland, at the RES-COM project presentation

SmartF-IT – The IT for INDUSTRIE 4.0

Cyber-Physical IT Systems in the Factory of Tomorrow

Complex products know what discrete components go into building them, when they are to be assembled and serviced, and what needs to be considered when replacing them. In the factory of the future, they will control their own manufacture through cyber-physical systems (CPS) and facilitate flexible production. The SmartF-IT project studies cyber-physical IT systems for INDUSTRIE 4.0 and develops software tools for the interactions among processes, products, equipment, and employees in multiadaptive Smart Factories. The project, managed by DFKI and funded by the Federal Ministry of Education and Research (BMBF), was launched on June 19, 2013 at a kick-off event in Saarbrücken.

SmartF-IT develops technologies that enable manageable, small volume production runs in real time with maximal quality at low costs. Manufacturers can react to market fluctuations and global trends, supply a large number of variants or ultra small series, and satisfy customer requirements. SmartF-IT meets these challenges by using adaptive cyber-physical IT systems at every manufacturing level, in order to achieve the introduction, implementation, and operation of integrated production systems.

"In SmartF-IT, we are studying the next generation of intelligent IT systems that can manage complexity in the planning, operation, maintenance, and fault management of cyber-physical production systems in networked Smart Factories. This includes practical testing of these innovative IT systems in production environments through specific implementation projects at two of our partners plants, Bosch Rexroth and Miele, as well as a new production line at BMW," explained Prof. Dr. Wolfgang Wahlster, CEO and head of Intelligent User Interfaces at DFKI. "This allows us to develop and test the migration strategies for variant-rich production in INDUSTRIE 4.0 under realistic conditions in multiadaptive factories. The spectrum of interest ranges from assembly lines for hydraulic control components to electrical kitchen appliances to special engines for automobiles."

Products communicate over RFID chips and smart labels with integrated sensors in cyber-physical IT systems. They supply data about their attributes and status and, in effect, are networked to an Internet of Things. The research objectives of SmartF-IT reach far beyond the level of single production lines. SmartF-IT puts the individual production unit in the foreground and focuses on the use of IT methods to implement agility and multiadaptivity as major components of the Smart Factory.

The foundation of the Smart Factory, as established by SmartF-IT, is an integrated and executable IT supported model, with needs-based adjustments for the human operator that accounts for the sustainable well-being of all involved in the production process. The adaptable, reconfigurable production unit for the optimized manufacture of variant-rich, customized products in the context of "high-mix, low-volume manufactur-

ing" (to a lot size of 1), stands in a hybrid arrangement of manufacturing equipment and human labor supported by new, customized, production assistance systems. SmartF-IT investigates two typical areas of application for the new technologies: Above all this must include the migration of an existing production (retrofitting) and the planning and subsequent operation of a new production line yet to be built.

The SmartF-IT methods fundamentally greatly reduce the effort for the start up of production and, during operations, for the dynamic reconfiguration. A CPPS cockpit (Cyber-Physical Production System) illustrates the IT integration at the planning and control level and brings transparency to the cause and effect relationships in multiadaptive processes.

The technologies are tested and defined in the production plants of the partners BMW, Bosch Rexroth and Miele. The ways in which the achieved results can satisfy the requirements of highly productive plants are also being studied in a controlled parallel operation.

"I hope that INDUSTRIE 4.0 brings an advantage to Germany in the global competition. Together, the three strong German industries of electrotechnics, information technology, and mechanical engineering can accomplish exactly this. If not us, then who?" asks Dr. Matthias Möller, Bosch Rexroth in Homburg.

The close cooperation among the representatives of business and research ensures that results and solutions address the immediate industrial requirements and that generic models, methods, and tools are created that can be rolled out and exploited across all sectors. The business offices of INDUSTRIE 4.0, sustained by the professional associations BITKOM, VDMA, and ZVEI, serve as the forum.

SmartF-IT is funded for a period of three years (6/1/2013 - 5/31/2016) under the high-tech strategy of the Federal Ministry of Education and Research (BMBF) and supported by the DLR project management agency for Software Systems and Data Sciences.

Consortium Partners

- DFKI, Saarbrücken (lead manager)
- Bosch Rexroth, Stuttgart and Homburg/Saar
- Fortiss, München
- Miele & Co. KG, Bünde
- PLATOS, Herzogenrath
- Robert Bosch, Schwieberdingen
- TU Darmstadt, DiK - special subject area Data Processing in Design, and IAD - Institute for Industrial Science
- ZeMA (Center for Mechatronics and Automation Engineering), Saarbrücken
- BMW (associate), Munich

More information
www.smartf-it-projekt.de
www.plattform-i40.de
www.bmbf.de/de/6618.php

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INDUSTRIE 4.0 – A New World of Manufacturing

Information Day at Saarbrücken Schloss

Plug and Produce – decentralized production control, information exchange beyond production lines and enterprise boundaries, cost effective production of fewer pieces and small series – INDUSTRIE 4.0 production processes give medium sized manufacturers new perspectives for profitable new market segments.

The "INDUSTRIE 4.0 - The New World of Manufacturing" event held on June 20, 2013 in the Saarbrücken Palace was a first step at the regional level to inform locally-based, medium sized companies about the technologies, economic opportunities, and specific implementation of INDUSTRIE 4.0.

INDUSTRIE 4.0 is a future oriented project and part of the government's high tech strategy to promote automation in the traditional manufacturing industries. The aim is to strengthen Germany's standing as a manufacturing center and expand its competitive position as a leading global supplier of factory equipment. The state of Saarland is integrated in a lead role and could become a pilot region. Nowhere else is the research on the new industrial revolution so intensive as at DFKI. Networked communication and information exchange between machines and products (Internet of Things) has created the "smart factory," which is characterized by versatility, resource efficiency, and ergonomic design.

The demonstration facility at the DFKI SmartFactory shows the results of the RES-COM project (Resource Conservation Through Context-activated Machine-to-Machine Communication)) and provides a practical example of how the core INDUSTRIE 4.0 topics can be implemented in a complete production line.

More information
www.plattform-i40.de

Wahlster's Research in Artificial Intelligence Honored by IJCAI World Conference

At the 23rd International Conference on Artificial Intelligence (IJCAI-13) in Peking, Prof. Dr. Wolfgang Wahlster was the recipient of the "IJCAI Donald E. Walker Distinguished Service Award," the world's most respected award in the field of AI. Since 1979, this distinction award has been presented not more frequently than every two years to one individual researcher for lifetime achievement and scientific contribution to Artificial Intelligence. IJCAI President Prof. Dr. Craig Knoblock made the presentation during the opening ceremonies of the conference held at the Beijing International Convention Center (BICC).

Prof. Wahlster joins a line of respected scientists who have earned the prized over the last 20 years. He is the second German scientist and the fifth European to be selected for this international honor. In accepting the honor, Prof. Wahlster made reference to Donald E Walker, who was the director and treasurer of IJCAI for many years and for whom the prize is named: "He is the one who taught me that building bridges is the most important part of research – bridges between people, between disciplines, between diverse areas of special large subjects such as Artificial Intelligence, and between the international activities of research institutes throughout world."

Prof. Wahlster with IJCAI President Prof. Dr. Craig Knoblock

More information
http://ijcai13.org/program/awards
www.dfki.de/~wahlster/IJCAI_Award_Beijing_China_05_08_13

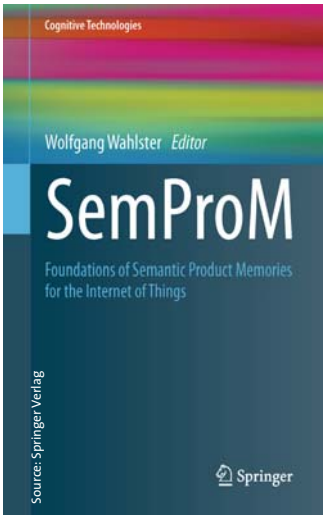
First Book About Principle of INDUSTRIE 4.0 Published

The publication of Prof. Wahlster's book "SemProM: Foundations of Semantic Product Memories for the Internet of Things," in English language at Springer Publishing Company marks the first printing of a comprehensive, technical description of a key component of INDUSTRIE 4.0. As part of the German government's ICT-2020 research program funded by the Ministry of Education and Research (BMBF), the innovation alliance "Digital Product Memory" (DPG) through the collaborative project SemProM (Semantic Product Memory) is developing key technologies for smart factories, intelligent logistics, and hybrid products.

The term "Digital Product Memory" was first coined in one of the publications by Prof. Wahlster as early as 2007 and now, this provides the basis for all INDUSTRIE 4.0 projects. Cyber-physical object memories make production and logistics more efficient and flexible, production relationships more transparent, supply chains and environmental impacts more traceable. The manufacturer is supported; the consumer is better informed.

SemProM was a large scale industrial and academic research project that encompassed all aspects of design and implementation of semantic product memories. The project results after three years of research are now available in book form. The introductory chapters explain the fundamental ideas and the organization of the project, while the remaining sections discuss the structures, models, and processing of digital product memories as well as the multimodal interaction between them and various selected applications.

More information
www.semprom.org
www.bmbf.de/de/9069.php



Link to the book
www.springer.com/computer/ai/book/978-3-642-37376-3

Prof. Uszkoreit Winner of Google Focused Research Award

Prof. Dr. Hans Uszkoreit, Scientific Director at DFKI, language technology expert and spokesperson for the DFKI project office in Berlin, was selected in June 2013 as the recipient of the Google Focused Research Award.

Google sponsors the annual invitation-only program and this year invited leading advocates of language technology to propose projects appropriate for the theme "Knowledge Graphs and Compositionality in Web-scale Natural Language Understanding." Prof. Dr. Uszkoreit, together with Dr. Feiyu Xu, DFKI senior software engineer and Prof. Roberto Navigli, La Sapienza University in Rome, proposed the "Language Understanding cum Knowledge Yield (LUcKY)" project. The aim is to study software tools that perform the automatic extraction of conceptual relationships (Relation Extraction) from Big Data – very large collections of facts, or knowledge banks. Google granted 220,000 USD in project funding.

The bulk of human factual knowledge is linguistically generated, passed down, and stored as text in archives. Recent advances in computer linguistics and application-oriented language technologies make it possible not only to use distributed unique data in data silos, but also to better analyze the relationships between these facts and exploit the knowledge gained. Language recognition systems promise a host of new knowledge derived by knowledge extraction from very large language knowledge bases.

The LUcKY project produced knowledge graphs that exploit and represent explicit contextual relationships linguistically included in the texts that are not found by a simple keyword search. The goal is the automatic identification of semantic relationships between terms and, consequently, to gain new knowledge from topic recognition and relationship analysis. The language technologies are used in practical scenarios to identify and evaluate the relationships in, for example, large quantities of data in the healthcare field. These tools can lead to new diagnostics, therapies, drugs, or to expanded knowledge about previously lesser known subjects such as the progress of an illness, the side effects, or the key to a cure.

Other areas of application that can greatly benefit the broader public are in the area of sentiment analysis or the assessment of customer interactions. Many evaluation platforms provide product claims, critiques, or suggestions that do not guarantee the objectivity of the author or may be suspicious at the least. They give the impression that only limited trust should be given to such recommendations, because it is not clear whether the critic, e.g., of the hotel, vacation resort, or restaurant, is presenting the recommendation as a relevant private opinion or, perhaps, as a favor, or as a commissioned posting. The analysis of customer feedback could provide information about the reliability of the comments or help to identify the possible self-interests of the commentator.

Google's Focused Research Program promotes research topics of fundamental interest to the company itself as well as to the broader scientific community.

The computer science of Saarbrücken now has three Focused Research Award recipients. In 2010, Prof. Dr. Andreas Zeller, Saarland University, was the winner in the field of "Software and Hardware Systems Infrastructure." Prof. Dr. Gerhard Weikum, Max Planck Institute for Computer Science won the Focused Research Award in 2011 in the subject of "Information Retrieval, Extraction, and Organization."

More information

http://googleresearch.blogspot.de/2013/07/natural-language-understanding-focused.html

http://research.google.com/university/relations

http://research.google.com/university/relations/focused_research_awards.html

www.dfki.de/lt/lt-general.php

www.freebase.com

Meta-Forum 2013 – DFKI Leads Largest Multilingual Language Technology Alliance

Dr. Andreas Goerdeler, Ministry of Economics and Technology

META-FORUM is an international conference series on technologies for a multilingual Europe. Following very successful conferences in Brussels (2010, 2012) and Budapest (2011), META-FORUM 2013 was held on September 19-20, in Berlin at the Federal Ministry of Economics and Technology (BMWi). The event coordinator was the DFKI Project Office in Berlin, department of Language Technologiy, in cooperation with the BMWi. The two special themes of this year's edition of the conference were Big Data Text Analytics and Multilingual Web Services.

Dr. Andreas Goerdeler, responsible for information society and media issues at BMWi, presented the opening remarks in which he cited the META-NET study "European Languages in the Digital Age" and advocated the breakdown of Europe's language borders through innovative technologies and, in this way, the strengthening of the common digital market. Success is dependent on linking the topics Smart Data and research transfer inside the industry. BMWi is making preparations to present a new research program in Berlin in conjunction with the "Big Data Days" on November 11-12, 2013.

Subsequently, Márta Nagy-Rothengass, head of the "Data Value Chain" office at the General Directorate for Communication Networks, Content, and Technology (DG Connect) at the European Commission (DG CNECT) presented an overview of the activities of the commission in the area of Big Data. "The intelligent extraction and exploitation of information from a multilingual flood of data," according to Nagy-Rothengass, "poses a unique challenge for today's language technology research." Dr. Daniel Marcu, Chief Science Officer at SDL, USA, in his keynote address to an audience of more than 200 people, presented a critical analysis of the "Strategic Research Agenda for a Multilingual Europe 2020" proposed by META-NET at the start of 2013. He noted the broad support that already exists for the research topics specified in this strategy paper and reached the conclusion that no region on earth is better suited than Europe to profit from linking the topics of multilingualism and language technologies. In the second keynote, Prof. Wolfgang Wahlster (CEO, DFKI) created a bridge linking the topics of Big Data and Language Technology as he discussed the relevance of text analytics in the analysis of very large quantities of data. After presenting the DFKI research results, he presented a summary of the ongoing activities of the BMWi and the BMBF (Federal Ministry of Education and Research).

Several leading European researchers reported their latest findings and success stories from ongoing research and industry projects. A panel discussion addressed how existing technologies and services were being used in the European platform for language technologies postulated by META-NET. A second discussion was attended by representatives of the different interest groups (e.g., the European Federation of National Institutions for Language, Network to Promote Linguistic Diversity, Committee of Experts on Regional and Minority Languages of the European Council, Globalization and Localization Association, LT Innovate, META-NET) where they all demonstrated their solidarity with the goals being pursued by META-NET. "We are very pleased that the number of supporters continues to increase! This year, the main area was in the umbrella organizations of the linguistics communities and the

Dr. Daniel Marcu, Science Officer SDL

Prof. Wolfgang Wahlster, CEO DFKI

GALA and LT Innovate initiatives, which we already have some cooperation with, but this will be even closer, especially in the future," said Prof. Hans Uszkoreit, Head of the Language Technology Lab at DFKI and coordinator of META-NET.

This year's META Prize was awarded to the Rosetta Foundation. The META Seal of Recognition was presented to the companies: Cereproc (UK), Disruptive Innovations (France), Kilgray Translation Technologies (Hungary), and Tetracom Interactive Solutions (Bulgaria). Approximately 30 companies and research project teams presented their current findings in the form of posters and software demonstrators in the exhibit area.

META-FORUM 2013 was organized by META-NET, a competence network comprised of 60 research organizations in 34 countries. META-NET forged the Multilingual Europe Technology Alliance (META) – an open alliance of programmers and users of language technologies from research, industry, and public administration. The common goal is to prepare a research and technology offensive for the realization of a multilingual information society in Europe. Since its establishment in November 2010, membership in the Alliance has grown to more than 700 companies and institutes from more than 60 countries.

The aim of the initiative is not only to strengthen the various strategic research topics such as the "Translingual Cloud," but also to develop a European platform for language technologies. "The coming months are critically important for European language technology research. The work programs as well as the first invitations to bid are currently in preparation for the two large European funding programs Connecting Europe Facility and Horizon 2020," according to Georg Rehm, META-NET manager. "The language technology research in Europe is well positioned, with far less financial support than say, the large Hadron collider, to define the information and communication technologies of the future," explained Rehm.

Videos of the lectures and panel discussions, presentations, a photo galery, and more information is available online at: www.meta-net.eu/events/meta-forum-2013.

META FORUM 2013

Prof. Hans Uszkoreit, Head of DFKI research department Language Technology

Dr. Daniel Marcu, SDL and Dr. Georg Rehm, META-NET Network Manager

FUNDED BY

Prof. Josef van Genabith, Dublin City University, Centre for Next Generation Localisation, presented the European Initiative for Quality in Translation

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Semantic Web for All – New Application Scenarios for the Media Industry

The Semantic Web technology stack has been established. Rather than continuing to standardize the existing basic building blocks, now is the time to enable the "Semantic Web for all." What new technological modules are required in order to use semantic technologies productively and to achieve added value in the media business?

The answers to this question were the focus of a Semantic Media Web Innovation Forum conference on "Semantic Technologies - Application Strategies and Convergence of Metadata." The event was jointly organized by the German-Austrian W3C office at DFKI and Xinnovations, a cooperation of companies and institutions being active within the field of internet-based business and communications processes.

The conference was held in Berlin on September 26-27, 2013 at Humboldt University. The discussion centered on the application fields of multimedia archives and digital publishing. The program agenda opened with Prof. Dr. Felix Sasaki, senior researcher at DFKI Project Office Berlin and head of the W3C Germany and Austria Office: "There is no blanket answer to the question as to what new technological modules are required to productively exploit semantic technologies in the media business and achieve added value. We are just beginning to get a vague understanding of the variety of application scenarios the future will bring. The many contributions to the conference, however, made it clear that semantic technologies can offer considerable potential in terms of the optimal use of multimedia content and the improved retrievability of networked publications."

Besides the current technologies for exploiting multimedia data, conference topics included practical lectures about multimedia archives, film production, semantic storytelling, and multimedia mashups. The speakers stressed the importance of semantic modeling as the basis for innovative applications as they presented previews of the future Semantic Media Web.

The agenda on the second day was dedicated to the topic of metadata vocabularies for digital publishing. In 2013, W3C established the Digital Publishing Activity (www.w3.org/dpub), where metadata plays a major role. In the traditional publishing process, metadata is an established means of describing (digital) objects. Content enriched with metadata, or "content-as–a-service" promises huge potentials in the field of digital publications.

"As the scientists have impressively shown us, the basic research in Semantic Web technologies is quite advanced," concluded Rainer Thiem, CEO of Xinnovations. "Many of the practical examples introduced and discussed at the conference have demonstrated, especially in the area of multimedia applications, that the combination of semantic and language technologies holds great promise. In fact, the next paradigm shift is already taking shape: Imagine the "Pragmatic Web" as a synonym for the transition from passive to active web, in which intelligent multimedia-content is linked over pragmatic internet services with new kinds of user interfaces."

Many questions remain to be answered before this vision becomes reality, for example, in terms of metadata quality, linking vocabularies, metadata workflows, the role of domain-specific and general vocabularies as well as the balance between automatic creation or processing of metadata and human intervention.

More information
www.semantic-media-web.de

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DFKI Interview – Kathrin Eichler

Kathrin Eichler is a researcher at DFKI's Language Technology Lab and a PhD candidate at Software Campus, a program to promote future IT managers

What do you see as the application potential of your research?
My research is all about identifying contextual matches in texts. We are not looking for specific key words, but rather for semantic similarities and we are using the RTE ("Recognizing Textual Entailment") technologies.

The results can be used in the area of customer support in order to determine whether a predrafted response text is already stored in the system for a customer inquiry, even if the terms used are completely different ones. For example, one customer is complaining that the sound track and picture from a DVD do not match, another claims the audio and video are asynchronous. Both mean the same thing.

When did your interest in Artificial Intelligence begin and how have AI processes changed since that time?
The idea of AI has fascinated me ever since I was a student in Tübingen and attended a seminar on machine learning in computer linguistics. After getting my masters degree in "Intelligent Systems" at the University of Sunderland, I applied and was hired by DFKI.

During the course of my studies, monitored learning processes played a significant role. Instead of developing rule-based systems, as in the past, we annotated data and trained models. Today, the trend is going more and more towards processes that work with raw data. In contrast to the manually annotated data, this is available in large volumes often at no additional cost and, with today's methods and hardware, can also be processed in meaningful ways.

What are the greatest challenges and opportunities for AI systems today?
Well, human language is one of the greatest challenges in AI. Although IBM's Watson beat human competitors in the TV quiz show "Jeopardy," in contrast to humans, the computer program is only capable of finding and linking relevant facts in large data volumes. It certainly cannot draw conclusions, develop an independent thought, or express feelings. The "language skills" of such systems do not even come close to the level of human understanding.

Nevertheless, there are applications in language technology that have already been successfully used in many different areas. Applications, for example, that are able to link data in different languages are increasingly important.

What do you enjoy doing when you are not working as a research scientist?
I like to sing in my leisure time and spend as much time as I can in my garden and with my family.

Are there parallels to your professional life?
There is an old saying: Water doesn't boil any faster if you stare at it. That applies to my work too. Good ideas need time and proper "care" before they can thrive.

What are your current projects?
Since 2012, I have been working on an EU project named EXCITEMENT ("Exploring Customer Interactions Using Textual Entailment") and coordinating the work package that deals with developing the interface between textual entailment technology and industrial applications.

At the Software Campus, I head the ISSA project, funded by the Federal Ministry of Education and Research (BMBF) and supported by Software AG. The aim of that project is to investigate how textual inference can be used to measure the contextual similarities of the texts, especially those in customer inquiries.

eFahrung Electrifies Corporate Fleets

Photo: AGT Germany

Prof. Lutz Heuser

Germany has the goal of becoming a "leading market for electric mobility" by 2020. Private vehicle owners as well as rental and car-sharing companies have already invested heavily in electrically powered vehicles. Corporations have hesitated until now to integrate e-cars into their fleets because of the lack of an efficient and comprehensive (software) infrastructure.

The eFahrung project is one of about 30 core projects that make up the "Display Room for Electric Mobility, Berlin-Brandenburg" with the aim of developing and testing business models for the shared use of electric cars by corporations. The aim is to create a software infrastructure to optimize vehicle use and integrate services for fleet operators. As project coordinator, the Urban Software Institute develops the basic business model. "We want to offer an extremely interesting business opportunity for fleet operators in Berlin to gain fleet experience with electric mobility," said Prof. Lutz Heuser, Chief Technology Officer at the Urban Software Institute and senior advisor to DFKI for City Management, as he talked about the overall goal of the collaborative project. At the Intelligent User Interface department and the Robotics Innovation Center in Berlin and Bremen, DFKI is developing an intelligent eCar fleet monitoring package that includes onboard units and the connection to the control system.

More information
www.schaufenster-elektromobilitaet.org

Project SimpleSkin Exploring New Methods – Embedded intelligence Enters the Textile Market

Prof. Paul Lukowicz

The European Union is sponsoring Project SimpleSkin to study some fundamentally new approaches to the production of smart textiles and functional clothing. The basic concept is to decouple the manufacture of fabrics with built-in sensor infrastructures from the individual intelligent clothing item and the application that will use it. For example, a T-shirt made of a special fabric woven with integrated sensors, continuously monitors and records the wearer's vital signs and forwards them to a smart phone. The parameters can be processed and evaluated by an "app", for example, to warn of over exertion, severe stress, or incorrect posture.

"Over the long term, this functional clothing could become an established standard, comparable to the sensor-capable mobile telephones that have already become a part of everyday life," said Paul Lukowicz, Head of Embedded Intelligence research department at DFKI.

The joint project was launched on July 1, 2013 with DFKI's Embedded Intelligence as lead manager. Other partners in the project are the University Stuttgart, the German Research Institute for Textiles and Fibers (DITF), TU Eindhoven (Netherlands), ETH Zurich (Switzerland), and Sefar (Switzerland).

More information
www.simpleskin.org

National Research Council (USA) Visit to DFKI

(l.-r.) PD Dr. Matthias Klusch, Dr. Patricia Wrightson, PD Dr. Peter Fettke, Prof. Katia Sycara, Prof. Wolfgang Wahlster, Dr. Michael Feld, Prof. Anthony Jameson

DFKI Saarbrücken and Kaiserslautern hosted Dr. Patricia W. Wrightson and Prof. Katia Sycara from the US National Research Council (NRC) as part of their planned fact finding mission to Germany on behalf of the Commission CHMNI (Integrating Humans, Machines and Networks) in August 2013. Their interest focused on the current state of research at DFKI in areas of technology related to optimal situational and computer aided decision support systems.

DFKI's research results in the field of Intelligent Decision Making were discussed with respect to the US national research priorities.

5th Innovation Day at SmartFactory^{KL}

Representatives from industry, science, and government discussed the future technologies and visions for various manufacturing scenarios at the 5th Innovation Day held at SmartFactory^{KL} on September 10, 2013. DFKI's department for Innovative Factory Systems, headed by Prof. Detlef Zühlke, as well as partners from science and industry presented research results and important new projects for the factory of the future. The conference convened under the motto "INDUSTRIE 4.0 – From Hype to Reality" and the theme of transitioning from visionary buzzwords to feasible concepts.

Industry is increasingly recognizing the 4th Industrial Revolution as a technological watershed driven by the Internet of Things. The specific demand is now for flexible solutions to company-specific problems. At the new demonstration facility of the SmartFactory^{KL}, current insights to Plug 'n Play components for production systems on the basis of networked control systems can be evaluated realistically and independent of manufacturer. The new paradigm and technological innovations of "INDUSTRIE 4.0" will be presented clearly and conveniently to the public for the first time at the Hannover Messe 2014.

More information
www.smartfactory.de

Prof. Jörg Siekmann Honored as DFKI Fellow

(l.-r.) Dr. Olthoff, Prof. Siekmann, Prof. Wahlster

On the 25-year anniversary of DFKI, Prof. Siekmann was honored as the recipient of a DFKI Fellowship, the highest recognition that DFKI can bestow. The honor, as a rule, is bestowed every two years to an internationally recognized top-scientist and friend of DFKI.

Jörg Siekmann is particularly deserving of the honor because of his contributions to DFKI and the computer sciences in Germany. He is considered as one of the fathers of Artificial Intelligence in Germany. Prof. Siekmann made a significant contribution to the establishment of the special subject area of Artificial Intelligence and the expansion of the AI department within the German Informatics Society and served as its first speaker. From the beginning, he lobbied the former Federal Ministry of Research and Technology (BMFT) for the establishment of a German AI research center. Prof. Siekmann also worked together with Prof. Richter and Prof. Wahlster on the development of the scientific concept of DFKI. As a computer science professor, he was instrumental in establishing the department of Deduction and Multi-Agent Systems and the e-Learning Competence Center at DFKI.

Prof. Wahlster Reappointed to the Board of Trustees, International Computer Science Institute (ICSI) in Berkeley

Prof. Wolfgang Wahlster

On October 11, 2013, Prof. Wahlster was reappointed for another three-year term to the board of trustees of the International Computer Science Institute (ICSI), which like DFKI, is celebrating its 25th anniversary. ICSI was founded in 1988 by Prof. Norbert Szyperski (former chairman of GMD), and like DFKI, it is a non-profit public-private partnership (PPP). Ron Kay served as its first director, establishing the basis for the long term success of this internationally respected center of Excellence.

Prof. Wahlster campaigned through the Research Alliance of the federal government on behalf of the German post doctorate program at ICSI. The program, known as "FIT," will enjoy the financial support of the Federal Ministry of Education and Research (BMBF) in the future. Just a few days earlier in Helsinki, on October 7, 2013, Prof. Wahlster was also reappointed for a 2-year term to the scientific advisory board of the European Union's Future Internet PPP (FI-PPP), the largest European PPP for internet research. Also, on September 23, 2013, Wahlster was appointed to the executive board at the general meeting of the European elite institute EIT ICT Labs, where he is to represent the interests of the core scientific partners in Germany.

Honorary Doctor Title for Prof. Detlef Zühlke at Lucian Blaga University of Sibiu

Honors celebration for Prof. Zühlke at the 6th International Conference on Manufacturing Science and Education (MSE)

The Hermann-Oberth Faculty at the Lucian Blaga University in Sibiu, Romania (ULBS) awarded Prof. Detlef Zühlke an honorary doctorate for his outstanding research contributions in the field of factory automation.

As head of DFKI's Innovative Factory Systems department and Chair of the Production Automation department at TU Kaiserslautern, Prof. Zühlke has maintained close contact with ULBS in the area of smart manufacturing technologies since 2007. Furthermore, the ULBS is a member of the technology initiative SmartFactory^{KL} at DFKI.

Martin Haag and Christoph Igel to Lead the e-Learning Working Group at GMDS and GI

At the 58th Annual Conference of the German Association for Medical Information Systems, Biometrics, and Epidemiology (GMDS), Prof. Martin Haag, Heilbronn University and Prof. Christoph Igel, Director of the Centre for e-Learning Technology (CeLTech) were elected to serve as chairman and co-chairman (resp.) of the working group "Technology-Aided Teaching and Learning in Medicine (TeLL)." The TeLL working group is active both in the GMDS and also anchored as a working group in the organization of the German Informatics Society (GI).

EIT ICT Labs Summer School in Trento Powered by DFKI

EIT ICT Labs Summer School program "Intelligent Services for Digital Cities" took place from September 2-6, 2013 in Trento. Six teams of students from all over Europe were asked to develop ideas for innovative services for "digital cities" using the technologies developed by the partner organizations.

Team INTELLIVENT used the MMIR technology (Multimodal Interaction and Rendering) developed at DFKI to win one of the first place prizes at the summer school. The team presented an idea, developed together with experts from the Italian EIT ICT Lab in Trento, at a Demo Day dedicated to the theme "Digital Cities" on November 29, 2013 in Berlin.

More information
www. eitictlabs.eu

Topping-out Ceremony at the DFKI Bremen Site: New Building Structure Completed

Continued expansion: DFKI Bremen proceeds with site construction. The topping-out ceremony was held in early September 2013. The building should be ready for occupation by May 2014. "The completion of the first building phase highlights the importance to DFKI of the Bremen site as well as the good faith we have in further positive developments in the research activities conducted at Bremen," said CFO Dr. Walter Olthoff at the topping-out celebration.

The core of the new, 4-story building is the underwater pool, which is about 4000 cubic meters large and certainly one-of-kind in Germany. With its dimensions (24x20x8 meters), it is the perfect test environment for the development of intelligent systems for deep sea robotic systems.

Celebrating the completion of structural work (l.-r.): Prof. Rolf Drechsler, Site director Prof. Frank Kirchner, DFKI CEO Prof. Wolfgang Wahlster, foreman Michael Ley from August Prien Company, DFKI CFO Dr. Walter Olthoff, and Andreas Timmermann from HTP architectural firm

Outstanding Matcher Award for Tom Thaler at International Workshop PMC-MR'13 in Peking

At this year's annual International PMC-MR'13 Workshop (Process Model Collections: Management and Reuse), which was held in conjunction with the Business Process Management Conference (BPM 2013) in Peking, Tom Thaler, from the Institute for Information Systems (IWi) at DFKI, received the "Outstanding Matcher Award." The Matching Contests are conducted in the context of the workshop and his algorithm to compare various process models was enough to convince the jury. He successfully implemented the "N-Ary Semantic Cluster Matching" (RefModMine-NSCM) method to analyze the process models and form clusters on the basis of semantic similarities. In a final step, binary matchings between two models are extracted from these clusters to provide information, for example, as to whether one model with an equivalent subject matter adequacy is, perhaps, more efficient to use or has implementation advantages.

More information
http://processcollections.org/matching-contest
http://tom-thaler.de

DFKI Service Offering

As an internationally renowned Center of Excellence for innovative software systems based on Artificial Intelligence (AI) methods, DFKI is offering the following services with more than 25 years of experience in basic and applied R&D:

- Technology transfer of the award-winning research results of DFKI
- Innovation coaching and start-up consulting in the Public-Private-Partnership sector
- Individual design, development and implementation of innovative application solutions
- Market studies, expert surveys, feasibility analysis and empirical user studies
- Component development with AI-functionality, enhancing the performance of complex software systems
- Scientific advice on the selection and implementation of complex software solutions
- Customization, implementation, deployment and maintenance of our AI-solutions
- Scientific evaluation and benchmarking of software solutions
- Application-oriented basic research
- Independent assessment of IT-security and privacy
- Technology workshops, training and practice
- Scientific monitoring of data collections and their evaluation
- Business engineering: Process analysis and development
- Innovation coaching and turnaround management
- Strategic and technical Due Diligence consulting for companies in the ICT sector
- Technical and organizational support for the standardization in the IT sector (including W3C, ISO)
- Design, construction and operation of Living Labs

Kaiserslautern Site

Saarbrücken Site

Bremen Site

Project Office Berlin

German Research Center for Artificial Intelligence

Company Profile

Established
1988

Legal Form
Non-profit organization
(public-private partnership)

Executive Board
- Prof. Dr. Dr. h.c. mult. Wolfgang Wahlster, CEO
- Dr. Walter Olthoff, CFO

Aufsichtsrat
- Prof. Dr. h.c. Hans-Albert Aukes, Chairman
- Dr. Susanne Reichrath, Representative of Saarland's Minister President for Higher Education, Science and Technology, Vice Chairwoman

Locations
Kaiserslautern (registered office), Saarbrücken, Bremen, Berlin (project office). Further operating sites in Osnabrück and St. Wendel

Shareholders
Astrium GmbH, BMW Group Forschung und Technik GmbH, CLAAS KGaA mbH, Daimler AG, Deutsche Messe AG, Deutsche Post AG, Deutsche Telekom AG, Empolis Information Management GmbH, Fraunhofer Gesellschaft e.V., Harting KGaA, Intel Corporation, John Deere European Offce, KIBG GmbH, Microsoft Deutschland GmbH, RICOH Company Ltd., SAP AG, Software AG, University of Kaiserslautern, Bremen University, Saarland University

Equity Holding
Center for the Evaluation of Languages and Technologies Srl (CELCT), Trento - Graphics-Media.net GmbH, Kaiserslautern - Ground Truth Robotics GmbH, Bremen - PMC e.G., Bremen - SemVox GmbH, Saarbrücken - Yocoy Technologies GmbH, Berlin

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Intelligent Solutions for the Knowledge Society

The German Research Center for Artificial Intelligence (DFKI) was founded in 1988 and has research facilities in Kaiserslautern, Saarbrücken and Bremen, a project office in Berlin and branch offices in Osnabrück and St. Wendel. In the field of innovative commercial software technology using Artificial Intelligence, DFKI is the leading research center in Germany.

Based on application oriented basic research, DFKI develops product functions, prototypes and patentable solutions in the field of information and communication technology. Research and development projects are conducted in fourteen research departments, eleven competence centers and six living labs. Funding is received from government agencies like the European Union, the Federal Ministry of Education and Research (BMBF), the Federal Ministry of Economics and Technology (BMWi) and the German Federal States as well as from cooperation with industrial partners. Twice a year, a committee of internationally renowned experts (Scientific Advisory Board) audits the progress and results of state-funded projects. In addition, BMBF evaluates DFKI every five years. The most recent assessment was again very successfully concluded in 2010.

Apart from the state governments of Rhineland-Palatinate, Saarland and Bremen, numerous renowned German and international high-tech companies from a wide range industrial sectors are represented on the DFKI supervisory board. The DFKI model of a non-profit public-private partnership (ppp) is nationally and internationally considered a blueprint for corporate structure in the field of top-level research.

DFKI is actively involved in numerous organizations representing and continuously advancing Germany as an excellent location for cutting-edge research and technology. Far beyond the country's borders DFKI enjoys an excellent reputation for its academic training of young scientists. At present, 412 highly qualified researchers and 263 graduate students from more than 60 countries are contributing to more than 170 DFKI research projects. DFKI serves as a stepping stone to leading positions in industry and successful careers as founders of spin-off companies. Over the years, more than 60 staff members have been appointed professors at universities in Germany and abroad.

Research & Development

Scientific Directors and Research Departments

Kaiserslautern Site

- Prof. Dr. Prof. h.c. Andreas Dengel: Knowledge Management
- Prof. Dr. Paul Lukowicz: Embedded Intelligence
- Prof. Dr.-Ing. Hans Schotten: Intelligent Networks
- Prof. Dr. Didier Stricker: Augmented Vision
- Prof. Dr.-Ing. Detlef Zühlke: Innovative Factory Systems

Saarbrücken Site

- Prof. Dr. Antonio Krüger: Innovative Retail Laboratory, St. Wendel
- Prof. Dr. Peter Loos: Institute for Information Systems
- Prof. Dr. Philipp Slusallek: Agents and Simulated Reality
- Prof. Dr. Hans Uszkoreit: Language Technology
- Prof. Dr. Dr. h.c. mult. Wolfgang Wahlster: Intelligent User Interfaces

Bremen Site

- Prof. Dr. Rolf Drechsler: Cyber-Physical Systems
- Prof. Dr. Frank Kirchner: Robotics Innovation Center
- Prof. Dr. Bernd Krieg-Brückner Bremen Ambient Assisted Living Lab
- Prof. Dr. Joachim Hertzberg: Robotics Innovation Center, Branch Office Osnabrück

Project Office Berlin

- Projects and cooperation in the German capital region

Living Labs

Testing, evaluation, and demonstration of innovative technologies in comprehensive application scenarios

Advanced Driver Assistance Systems Living Lab, Bremen Ambient Assisted Living Lab, Innovative Retail Lab, Robotics Exploration Lab, Smart City Living Lab, Smart Factory

Competence Centers

Coordination of research activities in particular areas

Ambient Assisted Living, Case-Based Reasoning, Computational Culture, e-Learning, Human-Centered Visualization, Language Technology, Multimedia Analysis & Data Mining, Semantic Web, Safe and Secure Systems, Virtual Office of the Future

Key Figures

Annual Budget 2012

€ 36.0 million

Total Assets 2012

€ 113.6 million

Employees

412 professional staff, 263 graduate student staff

As of October 22, 2013

Scientific Excellence and Transfer

International Scientific Advisory Board

Bi-annual evaluation of publically funded projects

- Prof. Dr. Horst Bunke, University of Bern, Switzerland, Chairman

Leading-Edge Research

DFKI is the only German institute for computer science to participate in each of the three leading-edge research clusters

- Cluster of Excellence "Multimodal Computing and Interaction" funded by the German Research Foundation (DFG)
- Leading-Edge Cluster "Software Innovations for the Digital Enterprise" funded by BMBF
- European Institute of Innovation and Technology - Information and Communication Technology Labs (EIT ICT Labs)

Networks of Excellence

At present, DFKI is a coordinator or core partner in four European Networks of Excellence

Promoting Young Talent

DFKI is a founding member and core partner of the Academy Cube and the Software Campus to promote managerial talent in the IT industry

Academic Chairs

More than 60 former staff members have been appointed professors at universities in Germany and abroad

Spin-offs

Over 60 spin-off companies have created approximately 1,700 highly skilled jobs

Committees and Academies

DFKI is represented by its scientific directors on numerous committees and academies

Scientific and Government Committees

Research Alliance of the German Federal Government, Feldafinger Kreis, Münchner Kreis, Advisory Board of the Future Internet Public-Private Partnership Programme of the European Union (FI-PPP), Coordinator of the European Alliance Multilingual Europe Technology Alliance (META-NET), Management Board of the International Computer Science Institute in Berkeley, National Institute of Informatics (NII, Tokio), Chair of the German Informatics Society (GI), and others

Business Committees

International SAP Research Advisory Board, Governance Board Intel Visual Computing Institute, Advisory Board NEC Computers and Communication Innovation Research Lab, and others

Scientific Academies

Royal Swedish Academy of Sciences, German National Academy of Sciences Leopoldina, Berlin-Brandenburg Academy of Sciences, Academy of Sciences and Literature, National Academy of Science and Engineering, European Academy of Sciences, and others

Intelligent Solutions for the Knowledge Society

- Knowledge management and document analysis
- Virtual worlds and 3D internet
- E-Learning and e-Government
- Development of provably correct software
- Innovative factory systems
- Intelligent networks
- Information extraction from text documents
- Intelligent web retrieval and web services
- Multi-agent systems and agent technology
- Multimodal user interfaces and language understanding
- Visual computing
- INDUSTRIE 4.0
- Augmented vision
- Mobile robotic systems
- Shopping assistance and intelligent logistics
- Semantic product memories
- Safe and secure cognitive systems
- Semantic web and Web 3.0
- Ambient intelligence and assisted living
- Intelligent solutions for safety and security
- Driver assistance systems and Car2X communications
- Cyber-physical systems

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