DFKI Opens New Lab in Bremen

DFKI at CeBIT 2006

Special Exhibit Human Computer Interaction
DFKI has been selected as one of 365 places – one for each day – in “Germany - Land of Ideas”, an initiative under the patronage of the President of the Federal Republic of Germany. In the year 2006, one specific day has been assigned to each selected place, when it will present itself, its ideas, and its results to the public. Within the framework of this initiative, DFKI invites the public to learn more about the work being performed here on September 22, 2006: Rendezvous with Innovation – Intelligent programming lets computers understand human language and gestures.
The establishment of the new DFKI lab is supported by the state of Bremen and the Federal Ministry for Education and Science (BMBF). The opening ceremony for the DFKI-Bremen Lab was on February 27, 2006 and took place in the Upper Chamber of the Bremen City Hall.

As the third site for DFKI, along with the Saarbrücken and Kaiserslautern locations, the new facility will concentrate on "Robotics" (Head, Prof. Dr. Frank Kirchner) and "Safe and Secure Cognitive Systems" (Head, Prof. Dr. Bernd Krieg-Brückner). The site speaker is Prof. Kirchner. The state of Bremen has agreed to provide funding for the Lab in the amount of €1.3 million and, starting in 2008, BMBF will also provide support to the DFKI-Bremen Lab totaling €1.3 million.

Prof. Wolfgang Wahlster, Chairman of the Executive Board at DFKI, sees DFKI as a dynamic partner for innovation. "DFKI transforms research monies into know-how but does not stop there, rather it goes on to rapidly convert this know-how into marketable products, value-added services, and finally, back into money so that the entire innovation cycle can start again," said Prof. Wahlster. "The leverage effect of the funding for innovation is unique at DFKI: for every euro provided by the host states to DFKI in 2005, we created 13 euros."

The work effort of the Robotics Lab at DFKI-Bremen will concentrate on research, technology development, and the relevant application of intelligent, cognitive robotic systems, as well as complex, integrated systems. "Our special focus in Bremen is on underwater and space robotics," explained Prof. Dr. Frank Kirchner. "We are developing autonomous vehicles for the exploration of space and the underwater sea world; in the future, we will supply intelligent robots that possess a high degree of mobility and maneuverability, in addition to an ability to autonomously draw conclusions and derive alternative actions based on the environment being explored."

Senator Willi Lemke, Bremen; Prof. Frank Kirchner; Prof. Wolfgang Wahlster; Parliamentary State Secretary Thomas Rachel, BMBF; Prof. Wilfried Müller; State Secretary Dr. Susanne Reichrath, Saarland; Parliamentary State Secretary Thomas Riechel, BMBF; Prof. Wolfgang Wahlster; Prof. Bernd Krieg-Brückner; Ir. Anton H. Schauf, Deutsche Telekom AG
CityGuide Mobile – A Navigation System for Mobile Phones

CityGuide Mobile is a multi-lingual, interactive mobile navigation system, developed by DFKI in cooperation with the City of Kaiserslautern and Webnologic Internet Systems, a company based in Koblenz, Germany. CityGuide Mobile can be employed as a pedestrian city guide as well as a guide for trade fairs and exhibits. The system is based on a platform-independent software application, which runs on most Java equipped mobile phones and handheld computers. In contrast to most other systems, it does not require a GPS receiver. The system runs at minimal expense as you only pay for the internet connection to the city server. CityGuide Mobile was first deployed successfully as a guide at the Intergeo Trade Fair in Düsseldorf in October 2005.

CityGuide Mobile provides a rapid and accurate orientation to a foreign environment. All that is required is the entry of your present location and your target destination. The shortest path is then displayed on a map section or in written directions.

The technology used in the City Guide originated with our partner, Webnologic Internet Systems, which also developed the software for the mobile application. The basic content and mapping as well as the routing network were prepared and implemented into the system by the offices of Urban Development and Organizational Management of the City of Kaiserslautern.

Being the product of a DFKI initiative, the project was the winner of the multimedia competition “Media in Motion” in 2003/04 sponsored by the state of Rheinland-Pfalz and has been developed for the World Soccer Championships 2006 in Germany. The implementation received funding support from the state government’s multi-media initiative “trip-inform” in the amount of 100,000 €.

Services offered by DFKI
- Project coordination, consulting, design, and evaluation in the area of mobile navigation and personal information services

Additional information
http://cityguide-mobile.com

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TaskNavigator – An Agile Tool for Knowledge Worker Processes

TaskNavigator is a web based, workflow management system, which assists individual knowledge workers and teams to schedule, manage and coordinate their tasks in the form of work breakdown structures (WBS). Various documents from different sources, such as document management systems, e-mail, or local desktop computer, which could be relevant to these tasks, are automatically suggested by the TaskNavigator. Further, the user is shown a task similar to the one at hand that was accomplished in the past and can be copied, as appropriate as the current solution.

An individual knowledge worker benefits from the TaskNavigator’s direct access to the process know-how of colleagues without having to search through various document sources within the company for the relevant information. The TaskNavigator provides a web-based collaboration tool, including ad-hoc workflow and process tracking, with global access for distributed, dynamic teams. The company benefits from minimizing the risk that relevant documents will be overlooked, as well as from the continuous collection of know-how during job processing and the “recycling” of the acquired knowledge.

DFKI develops the TaskNavigator under the auspices of the Competence Center “Virtual Office of the Future”. Together with RICOH, innovative software solutions are designed and tested for the effective support of knowledge intensive work processes.

Services offered by DFKI
- Consulting, design, and evaluations of the proactive provision of task-specific information based on personal and company-specific organizations and contents.

Additional information
www.dfki.de/vof

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NEWS – Semantic Web Services for Accurate News Processing

NEWS is an EU project to develop technologies for the annotation, analysis, intelligent search and syndication of online content for the suppliers and users of news.

NEWS develops freely definable interactive web services to facilitate the multi-medial and multi-lingual annotation and semantic search for news items automatically. In addition, NEWS technologies allow for the automated creation of trend analyses and the setup of customized user interfaces.

The consistent use of established semantic web standards like RDF and RDFS is an underlying principal of NEWS. Similarly, the existing ontologies and XML-based news standards like NITF or NewsML are always considered. A web services based architecture allows for a flexible integration with existing systems and work processes employed at news agencies and their customers.

The Knowledge Management research department at DFKI works on this project together with partners from Israel, Italy, and Spain.

Services offered by DFKI
Project coordination, component development, consulting, and training

Additional information
www.news-project.com

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Semantic Desktop – EPOS and Gnowsis
Intelligent Tools for Personal Knowledge Management

The Semantic Desktop application EPOS uses individually structured work stations with heterogeneous information sources, such as file directories, e-mails, and bookmarks, to create a homogeneous personal knowledge room. In this way, the high costs of organizational and administrative effort, the redundant data storage, and the aggravating searches for information which accompany the distributed data of various applications running on a desktop computer are all significantly reduced.

The Gnowsis adapter framework extends the existing desktop applications via semantic web interfaces and permits a uniform semantic representation of data independent of the software used to create it. It is now possible to link together data across application boundaries and retrieve information from an intelligent, semantic search.

The personal computer becomes a web, in which the user can conveniently surf for the desired data. Further, the system recognizes what the user is working on and proactively offers relevant background information (automatic context generation).

The Gnowsis and EPOS concepts are being further developed as a social semantic desktop in the EU Project "NEPOMUK", by 16 partners in six countries and under the management of DFKI. The project will allow networking of individual knowledge rooms, so that they can be used as a distributed corporate memory.

Services offered by DFKI
Project coordination, component development for Desktop Application Integration, working with semantic desktop standards, project consulting and implementation in the area of the semantic web, training

Additional information
www.gnowsis.org
www.dfki.de/epos

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www.gnowsis.org
The influence of digital media is now pervasive throughout our daily social life. Educational and leisure activities have been transformed by a computational culture, even though we may not be immediately aware of this. The cultural and social changes and processes associated with this have assumed a more significant place in the eyes of artificial intelligence: C4 is the focal point for DFKI project activities that deal with this phenomenon. At CeBIT 2006, C4 is exhibiting two new approaches to Human-Computer-Interaction.

**TOUCH-A-SOM – EXPLORATION OF EXTENSIVE MUSIC COLLECTIONS**

This application enables navigation through a music collection that relies on 60GB mp3’s and the metadata from various Internet music distributors (Netlabels). The metadata are used to train an artificial neural network that will automatically group similar musical titles into 180 clusters. The user is encouraged by an attractive graphic presentation and the use of touch screens to engage in an intense interaction with the musical material.

**BLOGMIX – BLOGOSPHERE MEETS ARTIFICIAL INTELLIGENCE**

Blogs have become a mainstream topic in Germany. The subjects offered range from individually maintained online diaries to journalistic filter blogs and knowledge blogs for specialists. In addition to the already well known and established technologies like RSS readers and aggregators, BlogMix has tools for semi-automated, user-supported selection, compression, and elimination of redundancies that help you come to grips with the daily Blog reading matter. This relies on the project results from the research departments Knowledge Management (Dynaf) and Intelligent Visualization and Simulation (@VISOR, page 18).

Services offered by DFKI
Consulting, design, and implementation of systems and applications

Additional information
www.computationalculture.org

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**„SNAP LOC“ – Hybrid Positioning Service for Smartphones**

The mobile web service SNAP LOC provides GPS-independent positioning everywhere that has no access to a GPS signal, for example, in concentrated built up areas of the inner city.

Through various image processing and pattern recognition methods, the server determines a canonical image detail of the face of the building and a corresponding hash value, which it then compares to a database using statistical filters and known abstracts of building characteristics such as the arrangement and number of window groups. It sends the best hits corresponding to the attained quality, along with the corresponding coordinates to the mobile client, or uses the data as positioning information for a subsequent web service.

SNAP LOC implements object recognition by means of image processing and context information. It can be employed anywhere where location-based services are required, for example, pedestrian navigation, mobile digital tourism, shopping or restaurant guides, or even for leisure trends like geocaching.

SNAP LOC is the result of a DFKI project under the framework of the multimedia initiative sponsored by the Ministry for Economic Affairs, State of Saarland and Deutsche Telekom AG.

Services offered by DFKI
Support and consultancy in the development of mobile broadband services and product prototypes

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The aim of CASCOM research (www.ist-cascom.org) is the intelligent coordination of mobile transaction services at any time from any location from the innovative integration of technologies from the fields of multi-agent systems, semantic web services, peer-to-peer, and mobile telecommunications. In the CASCOM project, application-specific services are encapsulated with intelligent agents that are capable of efficiently solving highly complex tasks in dynamic environments.

So far, during the term of the project application scenarios (e.g., emergency medical assistance, telemonitoring, shopping mall) have been defined, described in UML and discussed. Further, the underlying design architecture for the mobile P2P network, as well as, the components and methods for the semantic service coordination have all been defined and in fact, have already been partially developed in the first prototype versions.

This allows, for example, a tourist vacationing in a foreign country to access the data base of the family doctor or insurance agency using a PDA and the personal CASCOM agents in order to pass on information about prior existing illnesses to the local doctors. The medical team is provided with detailed information faster and much better than the affected patient could ever report on his own. Expensive and repetitive diagnostic procedures that have already been performed at the patient’s home can be avoided and many of the associated risks and costs can be minimized. The information transferred in this way is evaluated to determine whether the patient should be given immediate treatment or whether the decision should be made to transport the patient back to their attending doctor. The networked information sources guarantee that the costs incurred will be covered by the insurers. Emergency medical personnel who answer a call for assistance from a completely unfamiliar patient also benefit from the CASCOM architecture through accessing ad hoc communications and retrieving relevant data while on the move.

Agents play an essential role in supporting the user during system operation by helping to locate the relevant services among the various sources and composing the appropriate response. Before such a dynamic composition can occur, a semantic description of the services must be available. Another prerequisite to employment is the integration of trustworthy and reliable security functions. Network and service providers must cooperate on a Europe-wide basis to insure mobile users have the access to the services. This is precisely why the CASCOM architecture prefers agent based coordination of services. The underlying processes are kept generic to permit other uses of the system apart from the medical applications used in our examples.

The generic architecture (see Figure 1) of CASCOM illustrates the different types of components and their interactions. These consist of functionally interdependent layers which serve as the basis for the coordination required by the underlying network management and semantic services. The two vertical dimensions represent the context and security of the respective processes.

An integrated demonstrator of the all CASCOM technologies is to be introduced in connection with a workshop and then evaluated in field testing in 2007.

Additional information
www.ist-cascom.org

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Figure 1

Figure 2
DFKI designed, developed, and implemented a planning and scheduling system for Saarstahl AG to manage the production of steel at the Völklingen steel plant. The implementation phase concluded with the successful start of production operations in December 2005.

Flexibility and rapid reorganization are essential criteria for production planning and control in dynamic, fault prone environments such as those commonly found in the steel industry. The agent based planning system from DFKI controls the manufacturing flow and ensures high quality steel.

At the core of the prototype system is a short range planning function for the steelworks based on the daily planning targets. The job of the planning unit is to determine the optimal utilization of the steel work aggregate and manufacturing resources. In the event of an interruption of the processes, the planning and scheduling system facilitates a rapid return to manufacturing operations.

The system is installed at the control room and supports the planning and control of the steel mills by calculating an optimal solution for the specified daily program targets. Selectable criteria are considered in conjunction with continuous data received from the mills and compared to the calculated planning figures in a way that permits early recognition of problems and allows for timely corrective actions to be taken.

Long term goals include a complete agent-based supply chain management system that will plan and monitor the flow of materials throughout the production cycle of Saarstahl AG.

Services offered by DFKI
- Generic, agent based solutions to support planning and control of steel production

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FUSE – Free Universal Secret Equal Elections: IT Security for eVoting Systems

The creation of eVoting security profiles for elections over open networks is just an initial goal along the path to insuring reliable association, works council, social insurance, or parliamentary elections against the backdrop of a European wide development of eDemocracy.

Services offered by DFKI
- Evaluations performed in accordance with the requirements of CC and ITSEC; software developer training based on CC; preparation of protection profiles and security targets according to the CC; and consulting in security management.

Additional information
www.dfki.de/fuse
www.dfki.de/pits

Contact
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The competence center for eLearning at DFKI designs its service offer for companies, public institutions, and educational service providers while supporting all forms of learning to include networked learning.

Our goal is to implement practical applications of leading research in technology aided teaching and learning systems. In cooperation with psychologists, educators, and practitioners in the field of education, we provide the competencies of the DFKI research departments.

We develop concepts and applications in the following subject areas:

“Intelligent learning environments” develops a broad range of intelligent technologies and tools for the educational environment including: semantic web technologies and metadata, service architectures, web presentations for mathematical formulae, customizable and adaptive hypermedia, context-adaptivity, user modeling, interactivity with personal feedback, authoring tools for interactive applications, and technologies for the implementation of new concepts in education.

“Building learning networks” encourages cooperation between companies, public and private organizations and has the goal of improving learning with new media and innovative technologies. We facilitate technology transfer and use in permanent learning networks.

“Lifelong learning” includes the concepts, methods, and technologies that deal with the growing demand for information at all phases of the learning cycle – starting with basic skills training and advanced education through the continuous update of the knowledge base in all routine fields of activity.

“eLearning and knowledge management” supports the design and specification of learning objects and the associated architectures for adaptive and customized learning in various contexts. This includes authoring tools, course development, and intelligent memory and search.

LeActiveMath is one of the technology enhanced learning projects carried out under the 6th EU Framework Program. LeActiveMath focuses on the development of an intelligent, web-based learning environment for mathematics and is currently under evaluation in several European countries both at secondary schools and universities. It is also applied in individual study programs.

The system adjusts its content, procedures, and suggestions to the situation, knowledge, goals, and motivation of the student. In the process, the learning program is modified for the users and their learning goals: Students who want to prepare for an examination are handled differently than users who are searching for additional information about a special subject area.

Gaps in knowledge and skills can be filled in and exercised, experts can solve complex problems or skip to the next topic.

LeActiveMath supports learning through tutorials, feedback in interactive exercises, and active learning tools. Greater control and more responsibility for learning is given to the student as a result of this transparent user model.

The tools and components in LeActiveMath are developed on the basis of didactic and cognitive research results. The technology of multilingual systems are demonstrated here with the aid of mathematics, but such a system may also be employed in other areas.

Additional information
www.leactivemath.org

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The Institute for Information Systems (IWi) at DFKI under the scientific leadership of Prof. Dr. Peter Loos is home to more than 60 employees - 20 of whom are full time staff in the area of applications research. Their work is focused on examining economic management issues, the design of business information systems, and the use of modern technologies in manufacturing, service, and government. The Institute explores the methods and applications required in the areas of lifelong learning, business integration, and e-government.

Business process management has been an important focus of research since the early 1990's and has been among the core competencies of the Institute ever since that time. This is where the ARIS-House of Business Process Management developed the framework concept for the integrated management of business processes. An important concept that has emerged in the design of business processes is based on the semiformal, descriptive languages for information modeling, for example, the event-driven process chain (EPC), which was also developed here at the Institute. The reference models that can be employed to support such modeling represent another important area of IWi research.

The capacity portfolio of the Institute includes the implementation of national and international research projects in cooperation with various partners, as well as coaching, consulting, and the implementation of projects or studies. By integrating the generation and transfer of knowledge, the Institute has created a rich environment for interdisciplinary research, which promotes scientific advances in the area of information systems.

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Business Process Management – Institute for Information Systems

The ability of a company to integrate into today's global, value added networks has become a decisive factor for success. Choosing the right business model and integrating the appropriate information and communication technologies, organizational structures, and business processes are the keys to commercial success.

Although there are currently numerous technical networking solutions being researched under the key words EAI, EDI, and web services, the problems of integrating the business management aspects are, for the most part, neglected. In particular, it has been found that rather than data transfer, it is the integration of business processes that is the key design element of successful companies. The Competence Center for Business Integration (CCBI) in Saarbrücken addresses this situation and focuses on a holistic examination of process oriented integration concepts and the process-aided information technologies. CCBI contributes as a key partner in the European Network of Excellence project INTEROP (www.interop-noe.org).

The results of CCBI research performed under different national and European projects all have collaborative business processes as their focus and contribute to solutions in various domains. These industries include: automotive, aviation and space, mobile communications, and furniture (Project ATHENA, www.athena-ip.org), also, construction (Project Artikos, www.artikos.info), logistics and factoring (Project PoZz, www.pozz.de), judicial applications (Project elustice, www.elustice.eu.com), and public administration (Projects: InfoCitizen, www.infocitizen.org and R4Gov).

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Sphere of Competence Business Integration

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Additional information

www.ccbi.de

HALL 9, STAND B45

HALL 9, STAND B45
Lifelong learning, from basic skills training and advanced education to refresher training to insure the use of state-of-the-art knowledge in regular work activity, is firmly established as an educational principle in a knowledge society. The IWi develops applications in the field of lifelong learning using concepts, methods and technologies designed to respond to the growing demand for information and knowledge at every phase of the learning cycle. Under the co-direction of L3S and DFKI, 19 international partners are working as part of the EU framework Network of Excellence project “ProLearn” (www.prolearn-project.org), in collaboration with over 150 associated organizations from research and industry, to coordinate research throughout Europe in the field of technology-enhanced learning.

As national research efforts are concentrated in the EXPLAIN project (www.explain-project.de), which focuses on efficient design processes for creating training materials, as well as the organizational and computer-aided integration with product development, the EU project PROLIX (www.prolixproject.org) is developing open, service-oriented reference architecture for process oriented learning and process oriented information exchange. The major goal is to coordinate the learning and business processes that occur in complex work situations take into consideration the (learning) needs of the workers and the company. In addition to the international and national research efforts, the IWi Competence Center eLearning networks its research activities in the area of lifelong learning with related research being conducted at DFKI.

A crucial element in the modernization of public administration is the employment of innovative information and communication technologies. The Competence Center for eGovernment at the Institute for Information Systems (IWi) provides a research infrastructure for the establishment of projects in the subject area “eGovernment”. The availability of a knowledge base for the acquisition of research projects and the exchange of know-how between scientific and government sectors serves as the foundation for the activities performed at the competence center. Here, there is a continuous monitoring of scientific and practical developments in the area of eGovernment.

A key factor in this effort is the number and quality of relationships to institutions in the academic and government communities where extensive contacts have been established at national and European levels.

The DFKI competence center manages projects at the European level (www.ejustice.eu.com, www.raegov.info), the federal level (www.caegov.de), as well as the state level (Project Online Services Saar).
DFKI in Future Talk at CeBIT 2006

DFKI will place its stamp on numerous presentations and discussions as part of the “Future Talk” at CeBIT 2006 (Hall 9, A40). Opening Day sessions on Thursday, March 9, (11:35 - 12:30) will include current topics in IT development for 2006, the Informatics Year, as discussed by Prof. Dr. Wolfgang Wahlster and Prof. Dr. Hans-Jörg Bullinger (President of the Fraunhofer-Gesellschaft), Dr. Wolf-Dieter Lukas (Federal Ministry of Education and Research – BMWF), Christopher Schläffer (Corporate Development Officer, Deutsche Telekom AG), and Prof. Dr. Jürgen Leohold (Volkswagen AG).

The theme for Friday, March 10, is the “Next Generation Web/Multimedia”, and Dr. Norbert Reithinger is scheduled to report on the “SmartWeb – Mobile broadband access to the Semantic Web” (March 10, 10:00 - 10:20) while Dr. Allassane Ndiaye presents “Virtual Human – Anthropomorphic Interactive Agents and ZAMB – 82 million coaches” (March 10, 10:20 - 10:40).

In the afternoon, at “Mobile Solutions”, Dr. Tilman Becker talks about “AMI: Better than being there – intelligent meeting support” (March 10, 14:00 - 14:20). DFKI is a supporter of the Olympic Games 2008: Prof. Dr. Hans Uszkoreit will explain the results achieved to date for the DFKI “Compass2008 – Multilingual and mobile information services at the Beijing Olympics in 2008” (March 10, 16:00 - 16:20).

Live presentations of the prototypes from the SmartWeb, VirtualHuman, AMI, and Compass2008 projects are to be setup at MTI booth (A44) in Hall 9.

In the afternoon of CeBIT-Sunday, March 12, Future Talk addresses “Blogs, Computational Culture, Web 2.0” and Dr. Stephan Baumann presents “Computational Culture and Social Software” (March 12, 15:00 - 15:20). The work of DFKI in C4 (Competence Center Computational Culture) will be shown at our own DFKI booth in Hall 9, B45. The discussion format “Steamtalks: 60 Minutes of Future” was chosen by the panel members Reinhard Karger, Lars Cordis (fischerAppelt Kommunikation, Press Speaker for “Du bist Deutschland”), Johnny Haeusler (Creative Director, Spreeblick Verlag), and Stefan Keuchel (Press Speaker, Google Deutschland) for the topic “Du bist Blogging” (March 12, 15:30 - 16:30).

“Robotics” is the Monday morning focus on 13 March. Dr. Thomas Röfer from the new DFKI-Lab in Bremen will talk about “Robot soccer – The next big challenge in artificial intelligence” (March 13, 10:00 - 10:20). The topic for Prof. Dr. Frank Kirchner, Speaker for the DFKI-Bremen Lab is “Bio-inspired robotics – Sturdy locomotion over difficult surfaces” (March 13, 12:30 - 12:50). The robots out of the DFKI-Bremen Lab will be on display at the MTI booth (A60) in Hall 9.

Visitors are welcome to learn more about these and other AI-Topics at the DFKI exhibit, Hall 9, B45. Exhibits and demonstrators from the areas of Knowledge Management, IT-Security, Multi-agents, Multimedia, and Computational Culture, as well as systems for eLearning, Business Integration, or eGovernment will explain how innovative research approaches are transformed into application oriented implementations.

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A special exhibit about Human Computer Interaction will be presented by the Federal Ministry of Education and Research (BMBF) as a highlight of the CeBIT 2006. More than 40 exhibits have been prepared for this year's CeBIT from March 9–15, under the motto: 2006 – Informatics Year and Year of the World Soccer Championships. The exhibits will be set up over nearly 1125 sqm of floor space at the Future Parc in Hall 9, Stands A44 and A60, where all of the projects, demonstrators, and prototypes are placed into environments that are oriented on human interactive situations at home, or en route, in private, or in public.

DFKI is participating with demonstrations of multimodal, speech and language understanding, multilingual and mobile systems:

“SmartWeb”, for example, allows intuitive access to the semantic web over multimodal dialogs from a mobile phone (MDA IIIIV, – Pro, Smartphones, etc.). An intelligent search provides meaningful answers in the context of the World Soccer Championships rather than long hit lists of team schedules, matches or players.

A virtual moderator in the demonstrator system “VirtualHuman - Anthropomorphic Interactive Agents” invites human candidates to compete for the title of “Best Coach”. During the two quiz rounds of the soccer show, “ZAMB – 82 Million Coaches”, virtual soccer experts assist the participants to prove their soccer skills and select their own dream team for the World Championships 2006.

The “COMPASS2008” system provides several services to make the visit in Beijing easier for tourists and visitors from all over the world. During the Olympic Games 2008, information about the city, the weather, the matches, and other events can be retrieved over a mobile phone. The integration of translation technology, voice input and output, location sensitive services, and an open, semantically structured architecture let the user find the best information in their own language from any location and at any time.

The “M3i Mobile ShopAssist” lets a user call up information to compare competitive products via PDA. Here, the users can communicate from their mobile phone per voice or pen, or “show” the system an object and then ask questions about it. An ontology based web portal, the “Language Technology World” with its semantic structure demonstrates contemporary possibilities for networking know-how and the dynamics of complex, rapidly developing field of language technology. Both projects were realized as part of the BMBF COLLATE project – Computational Linguistics and Language Technology for Real Life Applications.

“AMI – Augmented Multi-party Interaction” deals with technologies that facilitate the setup, recording, and review of meetings with multiple participants. The data collected from a meeting can be browsed for specific content with an Internet browser. Live-demonstration of AMI-Technologies: Visitors are invited to participate at a meeting in the instrumented, mobile meeting room.

The eight legged “SCORPION” developed at the new DFKI-Lab Bremen is a robot designed for semi-autonomic employment in difficult to reach terrains. Scorpion can conquer surfaces that are impassable for other robots. 

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SmartWeb – Mobile, Multimodal Access to the Semantic Web

SmartWeb employs the technologies and standards of the semantic web, such as ontologies, semantic search, natural language processing, peer-to-peer (P2P), which are also used for the development of distributed knowledge systems in a company or individual data volumes, for example, in a PC. Knowledge from very different sources is exploited with semantic information and can then be integrated with local information and elements from the corporate memory or the social networks that connect various individual knowledge workers. Knowledge may be spontaneously shared with others – even over P2P networks if both sender and receiver employ semantic technologies.

The processes of computing technologies are approaching, in terms of results, those of humans. However, in principal, only when it is possible for every person to spontaneously enter a query or instruction into a computer system in their own native language and when the corresponding answer or response is, in turn, understandable in everyday terms, will the state of Human-Computer-Interaction be reached when the computer can be made an integral component of global cultural techniques for the knowledge society.

Additional information
www.smartweb-project.org

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The VirtualHuman project, sponsored by the Federal Ministry of Education and Research (BMBF) studies the natural interactions between humans and virtual characters. The technological challenge of designing such an interactive human-computer system is many times greater than that of animating film figures or computer games. Creating a virtual figure as a conversation partner requires detailed, anthropomorphic design of the character, realistic speech, and emotional interactions, as well as, the exact simulation of movement in real time.

Just in time and appropriately for this year’s World Soccer Championships, two human visitors can take part in a game with our virtual characters. The special game is called “ZAMB – 82 Million Coaches”. Here, every armchair coach has a chance to prove that they could coach the national team. It goes like this: Our virtual moderator invites two quiz participants to play two rounds in an attempt to win the title "Best coach". In round one, video sequences of familiar situations in soccer are shown and frozen just at the crucial moment. The participants must decide how the play will continue. Two virtual soccer experts provide assistance. The winner advances to the next round.

Round two is concerned with no less than selecting players for the German national team. The winners of round one can pick their own dream teams for the World Championships 2006. Our moderator then evaluates their choices and, perhaps, proclaims them as best coach for the national team.

Using this scenario, VirtualHuman demonstrates complex technological solutions in the area of multimodal user interfaces and realistic virtual characters.

Additional information
www.virtual-human.org

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The SCORPION is an eight-legged walking robot for hazardous outdoor-terrain. Using a biomimetic control concept, which allows a very flexible, robust walking behaviour, SCORPION can conquer surfaces that are impassable for other robots.

Possible future fields of application include exploration of hazardous environments, e.g. in SAR missions. Currently an amphibious version of the SCORPION is under development.

The SCORPION was developed under the direction of Prof. Dr. Frank Kirchner, head of Robotics Group at the Department for Mathematics and Computer Science at the University of Bremen and Director of the newly founded DFKI Lab Bremen, research group ‘Robotics and Intelligent Technical Systems’ (RITS).

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The initial results of a German-Chinese cooperative project called COMPASS2008 will be presented by DFKI at the special, Federal Ministry for Education and Research (BMBF) exhibit “Human Computer Interaction” in Hall 9, Booth A44.

COMPASS2008 is the digital escort for participants and spectators at large events, like the Olympic Games 2008 in Beijing. Multi-lingual tourist information will be available to the user via a mobile phone, notebook computer, and internet from hotel rooms, airport terminals, en route, or in the stadiums. Multi-lingual mobile services assist foreign visitors during their stays in many daily situations - whether in communicating with a waiter, a taxi driver, or for getting your bearings in the city, in emergencies or numerous other situations.

These multi-lingual services are provided by the “COMPASS2008 Olympic Service Platform”. In addition to the information users will require for their visit to Beijing, translation services are also being developed under the COMPASS2008 project. Services will be semantically structured in the form of taxonomy and the opportunity is also being offered for service providers to register their products with COMPASS2008. COMPASS2008 assists users to locate desired services in their own preferred language. All services may be called up over the Internet as well as from the various mobile devices.

For example, a user located in a taxi could enter the desired destination, such as “Forbidden City” and an appropriate category like, “Attractions”. The system translates the destination into Chinese, pronounces the word in the target language as necessary, and as an added benefit to the user, provides information about distance and estimated price.

At the restaurant, COMPASS2008 supplies access via the mobile phone to a selection of meals and permits detailed questions to be asked about ingredients, origins and tastes. The Compass-Service “Smart Dining Translation Assistance” helps the guest to order the selected menu items in the local language.

Both of these functions are based on the COMPASS2008 Hybrid Machine Translation Service, which offers users the opportunity to translate individual phrases, or even entire text passages, into Chinese. Free online machine translation services are integrated as a digital tourist glossary that includes sentences and phrases frequently used by tourists in foreign countries, especially created for China. The system employs general machine translation systems, as well as specialized machine translation technologies.

The COMPASS2008 project is sponsored by the BMBF and the Chinese Ministry of Science and Technology. DFKI is the lead project manager for Germany. The project partners:

- Fraunhofer Institute for Software and System Engineering (ISST)
- CAPINFO Ltd. Beijing
- Institute of Computing Technology (ICT), Chinese Academy of Sciences, Beijing
- Deutsche Telekom AG Laboratories, Berlin

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LT World is the most comprehensive WWW information service for the fast growing field of Language Technology. It is a rich source of knowledge for all aspects of this multidimensional technology area: research, products, companies, organisations, experts, resources, patents, conferences, terminology, news, and background knowledge.

The ontology-based Web portal LT World (www.lt-world.org) and its semantic structure demonstrate latest methods for interconnecting knowledge and capturing the dynamics of knowledge in a complex and fast growing field. In LT World, projects are connected with technologies and organisations, these again with people, products, patents and so on. Single information units appear in the context of their activity and facilitate efficient navigation. Moreover, the modularity of the single information units ensure a scalability of the knowledge base in the long term. This new kind of knowledge organisation based on semantics can basically be ported to other areas and is being successfully applied to additional information technology areas in the European project IST World (www.ist-world.org).

M3i Mobile ShopAssist is being carried out as a part of the Demonstration Center for Speech and Language Technology under the COLLATE II – Computational Linguistics and Language Technology for Real Life Applications project. It is funded by the Federal Ministry of Education and Research (BMBF) with the goal of bringing cutting edge language technologies closer to the average person.

The M3i Mobile ShopAssist is a mobile and multimodal demonstrator designed to showcase any set of products. Applied to a set of Natural Language Technology (NLT) products, a user can learn about the latest advancements coming into a market by enquiring about product features, and by comparing multiple products. As a result, users can interact with the system via the communication modes speech and handwriting, but also via gestures that allow one to interact with physical objects on a shelf, or their digital-world counterparts displayed on the mobile device’s display.

The demonstrator recently formed the foundation for a series of user studies that determine what modality combinations are best suited to changing mobile environments such as private environments (e.g. at home), and public environments (e.g. shopping or exploring a city). The results also outline how intuitive a specific modality combination is to use, how onlookers can affect a modality’s use in public environments, and the differences that exist between genders.

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Language Technology World – Virtual Information Center for Language Technology

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LT World will be carried out in the BMBF-Project COLLATE as a part of the Competence Center for Speech and Language Technology

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AMI – Augmented Multi-party Interaction

The research project AMI develops technology to support human interaction in meetings, through meeting browsers and online meeting assistants for multimodal meeting recordings. The multiparty interactions are captured with video cameras and microphones and analyzed in several subsequent steps. Finally, the meetings can be viewed using a standard internet browser. The browsing is supported by automatically generated summaries. During online usage, the technology supports the recognition of gestures, key word spotting and the identification of speakers. AMI Technologies are presented live in an instrumented mobile meeting room at the special BMBF exhibit: visitors can watch and even participate in a meeting. A 360-degrees camera captures up to four participants discussing a slide presentation. A microphone array identifies the current speaker, and on-line keyword spotting will raise an alarm when predefined keywords are detected. Heads and hands of the participants are tracked automatically and all data is shown on an extra screen.

DFKI NEWS

@VISOR – Intelligent Visualization Facilitates Human–Computer Communications

The modern computer work station may soon look like this: The user has a data glove on and is sitting before a 3-D monitor that has displayed personal documents, photos, videos, or books. These objects are arranged in the virtual room just as the user is accustomed to seeing in a traditional office. Now, with the gloved hand, the user is selecting a document and then reaching for it; pages are turned, just as they have always been; the user can file them, stack them, or toss them into the trash can.

The goal of the research efforts in @VISOR is the creation of a customizable virtual world, one which addresses the human perceptive abilities and breaks down the barriers between human work activity and computer applications. The project draws on the know-how of the DFKI research departments Intelligent Visualization and Simulation, as well as Knowledge Management. The initial results from @VISOR have already been integrated into a prototype in the form of a demonstrator.

DFKI-Kaiserslautern recently hosted a workshop under the framework of @VISOR. Attended by leading experts in the fields of visualization and Human-Computer Interaction from all over the world, discussions focused on new approaches and on ways to continue the research work of @VISOR even after the project ends in December 2006.

Additional information www.amiproject.org

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AMI is a research project funded within the 6th Framework Programme of the EU.

Project Participants at CeBIT:
Braunschweig University of Technology (BUT)
DFKI
IDAP Research Institute
Philips Consumer Electronics BV
University of Twente

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A meeting browser allows to watch, browse and search with new methods in a recorded meeting. A keyword search presents the results in their specific context. The browser shows multiple views of the meeting, the slides and even a transcript of what was said.

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Groundbreaking Ceremony in Kaiserslautern

DFKI, with the financial support of the government of Rheinland-Pfalz, the European Union, and the City of Kaiserslautern, has awarded the contract to build a new building in the PRE-Uni-Park, Kaiserslautern.

In early February 2006, Science Minister Zöllner of the State Rheinland-Pfalz laid the foundation stone for the new building in a ceremony together with DFKI Directors Wahlster and Olthoff, as well as site representative, Prof. Dengel. Mr. Zöllner categorized the construction as a proper and necessary step to improve the employment opportunities of the research facility and highlighted the importance of DFKI in the IT strategy of the state of Rheinland-Pfalz: “Our technology policies support the transfer of research results into commercial products and processes. DFKI has successfully demonstrated in Rheinland-Pfalz how to balance the interests of basic research and application research, the interests between science and business.”

The State of Rheinland-Pfalz contributes more than half of the total cost, an amount of 7.6 million €. The Science Ministry is contributing more than €1.8 million while the Ministry of Economics funds €1.0 million, and the Ministry of the Interior provides €900,000. The City of Kaiserslautern adds another €100,000.

With almost 4,200 sqm of floor space, the building will provide offices for 100 scientific researchers and approximately 50 student staff assistants. The new building is being constructed adjacent to the new Fraunhofer Center and the Institute for Surface and Coating Analysis while, on the opposite side, the new neighbor will be the Max-Planck Institute for Software Technology, also with locations in Kaiserslautern and Saarbrücken.

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DFKI Interview: Dr. Norbert Reithinger

Dr. Norbert Reithinger is a Principal Researcher und Research Fellow and, since 1993, has worked at the DFKI Research Department for Intelligent User Interfaces. The focus of his research is in the field of multimodal user interfaces.

What do you see as the application potential of your research?
All of my work is based on one simple goal: How can a user interact with the application most naturally? There are already smartphones on the market that offer the technical opportunities to implement innovative applications that function, easily and naturally, over a multimodal interface.

When did your interest in artificial intelligence begin and how have AI processes changed since that time?
My studies at the University of Erlangen-Nürnberg during the late 70’s gave me the chance to contribute to the development of the first German language dialog system. Today, we have an established, standard approach to the field of language recognition and processing.

What are the greatest challenges and opportunities for AI systems today?
The modification of multimodal interactive systems for new domains is still our greatest problem. The challenge in the coming years will be the development of a tool with which to customize this process.

What do you enjoy doing when you are not working as a research scientist?
My hobbies include listening to classical music, playing the piano, and reading. I enjoy walking and paragliding – but only as a passenger because my eyesight is a bit too weak to fly alone.

Are there parallels there to your professional life?
My guiding principal is “Keep it simple and stupid!” Complexity will creep in all by itself. Think of the paraglider, with common materials intelligently combined so that it can fly. That is how our systems must be developed – with simple and easily understood basics.

What are your current projects?
I am currently staying busy with two BMBF projects: SmartWeb (p. 14) and VirtualHuman (p.15).
pumps and nozzles – are combined and operated using integrated controls. This means the control effort can be reduced to just a few correcting variables in the event of a higher order wait override.

A second exhibit demonstrates the wireless parameterization of industrial machines from mobile systems. This involves the setup of a Bluetooth connection between a mobile phone and an electromotor to call up and set the parameter data needed for the desired configurations.

Want to learn more about SmartFactoryKL? Just visit us at HMI 2006 from April 24-28, at the Hannover Fair Grounds in Hall 15, E20. That is where SmartFactoryKL will be presenting some exciting exhibits in the area of “Factory Automation”. Our staff will be standing by to provide you with information.

Additional information www.smartfactory-kl.de.

We are looking forward to your visit.

Selected content of the page:

The technology-initiative SmartFactoryKL is a non-profit organization, established for the purposes of promoting the development, use, and dissemination of innovative plant technologies in a variety of industries and providing the appropriate scientific and practical foundations. The SmartFactoryKL provides a platform for interested partners to examine relevant problems.

VISION
The common vision developed by the partners is one of an intelligent factory of the future, featuring flexibility, networking, self-organization, and focused on the operators. Flexibility here includes component structures that can be rapidly modified and expanded. Open communications-interfaces support a generic manufacturer’s network of multiple plant components. Components, in turn, can recognize their tasks autonomously through self-organizing within their situational environment and coordinating among themselves on how to accomplish the job. User friendliness is the critical factor for the operators of technical systems and this can be achieved by customizable operating systems.

MAJOR FOCUS OF RESEARCH
Detailed discussions and workshops among industrial companies and research institutes have taken this vision and derived important fields of research into the areas of in-house locating systems, universal interface systems, web based interactive systems, and the virtual digital factory.

SMART SOLUTIONS FOR PRACTICAL OPERATIONS
In this respect, the SmartFactoryKL is the first industry-neutral, European demonstration and development center, where priority is placed on the development of relevant operational solutions. Two exhibits based on the results of preliminary work in the areas “process automation” and “mobile applications” will be shown at the Hannover Messe Industry Expo.

EXHIBIT
The Pump Unit is a joint development by KSB and Samson and supplies definable volume flows and pressures. The components supplied by each partner –
German Research Center for Artificial Intelligence

Publications

WE ARE PLEASED TO PRESENT THE FOLLOWING PARTIAL LISTING OF OUR STAFF’S RECENT SCIENTIFIC PUBLICATIONS:


The German Research Center for Artificial Intelligence (DFKI GmbH), with facilities in Kaiserslautern and Saarbrücken, is the country's leading research center in the area of innovative software technology for commercial application. In the international scientific community, DFKI is recognized as one of the most important "Centers of Excellence" in the world for its proven ability to rapidly bring leading edge research to commercially relevant application solutions.

DFKI was founded in 1988 as a nonprofit organization by several renowned German IT companies and the merger of two large, research facilities. Since then, DFKI GmbH has established a reputation for proactive and customer oriented work and is known both nationally and internationally as a competent and reliable partner for commercial innovation.

Because of the increasingly short cycles of innovation in the field of information technology, the lines between research, application related development, and conversion to products are becoming blurred. This is why DFKI projects typically include the entire spectrum from basic application-based research to market and customer oriented development of product functions.

DFKI GmbH is managed by Professor Wolfgang Wahlster (Chairman and CEO) and Dr. Walter G. Othloff (CFO). The projects at the DFKI are organized under one of the following six areas of research:

- Image Understanding and Pattern Recognition (Director: Professor Thomas Breuel)
- Knowledge Management (Director: Professor Andreas Dengel)
- Intelligent Visualization and Simulation Systems (Director: Professor Hans Hagen)
- Deduction and Multiagent Systems (Director: Professor Jörg Siekmann)
- Language Technologies (Director: Professor Hans Uzunkoreit)
- Intelligent User Interfaces (Director: Professor Wolfgang Wahlster)

Also integrated within DFKI are the Institute for Information Systems (IWi) directed by Professor Peter Loos, and the Center for Human-Machine Interaction (ZMMI) under the leadership of Professor Detlef Zühlke. The DFKI-Lab under leadership of Professor Kirchner and Professor Krieg-Brückner is currently established in Bremen, Germany and will focus on the areas of robotics and safe and secure systems.

At the DFKI competence centers, there is a broad concentration of technological and technical know-how, and the purpose is the management of important scientific problems from the following subject areas:

- Computational Culture
- eLearning
- Language Technologies
- Semantic Web
- Virtual Office of the Future

In the fiscal year 2005, the research institute managed an overall budget of approximately € 19.0 million and achieved a positive net income for another consecutive year. In 2005, DFKI welcomed Bertelsmann and Microsoft to its list of corporate shareholders, which also includes DaimlerChrysler, Deutsche Telekom AG, SAP, and IDS Scheer.

All work is organized under projects that have a clear objective and are scheduled to last for a specific period of time. This leads, among other things, to patented solutions, prototypes, or new or improved product functions. At the present time, there are more than 65 ongoing projects. Project progress is checked once a year by an independent, international group of respected experts. In addition to the BMBF grants for large, joint research projects, substantial contracts from business enterprises could also be acquired in 2004. The successful transfer of DFKI research results to functional products is continuing. The DFKI model of public-private-partnership (PPP) was positively received at numerous presentations and is often referenced as the recommended structure.

December 2004 marked the 5-year review of DFKI by the Federal Ministry of Education and Research (BMBF). The evaluation is complete and the results are positive. There is even an effort to incorporate the PPP organizational structure into the Federal Grant Handbook and the text of relevant laws. In December 2003, DFKI founded together with the Center for Scientific and Technological Research, ITC-irst, the Center for the Evaluation of Languages and Technologies (CELTEC) in Trento. The company also holds shares in XtraMind Technologies GmbH.

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- Virtual Office of the Future

In the fiscal year 2005, the research institute managed an overall budget of approximately € 19.0 million and achieved a positive net income for another consecutive year. In 2005, DFKI welcomed Bertelsmann and Microsoft to its list of corporate shareholders, which also includes DaimlerChrysler, Deutsche Telekom AG, SAP, and IDS Scheer.

All work is organized under projects that have a clear objective and are scheduled to last for a specific period of time. This leads, among other things, to patented solutions, prototypes, or new or improved product functions. At the present time, there are more than 65 ongoing projects. Project progress is checked once a year by an independent, international group of respected experts. In addition to the BMBF grants for large, joint research projects, substantial contracts from business enterprises could also be acquired in 2004. The successful transfer of DFKI research results to functional products is continuing. The DFKI model of public-private-partnership (PPP) was positively received at numerous presentations and is often referenced as the recommended structure.

December 2004 marked the 5-year review of DFKI by the Federal Ministry of Education and Research (BMBF). The evaluation is complete and the results are positive. There is even an effort to incorporate the PPP organizational structure into the Federal Grant Handbook and the text of relevant laws. In December 2003, DFKI founded together with the Center for Scientific and Technological Research, ITC-irst, the Center for the Evaluation of Languages and Technologies (CELTEC) in Trento. The company also holds shares in XtraMind Technologies GmbH.
Intelligent Solutions for the Knowledge Society

- Knowledge management and document analysis
- Intelligent e-commerce solutions
- E-Learning and e-Government
- Development of provably correct software
- Information extraction
- Intelligent web-retrieval and web services
- Multiagent systems and agents-technology
- Multimodal user interfaces and language understanding
- Intelligent visualization and digital simulation
- Image understanding and pattern recognition
- Usability Engineering
- Robotics and intelligent technical systems
- Intelligent product search, data mining and text mining
- Safe and secure cognitive systems
- Organizational memory and user modeling
- Semantic web
- Ambient intelligence
- Intelligent solutions for safety and security