NEWSLETTER

DFKI

GERMAN RESEARCH CENTER FOR ARTIFICIAL INTELLIGENCE

1/2005

RESEARCH LABS

IMAGE UNDERSTANDING AND PATTERN RECOGNITION

KNOWLEDGE MANAGEMENT

INTELLIGENT VISUALIZATION AND SIMULATION

DEDUCTION AND MULTIAGENT SYSTEMS

LANGUAGE TECHNOLOGY

INTELLIGENT USER INTERFACES

INFORMATION SYSTEMS

DFKI at CeBIT 2005

Bill Gates in Contact with DFKI – The Challenge of Innovation

IMM – Interactive Mobile Monitoring

CeBIT
HANNOVER
10. – 16. 3. 2005

Getting ideas to work
Partners for innovation

MULTIMEDIA-INITIATIVE

···T··· Saarland

Call for Participation
http://wm-konferenz.de

After Baden-Baden in 2001 and Luzern in 2003, the WM2005 – the premier conference on knowledge management held in the German-speaking world will take place in Kaiserslautern, Germany, in April 2005.

The conference will focus on the recent development of knowledge management strategies using IT solutions, such as intelligent access to organizational memories or the integration of business processes and knowledge management. 16 top quality workshops will examine different approaches on how knowledge management can be used to integrate people, organizations and information technology. There will also be a product expo.

Invited talks:
- „Knowledge plus Competence plus X"
  Prof. Dr. Klaus Kornwachs, Brandenburg University of Technology, Cottbus
- „Actor Model and Knowledge Management Systems: Social Interaction as a Framework for Knowledge Integration"
  Prof. Dr. Irma Becerra Fernandez, Florida International University
- „AI-Methods in Knowledge Management Systems and their Relevance for Knowledge Integration"
  Dr. Andreas Günter, Managing Director HITeC e.V., Hamburg
- „Remarks on Knowledge Management Studies in Japan"
  Dr. Naoyuki Nomura, Ricoh Company, Ltd., Tokio
- „Just-in-Time Knowledge Management: The Knowledge Sifter Approach"
  Prof. Dr. Larry Kerschberg, George Mason University, Fairfax

The conference is sponsored by:

KTS Klaus Tschira Stiftung gemeinnützige GmbH

FileNet

SIEMENS

SAP

PYLON

Mindjet Visual Thinking

Fraunhofer Institut Experimentelles Software Engineering IESE

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ontoprise

Media partner: wissens management

DoQ

Conference Chair:

PD Dr. Klaus-Dieter Althoff
DWM, University of Hildesheim

Prof. Dr. Andreas Dengel
DFKI GmbH

Workshop Chair:

Prof. Dr. Ralph Bergmann
University of Trier

Tutorial Chair:

Dr. Andreas Abecker
FZI, University of Karlsruhe

Conference Management:

Markus Nick
Fraunhofer IESE

Dr. Thomas Roth-Berghofer
DFKI GmbH

Christine Harms

Workshops:

- 1st Workshop on Intelligent Office Appliances (IOA 2005): Knowledge Appliances in the Office of the Future
  A. Bernardi, B. Decker, H. Holz, D. Muthig, N. Nomura

- 7th International Workshop on Learning Software Organizations (LSO 2005)
  A. Birk, T. Dingsøyr

- 1st Workshop on Learner-Oriented Knowledge Management and KM-oriented E-Learning (LOKMOL 2005)
  E. Ras, M. Memmel, S. Weibelzahl

- Workshop on Peer-to-Peer and Agent Infrastructures for Knowledge Management (PAIKM 2005)
  A. Abecker, L. van Elst, S. Staab

- Workshop on Modelling and Analysis of Knowledge Intensive Business Processes (KiBP 2005)
  N. Gronau

- Third German Workshop on Experience Management (GWEM 2005)
  A. Stahl, M. Schaaf, R. Traphöner

- Current Aspects of Knowledge Management in Medicine (KMM05)
  K. Maximini, M. Muscholl

- Knowledge Management in International Professional Services Firms (KMIPSF 2005)
  M. Willamowski, J. Kuhlmann, O. Wendel

- 2nd Workshop on Knowledge Management for Distributed Agile Processes: Models, Techniques, and Infrastructure (KMDAP 2005)
  H. Holz, H. Maus, N. Nomura, M. Schaaf

- Knowledge Management and Business Intelligence (KMBI 2005)
  B. Rieger, H. Dalinghaus, M. Gelhoet, M. Wolters

- Workshop on IT Tools for Knowledge Management Systems: Applicability, Usability, and Benefits (KMTOOLS)
  U. Reimer, A. Abecker, E. Maier, D. Ramhorst, R. Traphöner

- Semantic Model Integration (SMI05)
  A. Hahn, S. Abels, L. Haak

- 2nd Workshop Ontology-based knoWledge management (WOW2005)
  Y. Sure, A. Eberhart, H.-P. Schnurr

- Second International Workshop on Philosophy and Informatics 2005 (WSPI 2005)
  G. Büchel, B. Klein, Th. Roth-Berghofer

- Workshop on Information Just-in-Time (WIJIT2005) Seeking a New Knowledge Management Paradigm
  H. Fujisawa

- Knowledge Management in Small and Medium Sized Enterprises: Integration of HR and IT Perspectives (WMKMU 2005)
  B. Bartsch-Spörl, S. von Baeckmann, K. North, P. Pawlowsky

Registration and further information
http://wm-konferenz.de

Bill Gates in Contact with DFKI – The Challenge of Innovation

Earlier this year, on January 31, Professor Wahlster met Bill Gates and Jürgen Gallmann, the CEO of Microsoft Germany, during a high powered panel discussion with the theme "The Challenge of Innovation". The purpose of the discussion, held at the Pinakothek der Moderne in Munich, was to examine current models of cooperation between industry and science, to energize a larger dialog by inviting important panel members, and to seek new solutions that can support and sustain the innovative power of Germany.

The discussion, which lasted almost two hours, confirmed in full measure the timeliness and the relevance to industry of the research being conducted at DFKI. Gates listed the development of provably correct software using verification methods and intelligent multimodal user interfaces as the two most important topics for research over the next five years, and those are exactly the core competencies of DFKI. According to Gates, speech recognition, language understanding, and handwriting recognition will deliver a breakthrough in the next few years in the area of intuitive operation. Modeling of the respective application user and situation, based on Bayesian networks for example, was mentioned as a topic of current, mutual interest for research.

Photo: Frank Ossenbrink

Bill Gates, Jürgen Gallmann, Prof. Dr. Wolfgang Wahlster

Photo: Frank Ossenbrink

Prof. Dr. Hans-Jörg Bullinger, Prof. Dr. August-Wilhelm Scheer, Prof. Dr.-Ing. Johann-Dietrich Wörner, Bill Gates, Prof. Dr. Kurt Mehlhorn, Prof. Dr. Wolfgang Wahlster, Prof. Dr. Walter F. Tichy

Gates believes information technology is the key to innovation, even in areas like automobile engineering, biotechnology and materials research. During the panel discussion, Bill Gates clearly advocated once again the importance of AI research: He regretted that more was invested 30 years ago for AI research in the USA, when the systems were not realizable, than is the case today when, thanks to scientific advances and the huge increase in computing capacity, AI systems are available to industry.

Professor Wahlster, using the DFKI model as an example of a non-profit business organization with strong partners in industry, introduced Bill Gates to the concept of industry relevant research in "Private-Public Partnerships". With this concept, an efficient organizational framework is provided for the method of collaborative research in industrial alliances favored by Microsoft for Germany. Gates was especially positive in his comments regarding the technology transfer via intellectual capital which, at DFKI, is guaranteed by the standard rotation of staff from DFKI research into the businesses of the industrial partners.

Gates emphasized that the research challenges with the highest costs and risks are best placed at "Clusters of Excellence" where the best researchers are found and where, at the same time, strict patent laws insure the valuation of subsequent commercial success. Issues of taxation, he declared, play only a marginal role in his decisions concerning the locations for research activities.

This was the second time Professor Wahlster found himself in the company of Bill Gates (after the IJCAI 2001 in Seattle) and, once again, he was impressed by his detailed technical knowledge, his enthusiasm for research, his very positive opinion on AI, and his incisive analysis of the megatrends confronting IT.

At the close of this distinguished panel discussion, Jürgen Gallmann announced his opinion that the event marked the start of an effective dialog and that he would like to see the same panel meet again to provide further impulses for the ongoing innovation initiative.

The Business Process Innovations of Tomorrow

The management of business processes is an important focus for research conducted at the Institute for Information Systems (IWi) at DFKI. The service portfolio includes coaching, consulting, and project implementations. Perhaps most important is the transfer of scientific concepts and methods from research into practice. This includes training courses, workshops, or studies

contracted by manufacturing companies and consulting firms. The research results are regularly published in a variety of publications and frequently presented at conferences. They are also used in the numerous teaching activities at the institute.

In cooperation with universities, industry, service providers, and government, projects have been completed on a wide range of topics that includes both national and international areas of interest from basic and applied research to the development of prototypes:

The central purpose of the RefMod06 research project is the development of a modeling method that will enable small and medium sized software enterprises to customize and further develop existing reference models (www.refmod06.de). Reference model customizing is, in fact, the main goal of the Fuzzy-Customizing project. Here, the fuzzy set theory is employed to integrate previously unused, undefined aspects, such as, uncertainty conditions, imprecise statements of objectives, and other restrictions.

The KEG-Saar (Kompetenzzentrums Elektronischer Geschäftsverkehr – Saar) project is designed to support small and medium-sized enterprises (SMEs) with specific information about the advantages of electronic business transactions and to facilitate the introduction and use of modern information and communications technologies (www.keg-saar.de).

In addition to the SMEs, public administration and services are also an area of interest to the IWi. Innovative

concepts are developed and, in cooperation with the participating government agencies, implemented with great success. The establishment of the E Government Competence Center effectively consolidates and institutionalizes the IWi competencies in this domain. This insures the necessary research infrastructure for the acquisition and support of research projects with European and national organizations to include the State of Saarland which, in turn, guarantees the professional basis for the development of scientific methods and models for modern administration (www.e-government-cc.org). The RAFEG project is developing a comprehensive reference architecture called "E Government" that will provide the components required to implement information and communications systems technology to handle the routine processes encountered in the subordinate agencies of the State Departments of the Interior. The design considers hardware requirements while providing the structures for the software components used in automated administration (www.rafeg.de).

Additional information is available at
www.iwi.uni-sb.de

Services offered by DFKI
Research and teaching, knowledge transfer, consulting, as well as project acquisition and implementation in the area of business process innovation, business integration and lifelong learning.

CeBIT

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The Competence Center for Business Integration

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 key for commercial success.

Although there are currently any number of technical networking solutions available for research purposes, the problems of integrating business management aspects are usually neglected. For example, conceptual management strategies need to be introduced as well as business methods and models.

The Competence Center for Business Integration (CCBI) addresses the knowledge deficit and focuses on a holistic examination of management integration concepts and the supporting information technologies.

The CCBI projects are concerned with the implementation of integral concepts in various domains. ArKoS (www.arkos.info) and P2E2 (www.P2E2.de) develop architectures and frameworks for collaborative scenarios and business processes. The central theme of the EU-projects, Athena (www.athena-ip.org), INTEROP (www.interop.noe.org) and InfoCitizen (www.infocitizen.org) is interoperability beyond corporate or institutional boundaries in the fields of research and public administration. The optimization of legal processes using computer aided tools and models is the purpose of EJustice (www.e-justice.de).

Additional information is available at www.ccbi.de

Lifelong Learning

Lifelong Learning – from basic skills training to continuing education to refresher training that insures the use of state-of-the-art knowledge in the daily working environment – is a firmly established principle in the educational philosophy of a knowledge society. The Insitute for Information Systems (IWi) develops applications in the field of Lifelong Learning with concepts, methods and technologies designed to respond to the growing demand for information and knowledge.

The IWi can refer to numerous successful research projects in the fields of eLearning and knowledge management:

The PROLEARN Network of Excellence is an association of 19 international partners under the codirection of the L3S and the DFKI, in collaboration with over 150 associated organizations active in research and industry. The purpose is to coordinate research in the field of technology enhanced learning throughout Europe. Projects are concerned with the use of the latest technologies for current and future eLearning scenarios and content, for example, in support of corporate training programs (www.prolearn-project.org).

The Educational network WINFOLine builds upon the results of the research conducted under the online study course WINFOLine and extends to the concepts of management. The development of stable organizational structures, such as the development of a public training product pool from which it is possible to choose and combine various components from the numerous materials in the pool, is a central focus. Stable accounting, financial and organizational models permit implementation (www.winfoline.de).

The aim of the Organizational Handbook research project is the conception and development of integrated informatics for an application system that supports the documentation, networking, and design of operational measures for business process improvement. The documented activities stored in the "organizational knowledge database" can be networked and linked to an "organizational knowledge map".

ATHENA – Networked Organizations in the Global Marketplace

The ATHENA (Advanced Technologies for Interoperability of Heterogeneous Enterprise Networks and their Application) project is sponsored by the European Commission to advance a strategic goal of the 6th EU Framework Program, specifically, "networked businesses and public authorities". The ATHENA group is currently composed of 19 organizations, all leaders in the fields of research, education, industry, and other interest groups to include small and medium sized companies (SMEs). The lead management of the group is accomplished by SAP AG.

Motivation

One of the trends in the global marketplace is the increasing cooperation between companies. Traditional organizations are evolving into a "networked organization" to increase their flexibility and reduce operating costs. They must interact with numerous customers, suppliers, and partners and are forced to adopt dynamic trading methods and collaborative working practices. The business systems and applications to achieve seamless, inter-company business transactions must be interoperable and, in this way, facilitate the creation of a networked organization. Inadequate interoperability is one of the main obstacles to the introduction of new business models that can increase productivity and competitiveness. This is one of the goals expressed in the Lisbon Strategy for the modernization of the European economy and the establishment of a knowledge based society in Europe.

Objectives

With the ambitious vision to give "companies the ability to cooperate across corporate boundaries seamlessly by the year 2010", ATHENA is making significant contributions in the area of interoperable business applications and achieving several interrelated commercial, technological, and strategic results. The goals of ATHENA include the full spectrum of interoperability, from the technical components to applications and services, from the Research and Development phases to the Demonstration & Test phase, and from the training of staff to the evaluation of the social impact of the new technologies. To insure that the results of this interdisciplinary research are optimally relevant for industrial applications, which leads to a broad general acceptance, the ATHENA Research and Development effort is conducted in

close cooperation and in synergy within a larger community. ATHENA aims to be a continuous influence over the long term development of interoperability. This is the reason ATHENA initiated the neutral and independent European Interoperability Center (EIC), open to all interested parties from both the private and public sectors. The establishment of the EIC was recognized in the most recent supplement of the European Union's "eEurope 2005 Action Plan" to implement the Lisbon Strategy of growth and development.

Additional information is available at
www.athena-ip.org

Services offered by DFKI

The Information Systems (IWi) and Multiagent Systems research groups work on business process modeling with a focus on collaborative business processes and the development of interoperable platforms for business software based on service oriented, model driven architectures, agent technologies and multiagent systems.

News and Updates

The 5th ATHENA full project meeting is on March 8-10, 2005 at DFKI in Saarbrücken.

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## AGENTSTEEL – Process Engineering with Multiple Agents for Steelworks

The research conducted under the AGENTSTEEL project focuses on production planning and coordination of the processes involved in the supply network for the steel industry. The main area of investigation will be model driven or service oriented architectures to be defined in ATHENA. Of particular interest is the role agent-based technologies could play in this environment. Project AGENTSTEEL was established against this background to pursue the technological research and development of a planning and control system for the production of steel.

Objectives
The overall objective mentioned above may be broken down into two sub-objectives. These will be investigated in a two-phased project:

- Planning and control of the production processes employed at a steel mill
- Planning and control of the supply chain – from pig-iron suppliers to the steel and rolling mills and the downstream processing businesses.

The major task is the development of a flexible, planning and control architecture that is able to dynamically respond to the changing requirements of complex internal production processes. Early results are being
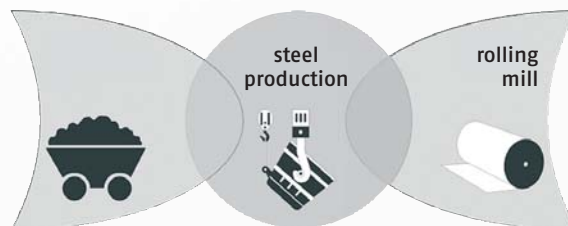
tested under operating conditions in MATS II, a joint project of DFKI and Saarstahl AG.

Services offered by DFKI
Dynamic, flexible planning methods for steel production; agent-based coordination of the planning and control of the complete value added chain.

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MATS II – Multiagent Technology for Steel Mill Management

Flexibility and rapid reorganization are essential production criteria for production planning and control in the dynamic, fault prone environments such as those found in the steel industry. MATS II is a joint project of DFKI and Saarstahl AG established with the aim of developing an agent based planning system to meet the quality demands of the steel industry.

Responding to customer requirements and the detailed orderbook at Saarstahl AG, an application prototype has been produced which takes technological and organizational limiting factors into consideration as it plans and controls steel production. The project is focused on the short range planning at the steelworks which is based on the daily planning targets. The job of the system is to optimize the detailed planning and production capacity at the steelworks as well as

the return to the rough planning targets in the event of an interruption in the production cycle.

The system is installed at the master control station at Völklingen and supports the planning and control of the steel mills by calculating an optimal solution for the specified targets in the daily program. Selectable criteria are considered in conjunction with continuous data received from the mills and compared to the calculated planning figures in a way that recognizes problems early enough to allow corrective measures to be taken.

The long term goal includes a complete agent-based supply chain management system that will plan and monitor the flow of materials in the production cycle of Saarstahl AG.

Services offered by DFKI
Generic, agent-based solutions in support of production planning and control of the Völklingen steel mills of Saarstahl AG

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IT Security Testing Center

The IT security testing center at DFKI has been accredited for many years by the German Federal Agency for Information Technology Security (BSI) and is licensed to perform every testing level of the internationally recognized ITSEC (Information Technology Security Evaluation Criteria) and CC (Common Criteria for IT Security Evaluation).

As a separate organizational unit of the DFKI, the test center for IT security is an independent, objective and reliable partner for all matters concerning the evaluation of software products and systems. The activities of the test center are based on a quality management system that meets the requirements of the international DIN EN ISO/IEC 17025 standard. This is a guarantee to our customers of the highest levels of quality, confidentiality and reliability. The test center, with competencies in formal methodologies and use of innovative tools and test procedures, is especially qualified to perform evaluations requiring high level certification standards (i.e., E4 ITSEC or EAL5 CC).

The IT security testing center has extensive experience in the area of product evaluation involving electronic signatures. Reference customers include the FlexiSecure GmbH which requested testing of its FlexiTrust product based on the Common Criteria and in accordance with the criteria prescribed in the signature laws. FlexiTrust is employed by the Regulating Authority for Telecommunication and Post (RegTP) as part of the modernization program for TrustCenter-Software.

Currently, the test center is evaluating signature application components supplied by various manufacturers and a model of the latest generation of chip card readers produced by the well known KOBIL Systems GmbH.

Additional information is available at
www.dfki.de/pits

Services offered by DFKI
Evaluations according to the requirements of CC and ITSEC; preparation of protection profiles and security targets according to the CC consulting in security management; training in the area of software development per CC and ITSEC

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Transfer Center "SISO" – Towards Secure Software

The Transfer Center for Secure Software at DFKI supports the implementation of innovative software technologies for industrial development processes. The service offer includes consulting and support in the use of formal and semiformal development techniques in accordance with the highest security standards as set by international standards criteria like ITSEC (Information Technology Security Evaluation Criteria) and CC (Common Criteria for Information Technology Security Evaluation).

The applications are in the areas of e-commerce, e-payment, e-government, pervasive computing, cryptographic protocol, smartcards, public key infrastructure and component conformity with signature law.

The services offered at the transfer center are designed for manufacturers of software systems and products in the area of "Safety" and "Security" and include:

▸ Support in the employment of new software engineering techniques and (semi-)formal methods
▸ Support in the preparation of protection profiles and security targets as per CC
▸ Development and marketing of tools like the Verification Support Environment (VSE II)

▸ Consulting regarding appropriate technologies and tools
▸ Support of IT security management programs
▸ Software development training in accordance with ITSEC and CC, for use in (semi-)formal development techniques and for formal program development with VSE II

The joint research project Verisoft, managed by Prof. Wolfgang Paul (University of Saarland) in cooperation with the T-Systems Nova GmbH, is working on the verification of a chip card based biometric identification system intended to restrict access to sensitive resources. The underlying cryptographic protocol, developed with the assistance of DFKI techniques for protocol verification, was shown almost automatically to be correct. The verified system is currently being implemented and the first prototype is being built.

Additional information is available at
www.dfki.de/siso

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LeActiveMath: Language-Enhanced, User-Adaptive, Interactive eLearning for Mathematics

LeActiveMath is one of the three Specific Targeted Research Projects in the 6th Framework Programme "Information Society Technologies", key action Technology-Enhanced eLearning. It started January 2004. The overall project funding amounts to 3.950.000 Euros.

LeActiveMath will deliver an innovative web-based third-generation eLearning system for mathematics that will be used in high school and college or university level classrooms as well as for self study.

It adapts to the learner and learning context and comprises personalization, tutorial dialogues, open student modeling, and interactivity that is tool-supported for active and exploratory learning.

The value added to previous systems is due to:

- Intelligent feedback and tutorial dialogs
- Integrated interactive tools that understand the semantics of learning objects

- Pedagogically grounded elements, contexts, and strategies that beneficially employ tools
- Reaction to the learner's motivational and emotional state
- Advanced personalization
- Open, inspectable student model
- Accessible exercise repository
- Free non-commercial usage
- A truly open and distributed architecture with one student model
- Reusability of single components and tools
- Integration in one configurable system
- Innovative semantic knowledge representation and integrated tools using it

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CASCOM – Context-Aware Business Application Service Coordination in Mobile Computing Environments

The main objective of the project (CASCOM) is to implement, validate, and trial a value-added supportive infrastructure for Semantic Web based business application services across mobile and fixed networks.

The essential approach of CASCOM is the innovative inter-disciplinary combination of intelligent agent, Semantic Web, Peer-to-Peer, and mobile computing technology. Conventional Peer-to-Peer computing environments are extended with components for mobile and wireless communication. Semantic Web services are provided by peer software agents which exploit the CASCOM coordination infrastructure to efficiently operate in highly dynamic environments. The generic CASCOM coordination support infrastructure includes efficient communication means, support for context-aware adaptation techniques, as well as flexible, resource-efficient service discovery, execution, and composition planning.

The project will deliver a full proof-of-concept implementation of the generic CASCOM service coordination support infrastructure for mobile business application service coordination for mobile users and workers, and a field-trial CASCOM demonstrator for selected pervasive health care application services. The three use case sce-narios Telemonitoring and e-Inclusion, Shopping Mall and Health Care are currently being evaluated.

This project is funded under the 6th EU framework program for research for a period of three years. The joint research project CASCOM is coordinated by DFKI and TeliaSonera AB.

Additional information is available at
www.ist-cascom.org

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Gnowsis – The PC's Own Semantic Web

The Gnowsis system extends existing desktop applications with the addition of semantic web interfaces. The user can use their personal computer as a personal semantic network. E-mails, documents, address book entries, photos, and appointment calendars stored throughout the jungle of individual data are all conveniently linked in a semantic network. The existing data structures remain intact and applications are not replaced, but rather extended.

The transfer of semantic web technologies to the pc does not disturb the uniform presentation of information, regardless of the software that generated it. Gnowsis functions are integrated into the user interfaces of common processing programs, like Microsoft Outlook or Mozilla Internet Suite, by way of Plugins. The user can create links between various resources, for example, a photo and the address book entry for a person. The links can be created manually or automatically and enable the user to "browse" between applications.

At the core of the Semantic Desktop system is the local web server that is extended by the semantic web and Gnowsis technologies. Standard applications are contacted by adapters. These reusable components compile the existing data structures and permit access to the program functions. This architecture is based on the W3C "Resource Description Framework" standard (RDF).

Gnowsis, when combined with applications developed for the semantic web or for knowledge management, can save both time and costs for the user.

Two DFKI projects, EPOS and @VISOR, already employ the Gnowsis system. The external "MeManage" project, a cooperation with Knallgrau GmbH, is built using Gnowsis components. The system is in the Beta phase and is being developed further with the goal of becoming the perfect basis for future research projects and commercial applications.

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 is available at
www.gnowsis.org

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EPOS – Evolving Personal to Organizational Knowledge Space

The exploitation of individual information and structures together with the parallel extraction of organizational knowledge is at the center of the EPOS research project, funded by the Federal Ministry of Education and Research (BMBF).

Every individual work station, with its structure and content, provides solid indications of the importance and relationships of information objects and structures. Even the work habits of an individual user reflect the assigned tasks within the organization and represent a personal perspective of the company.

First, the employee structures found in a variety of tools, such as the e-mail system, the file directories, or the visited pages on the web browser, are localized and analyzed. The resulting personal information model is converted into an explicit and communicable model that can then assist the user to manage the knowledge at his or her work station. Several personal information models of the organization combine to provide the basis for global models and ontologies within a corporate memory, designed to let users continue work as they are accustomed to working.

This means the user must not – as in earlier knowledge management systems – adjust to the system, rather the system adjusts itself to the individual structures of the user.

A personal information assistant prepares relevant, task-specific information from various sources and displays it in the respective viewing structures, or context of the user.

Services offered by DFKI
Analysis of work stations and modeling of individual structures to reflect a personal information model; Evolution of personal information models to global models and organizational ontologies; Proactive and task-specific preparation of information based on personal and organizational structures and context

Additional information is available at
www.dfki.de/epos

CeBIT

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The Image Understanding and Pattern Recognition department of DFKI examines innovative processes for the digitalization of documents under the rubrik "Oblivious Document Capture" (ODC).

An application scenario has been implemented in the form of an intelligent desktop, which permits the digital storage of documents and facilitates the editing and archiving of printed information sources like books and written files. A built-in glass plate allows automated recording of documents placed on the glass by a camera mounted under the work area. Two additional cameras positioned above the desk prepare three dimensional images in a stereo procedure. Because the digitalization is automatic, the user does not have to interrupt or reorganize work processes. Printed media such as books is recorded while the user is reading them.

ODC – Oblivious Document Capture

Special software developed at DFKI enables curvatures of the copied pages to be recognized and corrected so the images of the content are free of distortion. The distractions that so often arise from scanning or photocopying bound volumes are eliminated. In combination with a printer, the desk, in effect, replaces a photocopier or a computer with a flatbed scanner.

Additional information is available at: www.iupr.org

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SPECTER – Context and Affect Sensitive Personal Assistants in Instrumented Environments

The Federal Ministry of Education and Research (BMBF) project, called SPECTER, is developing a personal assistant that creates an artificial memory by recording the actions of the user. Part of this memory is a "personal journal" that serves as a reference work for the user and, in combination with a user model, forms the basis of the context sensitive support provided by SPECTER.

SPECTER combines several closely related research topics. The most important among these are studies that extend the user's perception, learning about behavior and affect, decision making aids, and even reflection and introspection about the information contained in the user's memories.

Currently, we are examining how SPECTER can assist a shopper. With RFID sensors, the system records primitive events (e.g., a product leaves the shelf) and maps this onto more complex actions (e.g., the user compares two products). Information obtained in this way

is used to assist the user with services provided in the local environment and in the Internet. The user can monitor and evaluate the recorded activities and then modify SPECTER's interaction with the environment to match personal needs.

Additional information is available at
www.dfki.de/specter

Services offered by DFKI
Consulting, design, and evaluation in the area of instrumented environments, RFID technology, ontology and web services

CeBIT

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M3I – Mobile ShopAssist

MOBILE MULTIMODAL HUMAN COMPUTER INTERACTION

The emergence of online internet shopping portals as a popular alternative to traditional shopping is already effecting the way we live. Although it provides a wealth of information, online shopping still lacks the basic emotions that accompany a real shopping trip to a traditional store with real physical products, for example, the sense of touch, or the atmosphere of being at a particular location. What if one could still shop traditionally, but without the hassle of waiting for the constantly busy sales representatives, or the frustration of being unable to see the product information locked behind a glass shelf, or perhaps finding the store is closed just when you have some free time?

The M3i Mobile ShopAssist is a Pocket PC application designed to augment the traditional shopping experience with natural language communication channels such as speech, handwriting, and gestures. Through the use of advanced modality fusion techniques, it is possible to bridge the digital and physical worlds through the interpretation of multimodal interactions. A user can interact with both physical objects on a shelf and their digital-world counterparts displayed on a Pocket PC.

Recent evaluations at Conrad Electronic in Saarbrücken, involved giving users the task of choosing a digital camera for purchase. Typical user actions included picking up the cameras from the shelf, checking their features and finally, comparing them to other products including their counterparts in the digital-

world. In fact, the users were encouraged to do so by the objects themselves. When picked up from the shelf, the camera initiates a dialog and interacts in both English or German, depending on the language of the shopper.

This work is being carried out under the COLLATE II (Computational Linguistics and Language Technology for

Real Life Applications) project, in particular, under the theme M3i (Mobile and Multi-Modal Interaction). 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. Conrad Electronic in Saarbrücken is also recognized for their contributions during the evaluation phase.

Services offered by DFKI
Research, conception, and prototype realisations dealing with Mobile and Multi-Modal Interaction (M3i).

Additional information is available at
www.dfki.de/m3i

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UMTS Product Prototype "Interactive Mobile Monitoring (IMM)"

DFKI is proud to present interactive live video streaming on UMTS mobile phones in the Future Parc at CeBIT 2005. Now, with DFKI's "Interactive Mobile Monitoring" (IMM) technology, it is possible to access and remotely control a network-compatible video camera via the mobile phone keypad of a UMTS smartphone, for example, the Nokia 6630.

The IMM prototype offers a preview of the mobile multimedia services that will be available in conjunction with important events like the FIFA World Cup Germany 2006. The IMM has already proven itself in practice at the UCI Cycle-Cross 2005 World Championships, in Sankt Wendel (January 29– 30, 2005). In the context of this sporting event, watched by more than 30,000 spectators, video cameras – e.g., with one hanging from a static balloon - allow the UMTS mobile users to watch a live, bird's eye view broadcast of the competition. The interactive video streaming of sporting events that cover large distances, allows the user to enjoy a more comprehensive and more intense experience. They can switch over to new viewing positions and even to instant replays and slow motion viewing.
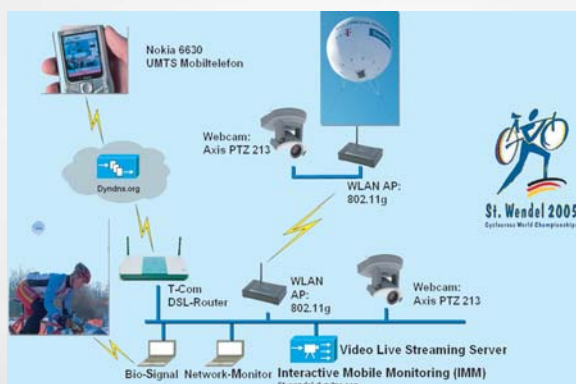
Every user can individually control the video source from the UMTS smartphone and, with a few simple key com-

binations, select between an overview display and a single source. If the selected camera is equipped with control options (Pan-Tilt-Zoom), it can be controlled directly from the mobile phone keypad.

The IMM Technology Demonstrator is one result of the "UMTS DoIT" and "Saarland Unwired" projects included in the joint multimedia initiative sponsored by the Saarland Ministry for Economic Affairs and Deutsche Telekom AG. The system can take advantage of interactive, mobile "eventainment" offerings. For example, a user can direct a virtual zeppelin to cruise over an event location to discover for example, where live-multimedia data about the event can be found. Then, directly tune to the livestream being transmitted from cameras on the ground or in the air. Control is also possible directly from the smartphone: move the camera to the right or left, up or down and zoom in and out. There are other practical uses of the IMM, for example, mobile monitoring of construction sites, mobile security applications, image based remote diagnoses, or in a modified version, the audio-video intercom at the entrance which puts the visitor through to the smartphone.

The use of "Interactive streaming" architecture is what enables the "Interactive Mobile Monitoring". The user has a convenient, easy to operate port to the source of the live-multimedia and uses it for direct interactions. The effect of such interaction is immediately visible: the camera repositions, the picture becomes larger or smaller. The IMM system employs standard technologies and is equally well suited for use with either an MS Windows system or a smartphone.

Additional information is available at
www.umts-doit.de

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

CeBIT

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German Research Center for Artificial Intelligence

SmesQA – Intelligent Searches Across Linguistic Barriers

SmesQA is a robust, crosslingual, question answering system that can process natural language queries. SmesQA analyses a free text question, finds the exact answer and delivers the desired information in the proper context. The language of the question is irrelevant to the language of the answer. This means for example, that a question asked in German may draw upon English language sources for the answer. SmesQA was especially developed to handle large volumes of open domain, unstructured text.

SmesQA expands the spectrum of search engines, not only by the fact that it enables more effective searches by the use of complex questions rather than simple key words, but also because it localizes meaningful answers in relevant documents and extracts them. SmesQA enjoys a much higher understanding quotient than the common search engines. Already, the system successfully answers questions related to persons, organizations, locations, time expressions and size measurements. The modular design of the SmesQA makes it particularly well suited for extensions for answering supplemental, and more specific, subject questions.

SmesQA offers outstanding performance as amply demonstrated in a recent comparison of European systems.

The system achieved the highest score in the Cross Language Evaluation Forum (CLEF) 2004 in the area of answering German questions in English documents.

In the future, SmesQA will be able to answer still more complex, user-specific questions interactively, where even partial answers in several documents will be located, extracted, and combined. This will provide an automated, subject-specific information research capability.

Additional information is available at:
http://quetal.dfki.de

Services offered by DFKI
Competent partner in the examination of linguistic-based, intelligent, multi-language question and answer systems and their use in innovative fields of application

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eXfinance – Language Technology for the Financial Services Sector

The eXfinance tools employ automated methods of information extraction and fusion to transfer company related financial data from various documents into the XBRL standard (eXtensible Business Reporting Language). XBRL is an open, XML-based representation language used by more and more important financial institutions.

eXfinance extracts and merges relevant information from annual reports, published in the PDF format and presents the information in XBRL. Both structured data (balance sheets, etc.) and free text (notes to the financial statements) are included. In this way, eXfinance represents an enormous increase in efficiency in the transfer of business information (annual financial statements) already in the public domain into the XBRL standard and contributes to the further spread of the standard.

In the future, eXfinance will also analyze other sources of text, like news tickers and other financial portals, to extract information relevant, for example, to share price data such as a change in the top corporate management.

The data so obtained can be combined with hard facts already coded in XBRL and provides an expanded pool of information for analysts, fund managers, and private investors.

eXfinance is developed and used in the EU project, WINS (www.winsproject.com/htdocs).

Services offered by DFKI
Implementation of eXfinance tools as either stand alone applications or as an online service; Extension of the fundamentals of language technologies to various languages; modification of methods used to extract information for special, XBRL based applications.

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VIeWs – A Tool to Connect Information and Knowledge on Websites

Websites generally offer a great volume of information that is not directed at any specific target audience.

The central aim of the VIeWs project is to demonstrate using the sample website, www.saarland.de, how the information stored online can be specifically tailored and made available to a variety of special interest groups. Existing information is enriched with additional relevant facts from automatically generated hyperlinks.

VIeWs is a web based tool. This means the user can navigate routinely to the Internet site www.saarland.de, and is assisted in the process by VIeWs. Using newly created hyperlinks that show, for example, supplemental facts about the town or community mentioned in a text, the user can click directly to them or continue as usual to browse through the website using the hyperlinks provided. Tourist information about hotels, restaurants, or cultural events can be called up directly and does not depend on the page structure provided by the web site.

VIeWs works by combining semantic web procedures, information extraction, and hyperlinking: VIeWs first analyses the web documents provided by the server and searches for city names. A web search for the recognized names is then initiated in the background according to

an ontology. Based on the results of this search and information already existing in the knowledge base, the website is refreshed and shown with Java-based context links to all the matching city names. Relevant information found in the URLs is extracted and then stored in the knowledge base.

Additional information is available at
http://views.dfki.de

Services offered by DFKI
System engineering of semantic browsers over automatically generated, ontology-based hyperlinks

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Saarbrücken and Trento Establish European Test Center for Language and Speech Technology Products

Dr. Fabio Pianesi, Dr. Mario Zen, Prof. Hans Uszkoreit, Prof. Wolfgang Wahlster, Dr. Gianluca Salvatori, Dr. Susanne Reichrath

Within the context of a visit by the Minister for Innovation from the autonomous Italian province of Trento, Dr. Gianluca Salvatori, in October 2004, a two-region-initiative named CELCT has been initiated between Trento and the State of Saarland. One of the main areas of study is the systematic testing of various natural language processing methods employed in answering questions using

knowledge stored on the Internet. Under the CELCT framework, for example, speech recognition systems that can understand and provide question-answer services over the telephone will be tested.

In addition, CELCT tests new language and speech technology components for customers from industry to determine their suitability for the market and also prepares neutral test comparisons of all software components from the various European manufacturers of products in this field. Working in cooperation with COLLATE, the German Competence Center for Language Technology at DFKI funded by the Federal Ministry of Education and Research (BMBF), CELCT will become almost a sort of European "Central Testing Lab" for high-tech products in the field of Human Computer Interaction.

The offices of CELCT are located at the BIC-Trento (Business Innovation Center). The development of the center is the responsibility of the head scientist, Dr. Amadeo Cappelli of Pisa. Dr. Fabio Pianesi from the ITC-irst is the Chairman of the Management Board and Prof. Dr. Wolfgang Wahlster, Director of DFKI, will serve as the vice chairman.
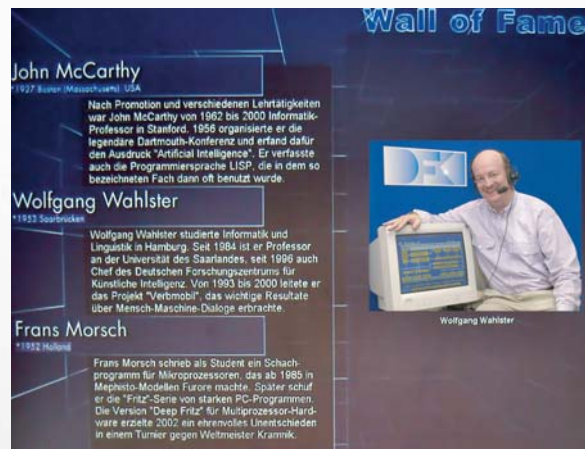
Additional information is available at www.celct.it

▶ Prof. Wahlster on the "Wall of Fame" for Pioneers in Computer Technology

The new "Wall of Fame" at the Heinz Nixdorf Museum Forum, the world's largest computer museum located in Paderborn, Germany, is an exhibit of historical achievements in the development, application, and spread of computers since 1945.

The selection of the 152 pioneers on the Wall of Fame is based on a categorical division of the field of computer technology into 36 areas. Each area is allowed a maximum of four outstanding personalities and their contributions are recognized through the use of biographical data (see www.hnf.de/museum/update_WallOfFame_liste.html). The display includes an individual name page with photos, biographical text and other media about each of the pioneers and their careers.

Scientific, technical, creative, or entrepreneurial contributions are among the criteria for selection. Also evaluated are originality, degree of acceptance, and effectiveness of innovations in computer science. Visitors to the museum will observe that the only German scientist in the category "Artificial Intelligence" is Prof. Wahlster.

▶ Prof. Wahlster in the Leopoldina

Foto: Leopoldina

Prof. Wolfgang Wahlster, Prof. Volker ter Meulen

The German Academy of Natural Science, the Leopoldina, has selected Prof. Dr. Dr. h.c. mult. Wolfgang Wahlster for membership in the Information Science Section. The certificate of acceptance was presented at an official ceremony in Heidelberg by the Academy's president, Prof. Volker ter Meulen, in October 2004 during a ceremony in Heidelberg. The Leopoldina, founded in 1652 and based in Halle (on the Saale) is the oldest Academy of Natural Science in Germany. The trans-regional, non-profit society of scholars has listed such personalities as Bohr, Darwin, Einstein, v. Humboldt, and Planck on past membership rolls. The goal of the Academy since the beginning still remains, "to contribute to the well being of man and nature." The honors conveyed upon Prof. Wahlster clearly symbolize the efforts of the Leopoldina, to welcome contemporary, outstanding members who are active in their field of science and research in order to form more comprehensive, critically focused, and well-considered opinions on important social issues.

▶ Dr. Matthias Klusch Named as DFKI Research Fellow

This award is presented in recognition of outstanding scientific contributions and service. Dr. Klusch received the award in 2004 on behalf of the DFKI for his work in the transfer of research results to industrial practice. The award is the equivalent of the C3/W2 professorship at German universities.

Dr. Klusch has worked since 1999 at the DFKI in Saarbrücken as a head scientist in the Multiagent Systems Group. His area of research expertise is the use of agent technologies with mobile, internet based IT applications. His current focus is on the flexible coordination of semantic web services, secure distributed knowledge systems and cooperative discussion strategies for information agents in the Internet as well as potential applications for the future Quantum Internet.

Since 1997, Dr. Klusch has organized the series of international workshops for Cooperative Information Agents (CIA). In 2003, he initiated the German conference series, MATES – Multi-Agent System Technologies. He is the co-editor of several international technical journals and is engaged as a recognized expert for many institutes for the advancement of research throughout the world. (www.dfki.de/~klusch).

DFKI Interview: Stephan Busemann

Dr. Stephan Busemann has been with DFKI since 1990 and as a Research Fellow, since 2000. He currently serves as the Deputy Director of the Research Department for Natural Language Technologies. His work is concentrated on text mining, information extraction and text generation (www.dfki.de/~busemann).

What do you see as the potential of the applications research being conducted?
Our applications contribute to the discovery of new ways to make implicitly inaccessible, coded knowledge available and useful. Specifically, this means extracting meaningful facts from the huge volume of text material available on the Internet.

When did you first get interested in Artificial Intelligence and how have AI processes changed since that time?
I began, towards the end of the 70's, to believe that interactive, spoken dialog systems were possible. The goal at that time, modeling a complete and comprehensive understanding of computer speech, gradually transitioned to enabling searches for specific information.
What are the greatest challenges and opportunities for AI systems today?
The human, as the ideal communicator, is back at the center attention. At the intersection where the biosciences, psychology, and AI meet, we are now able to study speech, thought, and emotion within a common framework for the very first time.

What do you enjoy doing when you are not working as a research scientist?
I am a passionate chess player – distance chess – where the players' moves are made by e-mail or on a server. I am quite proud of the fact that, over the years, I have managed to earn a spot among the top 50 in the world rankings. Playing distance chess lets me live out my tendency for perfectionism, as there is hardly ever any time pressure.

Are there parallels there to your professional life?
Playing chess is an art, but it is also a battle to conquer and explore new territories. All aspects also play a significant role in my professional work.

What are your current research projects?
There are several, so let me name only one highlight: I manage the EU Project called DirectInfo, where we are developing semi-automated screening methods to evaluate the effectiveness of advertising. One of the challenges for language technology is the identification of positive or negative references to companies in newspaper and magazine articles or television programs.

Prof. Dengel Selected as German Juror for European Software Prize

Prof. Dr. Andreas Dengel has been selected as Germany's representative on the Information Society Technologies (IST) Prize Executive Jury. This selection board provides the proposals used by the European Commission to decide the winners, including the three "Grand Prize" winners, each year. In 2004, the grand prize winners each received € 200,000.

The "IST Prize" is the most distinguished prize in Europe for innovative products and services in the field of information sciences. It is granted to companies and organizations that have designed and developed an innovative product with promising market potential. The winners want to market their products, which represent fundamental and trend setting ideas, and contribute to the information society and the science of Human Computer Interaction.

Prof. Dengel, upon his appointment explained, "The IST-Prize recognizes European researchers who are helping to pave the way to a knowledge society with their innovative applications."

The "IST Prize" is organized by the European Council of Applied Sciences, Technologies and Engineering (Euro-CASE), a non-profit organization composed of the national academies representing 18 European countries, with the sponsorship and support of the IST program of the European Commission. The nominees and winners gain tremendous prestige throughout Europe which significantly improves their ability to find financing, partnerships and access to the markets. These companies enjoy a significant increase in name recognition and confidence, as well as, the expectations for future business success.

Participate in this year's IST Prize competition. The application forms are available online at: www.ist-prize.org/apply.

East Meets West – DFKI as Academic Partner for the Hamburg Summit

Prof. Andreas Dengel, SE Ampalavanar Selverajah

The German–Chinese Summit Meeting in November 2004 was the venue as DFKI introduced the latest research results and prototypes.

The Hamburg Chamber of Industry and Trade welcomed

a demonstration team from the Knowledge Management Research Department of DFKI, directed by Prof. Andreas Dengel. The demonstration focused on CityGuide Mobile, the pedestrian information system that will be introduced at the FIFA World Cup 2006 in Kaiserslautern. The CityGuide Mobile system lets tourists browse and spontaneously choose from among the many attractions and events available throughout the city. The functions of the interactive tour guide may be transferred, for example, to the Olympic Summer Games 2008 in Peking.

Visitors to the DFKI booth included the Honorable SE Ampalavanar Selverajah, Ambassador of the Republic of Singapore. All were impressed by the developments and research efforts presented. During his China trip in March 2005, Prof. Dr. Dengel will be able to reinforce the contacts he made in Hamburg.

More information about the Hamburg Summit is available online at
www.hamburg-summit.com

CityGuide Mobile Wins "Media in Motion" Prize 2004

One of the five prize winners in the multimedia competition "Media in Motion – Regions with a Future" 2003/2004, sponsored by the State of Rhineland-Palatinate, is the pedestrian navigation system for the FIFA World Cup Germany in 2006, developed by DFKI in association with the City of Kaiserslautern and the software company, Webnologic Internet Systems of Koblenz, Germany. Prof. Dr. Andreas Dengel, Head of the Knowledge Management Research Department at DFKI, accepted the award in December 2004 from Minister President, Kurt Beck and Economics Minister, Hans-Artur Bauckhage.

The pedestrian navigation system, CityGuide Mobile, allows visitors to a city to browse the entire range of activities in the city and enjoy them as they so desire. The visitor needs only an everyday, recent model, mobile phone or a handheld computer.

After entering the current location, a menu lets the user restrict the display, for example, to show all or just one

pharmacy. If an ambiguous target is entered, the CityGuide Mobile presents a list of all possible matches, sorted by distance from the current location. If the user selects a navigation destination, a map showing the shortest route is presented or, if preferred, a text description is displayed.

A trial version of the pedestrian navigation system is planned for release in mid 2005.

Additional information is available at
http://cityguide-mobile.com

A Brief Introduction to the Center for Human-Machine Interaction (ZMMI)

User-Interface Design

The ZMMI is one of a small number of scientific enginee-ring institutes in Germany that has been active for many years in the field of Human-Machine Interaction. Head of the institute is Prof. D. Zühlke. The research ranges from basics of human information perception and methodologies for the process of user-interface design to new input and output technologies.

On this basis, the ZMMI has developed an integrated process for the design of convenient useware for indu-strial products. The process is already in use in nume-rous industrial projects. ZMMI has also been asked to respond to an increasing number of international user inquiries – typically in the USA and Asia.

The process is hardware independent and, with a usa-bility model at its core, meets current requirements for the systematic design of user-interfaces. This is clearly demonstrated by the task and user orientation as well as the platform-wide useware concept.

Research activities

Artificial Intelligence (AI) already accompanies the deve-lopment of user-interfaces with a task oriented approach, but even more when intelligent, interactive features, like voice interaction or avatars (virtual charac-ters) are deployed. In this field ZMMI studies the research areas of emotional perception control and the context-related acceptance of various characters that appear useful in an industrial environment.

smartFactory KL

The SmartFactoryKL at ZMMI is an extensive program representing a demonstration and development center for the design and introduction of an intelligent factory of the future. SmartFactoryKL is flexible, networked and self-structuring. This can be achieved by the research conducted in the development clusters: "industrial tracking systems", "communications technology", "vir-tual factory", and "operating systems". Research departments at the DFKI and the "ambient intelligence" research group of the University of Kaiserslautern are to be included.

Additional information is available at:
www.zmmi.de
www.smartfactory-kl.de

ZMMI at Hannover Fair 2005

Want to know more about us?
That's great!

ZMMI will be represented at the Hannover-Fair 2005 in the joint display area "Human Computer Interaction" (Hall 2/C14). We will be demonstrating the well establis-hed development process for industrial, task and user oriented user-interface design by showing sample development projects. You can see, for example, the user-interface of an industrial pump control and plastics extrusion.

We would be pleased to see you at our booth. Our staff will be happy to greet you and provide information about sample projects and further details about the ZMMI approach.

DFKI Soccer Robots to Play at International Tourism Exchange (ITB) in Berlin

In association with TZI University of Bremen and the City of Kaiserslautern, DFKI will introduce the soccer playing robots from the Sony Four-Legged Robot League at the ITB-Berlin, March 11–15, 2005. (www.itb-berlin.de). These commercially available "Aibo" brand robot dogs are to be equipped with software used by last year's RoboCup winners. "The German Team is the reigning world champion from the Four-Legged Robot League. This was a joint project of the Humboldt University-Berlin, the Technical University of Darmstadt, and the Universities of Bremen and Dortmund," said Prof. Dengel, Head of the Knowledge Management Research Department at DFKI.

The kicking robots can be seen at the City of Kaiserslautern booth (Hall 8.2) on the international fair grounds. The teams are each made up of four Aibos and will compete against each other on a three x four meter playing field. The participation at this year's ITB is part of a much broader cooperation between DFKI, the University of Bremen and the City of Kaiserslautern in conjunction with the FIFA World Cup Germany 2006.

Photo: Tim Laurinat

The City of Bremen is the host of the 2006 RoboCup World Championship. Hosting the two league championships in parallel presents an opportunity to appreciate the ambitious goal of the RoboCup Initiative: A RoboTeam should play and defeat the world champions in the year 2050.

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The core of all of the systems is the Dacos Simulation Engine, in which objects of the real world are modeled as software agents (e.g., customers as customer agents). These agents can automatically extract behavior patterns from collected real-world data (such as sales slip and customer card data) and encapsulate them in behavior nets, by means of which the agents react to environmental changes (e.g., promotion campaigns and price adjustments) in analyses and simulations.

The Dacos technology enables companies to play through "what if" scenarios and thus to test ex ante the reaction of customers and customer groups to changes in their marketing and sales mix. In addition, customer value, customer risk, and customer segmentation analyses can be performed.

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Dacos also supports manufacturers of consumer goods with its technology in solving application problems in category management, analytic customer relationship management, and trade promotion management.

Because of its generic conception, the Dacos Simulation Engine can also be applied to many other problems in various branches of industry.

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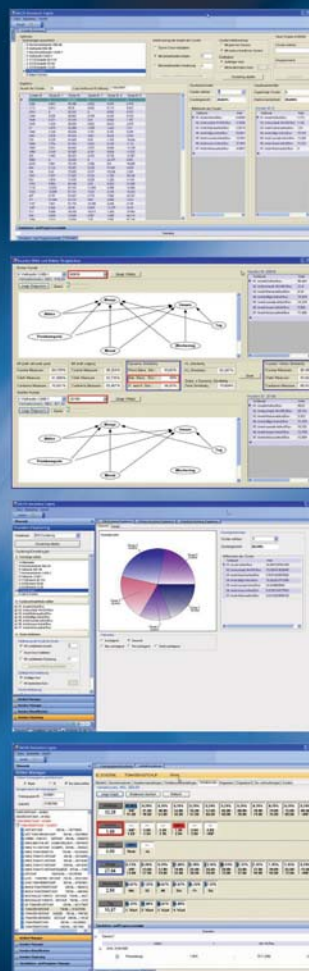
DFKI – Simply Innovation

Kaiserslautern Site

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. Olthoff (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 Uszkoreit)
- Intelligent User Interfaces
  (Director: Professor Wolfgang Wahlster)

Also integrated within DFKI are the Institute for Information Systems (IWi) directed by Professor August-Wilhelm Scheer, and the Center for Human-Machine Interaction (ZMMI), under the leadership of Professor Detlef Zühlke. The purpose of the transfer centers listed below is to make the scientific results of DFKI research available to commercial applications:

- AICommerce – Intelligence for eBusiness
- SISO – Towards Secure Software
- smartLab – Intelligent Assistance
- TransLect – Language Technology at Work

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:

- E-learning
- Language Technologies
- Semantic Web
- Virtual Office of the Future

Currently, the DFKI GmbH employs 205 highly skilled people. They are supported on a part time basis by an additional 210 student research assistants. In the fiscal year 2004, the research institute managed an overall budget of € 17.7 million and achieved a positive net income for another consecutive year. The list of corporate partners in the DFKI includes DaimlerChrysler, Deutsche Telekom, SAP, IDS Scheer and Bertelsmann, which is an indication of how much the performance achieved by DFKI is valued by industry.

Saarbrücken Site

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 62 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 (CELCT) in Trento. The company also holds shares in XtraMind Technologies GmbH. The general aim of expanding the research and development activities is realistic and remains valid for 2005.

Intelligent Solutions
for the
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- Intelligent e-commerce solutions
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- Multimodal user interfaces and language understanding
- Intelligent visualization and digital simulation
- Image understanding and pattern recognition
- Multimedia data bases
- Usability Engineering
- Affective agents as internet guides and e-commerce assistants
- Intelligent product search, data mining and text mining
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- Semantic web
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- Intelligent solutions for safety and security

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