

## KIT to showcase self-learning humanoid robot at CEBIT

Test Center for Autonomous Driving – Uncrackable Digital Wallet – Cloud Service Certification – Virtual Health Assistant – Quantum-based Prediction of Molecular Properties



*Eager to learn: the ARMAR-6 assistant robot can acquire new skills, support users and pass tools by observation alone. (Photo: KIT/Laila Tkotz)*

**At their joint booth at CEBIT in Hanover (Hall 27, booth G52) from June 12 to 15, Karlsruhe Institute of Technology (KIT) and FZI Research Center for Information Technology at the Karlsruhe Institute of Technology will showcase an assistant robot for the industry that can learn to use tools by watching its human colleagues, a test center for autonomous driving, an electronic wallet that cannot be cracked by data thieves, a certification system for reliable cloud services, and other highly exciting research and startup projects.**

### **ARMAR Assistant Robot: Number 6 is Learning**

It's normal for robots to be used in factories and warehouses these days. They carry out a variety of tasks such as picking, welding and assembling. But they are mostly specialized to perform a specific task and are separated from people by cages or barriers. ARMAR-6, however, can work together directly with its human colleagues. The youngest member in the family of humanoid robots based at KIT does

**Monika Landgraf**  
Chief Press Officer  
Head of Corp. Communications

Kaiserstraße 12  
76131 Karlsruhe  
Phone: +49 721 608-21105  
E-mail: [presse@kit.edu](mailto:presse@kit.edu)

**For further information,  
please contact**

Dr. Felix Mescoli  
Editor/Press Officer  
Phone: +49 721 608-48120  
E-mail: [felix.mescoli@kit.edu](mailto:felix.mescoli@kit.edu)

Julia Feilen  
Corporate Communications  
and Media  
FZI Research Center for In-  
formation Technology  
Phone: +49 721 9654-943  
E-mail: [feilen@fzi.de](mailto:feilen@fzi.de)

not focus on a specific activity but can, for example, learn how to use new tools by observing people.

With its arms resembling human limbs, ARMAR-6 can literally give its colleagues a hand with a hammer or drill, pass them tools or assist in any other way. This works not only with a few preprogrammed tools; thanks to its artificial intelligence, the robotic aid is able to continuously improve its capabilities – through observation, linguistic instruction or from its own experience. That means that without additional programming it can be used in a variety of environments and can support people in their difficult and highly stressful tasks.

Developed at KIT's Institute for Anthropomatics and Robotics, number 6 in the ARMAR series uses five cameras in its head and laser sensors in its mobile platform to find its way around. Capable of lifting a weight of about 10 kilograms even with an outstretched arm, it is equipped with torque sensors in the arm joints to ensure that it uses its power so carefully and reliably that it can safely work together with people. Being a true assistant, ARMAR-6 is able to recognize when someone needs help and offers it to them – something that will be demonstrated at CEBIT.

### **Virtual Experience – Baden-Württemberg Test Center for Autonomous Driving**

The FZI Research Center for Information Technology at Karlsruhe Institute of Technology will showcase a demonstrator which brings to life application scenarios of the Baden-Württemberg Test Center for Autonomous Driving (TAF BW) for visitors to the fair.

The test center was opened on May 3, 2018. There, companies and research institutions can test future-oriented technologies and services related to connected and automated driving in everyday traffic. However, not only automated driving of cars can be tested in the test center; buses, street cleaning vehicles and delivery services also have the option of developing future-oriented mobility for commercial vehicles. To achieve this, different kinds of traffic setups have been prepared and sensors for capturing traffic and its various factors in real time have been installed.

### **PriPay: Secure and Anonymous Virtual Wallet**

Whether we make cashless payments when shopping, accumulate loyalty points in supermarkets or book electronic tickets for public transport, we leave a wide range of information in all of these transactions and a clearly visible invitation for data hunters to follow our

trail. Researchers at KIT have now developed PriPay, a payment system protecting people's privacy which can be used to make payments and loyalty point transactions completely securely and anonymously. The virtual wallet is managed on the user's actual device. Thanks to randomization, not even the system operator knows the current balance; nevertheless, before a transaction takes place the balance is guaranteed to be sufficient. The fact that the transactions are hidden means that tracking is avoided from the start. Conversely, double-spending detection prevents users from spending more than is available in the account. And: the system works even without a permanent network connection. An application scenario using a canteen system at the CeBIT booth will demonstrate that PriPay is efficient and ready.

#### **AUDITOR: Reliable Certification of Cloud Services**

Holiday photos, music collections, customer files, and even business-critical databases – the number of private people and companies using cloud services is constantly growing. Finding a trusted cloud service provider, or conversely, convincing potential customers of the reliability of your own cloud offering, is difficult in this vast market. The AUDITOR research project coordinated by KIT aims to provide a solution with Europe-wide data protection certification of cloud services based on the new EU General Data Protection Regulation. Another aim is to improve the comparability of cloud services offered by companies from different EU member states. The criteria catalog is available to view at booth E06 in Hall 16 at CEBIT.

**Each day of the fair, a different KIT startup project will be introduced:**

#### **Zana (Tuesday): Interactive and Intelligent Health Assistant**

Using language technology and machine learning techniques, virtual health assistant Zana can communicate with users in the form of dialogs, control the conversation by asking follow-up questions and finally give personalized recommendations based on medical knowledge.

#### **Heisenberg (Wednesday): Quantum Algorithms for Predicting Molecular Properties**

Heisenberg software runs on both conventional computers and existing and future quantum computers. This allows development processes in the chemical and pharmaceutical industry to be accelerated

considerably and the understanding of chemical and physical relationships to be increased. As a result, new products can be realized much faster.

#### **Usetimes (Thursday): Automated User Research for Digital Offerings**

Digital offerings such as websites, apps and user interfaces should be as user-friendly as possible. This requires extensive testing during development. But this is time-consuming and expensive. Usetimes automates established methods of user research and is therefore able to deliver statistical results from a wide range of qualitative and quantitative user tests for the relevant product within 48 hours. Consequently, Usetimes can provide time and cost savings of 80 percent in tests with real users.

#### **Coral Innovation (Friday): Platform for Exchanging Information about New Technologies**

The idea platform from Coral Innovation publicizes thousands of innovative technologies from research, startups and companies that would otherwise be known only to the immediate environment. It also gives small and medium-sized businesses easy access to technological developments and knowledge from new industries. The technologies are shown in a generally understandable form and their content is connected. This allows companies to discover interdisciplinary potential more easily and to adapt unrecognized innovation potential from neighboring technology industries.

#### **Future Mobility: Camera-based Driver State Detection**

The FZI Research Center for Information Technology at Karlsruhe Institute of Technology will present a webcam at CEBIT which records relevant information about drivers and their states. The camera-based system captures the driver's face and evaluates it with regard to heart and blink rate, head posture and emotions. This contactless measuring method does not require any special lighting or extra technology to be installed on the body of the driver. Thanks to this system, accidents caused by fatigue or lack of attention can be avoided, with the driver receiving optimum support corresponding to their current performance requirements.

#### **Virtual Tour through the FZI House of Living Labs**

The FZI Research Center for Information Technology at Karlsruhe Institute for Technology has created a new research environment for IT

applications across more than 2,000 square meters on two floors in Karlsruhe. It is available especially for small and medium-sized companies for research and development across industries and applications and is known as the FZI House of Living Labs. Visitors can experience it first hand at CEBIT as a virtual simulation through head-mounted displays. They can also expect accurately simulated and animated demonstrators. The FZI House of Living Labs is a platform for developing and testing new applications, services and hardware. In order not to restrict the transfer of knowledge to the premises in Karlsruhe, scientists have digitized the FZI House of Living Labs. This allows anyone interested to learn more about the offering regardless of time and place.

**As “the Research University in the Helmholtz Association”, KIT creates and conveys knowledge for society and the environment. The aim is to make significant contributions to global challenges in the fields of energy, mobility and information. To achieve this, around 9,300 employees are working together on a broad disciplinary basis in natural sciences, engineering, economics, humanities and social sciences. KIT offers research-oriented studies to prepare its 25,500 students for responsible tasks in society, economy and science. Innovations at KIT bridge the gap between knowledge and application for the benefit of society, economic prosperity and the preservation of our natural resources.**

**The FZI Research Center for Information Technology at Karlsruhe Institute of Technology is a non-profit institution for applied IT research and technology transfer. It brings the latest scientific IT findings to companies and public institutions, and trains young people for academic and economic careers or for self-employment. Led by professors from various faculties, the research groups at FZI develop concepts, software, hardware and system solutions across all disciplines, and implement prototypes of these solutions. The FZI House of Living Labs provides a unique research environment for application research. All FZI research divisions have been certified according to DIN EN ISO 9001:2015. Its main office is in Karlsruhe. A branch office of FZI is located in Berlin.**

This press release is available on the internet at [www.sek.kit.edu/presse.php](http://www.sek.kit.edu/presse.php)

The photo of print quality can be downloaded at [www.kit.edu](http://www.kit.edu) or requested by mail to [presse@kit.edu](mailto:presse@kit.edu) or by phone at +49 721 608-47414. The photo may be used exclusively in the context given above.