

CeBIT: Mobile and Secure in the “d!conomy”

Human-machine Interaction with Mobile End Devices, Data Security, and Multi-core Technology Will Be Presented by KIT and FZI



KIT and FZI at CeBIT 2016: The Kinemic software facilitates operation of augmented-reality applications. (Photo: KIT)

“Discover d!conomy” – Digital Transformation Is Happening Now is the slogan of next week’s CeBIT 2016 in Hanover. And justifiably so: Digitization has long since reached all areas of our life and is transforming them massively. Digital transformations focus on smartphones, tablets, and data goggles, but also on airplanes, trains, cars, and not least, interconnected production facilities in Industry 4.0. How can the fruit of digital revolution be used more effectively and securely? Answers will be given by Karlsruhe Institute of Technology (KIT) and the FZI Research Center for Information Technology at CeBIT 2016 in Hanover (hall 6, booth A30).

Kinemic: Controlling Devices without Touching or Typing

Information technology is used anytime and anywhere. Currently available input devices, such as smartphones, however, still require time-consuming typing on virtual mini keyboards and the operator’s concentration on small screens.

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Kinemic – a spinoff of KIT – has now developed the only software of this type in the world for the free-handed operation of a variety of devices, such as PCs, smartphones or wearables, by writing words into the air or by simple gestures. Hand and arm movements are recorded by a sensor wristband or a smartwatch and then translated into gestures or text. Information and user interfaces are displayed in the field of view of the user wearing augmented reality goggles. Device operation is facilitated and workflows can be executed more quickly with less interruptions.

At CeBIT, visitors can test the system. During their visit of CeBIT, also Federal Chancellor Angela Merkel and the President of the Swiss Confederation, Johann Schneider-Ammann, will inform themselves about Kinemic at the booth of KIT and FZI.

More information:

<http://kinemic.de/> (in German only)

http://www.pkm.kit.edu/downloads/datenblatt%20KINEMIC_PressReview_de_final.pdf (in German only)

How Secure Is Your Smartphone?

Smartphones are widely used and frequently store highly sensitive data, such as contacts, photos, and e-mails as well as bank data and passwords. In case of Android-based smartphones in particular, security holes are closed months after they have become known only. At CeBIT, the demonstrator of FZI's Competence Center for IT Security will point out to visitors known security holes of the smartphone operation system (Android and iOS) they use on their smartphones. Many of these security holes can be exploited with a small effort and allow the attacker to gain complete access to the smartphone and, in the worst case, to the user's data.

FZI's Digital Innovation Center supports medium-sized enterprises in digitization and in managing the resulting new business models and challenges. The booth staff will inform visitors about how processes and updating strategies will have to be designed for manufacturers of smart devices to react in due time and appropriately to security holes.

More information:

<http://url.fzi.de/smartphony-cebit> (in German only)

<http://www.diz-bw.de> (in German only)

Augmented Reality Provides Big Data for Shop Floor Uses

In tomorrow's production, an increasing amount of machines and process data will be recorded. But how can valuable contents be filtered out of these enormous data volumes. How can big data be used smartly?

The Smart Data Innovation Lab (SDIL) of KIT is one of the leading big data centers in Germany. Here, national partners of science and industry jointly work on mastering the challenges associated with big data. At CeBIT, SDIL will present an interactive demonstrator to show how big data analytics can be used by technicians on the shop floor.

Augmented reality is a user-friendly approach to visualizing sensor values of e.g. oscillation frequency and amplitude or temperature of a component in real time on the screen of e.g. a tablet. The data are inserted into the recorded image of the camera and are directly linked to those points of the machine at which they are measured. The image is calculated based on the current angle of view. It is updated automatically when the user moves. This does not only result in an intuitive allocation to currently measured values, but also allows for access to analytical results for preventative maintenance.

More information:

http://www.informatik.kit.edu/english/5088_7775.php

http://www.pkm.kit.edu/downloads/Datenblatt%20AR_Teco_dt_final.pdf (in German only)

StreamPipes: Real-time capable Big Data Applications without Programming

Integration of sensor data from production machines and processes has become rather simple in the meantime. Frequently, it is aimed at detecting production failures as early as possible by real-time analysis of large data volumes. However, generation of such applications still requires both technical expertise (big data infrastructure) and expert knowledge (data scientists).

At CeBIT, FZI will present StreamPipes, a solution for small and medium-sized companies to establish a big data environment with a small expenditure and to generate real-time capable processing pipelines with graphical tool support. StreamPipes is one of the first modeling tools for distributed real-time systems on the big data scale. It is not limited to a certain runtime environment. Via a semantic integration level, heterogeneous processing nodes can be connected even within a processing pipeline.

More information:

<http://url.fzi.de/streampipes> (in German only)

<http://www.fzi.de/wissen> (in German only)

Blurry Box Makes Hackers Fail

A highly digital and interconnected world that is mainly based on software can be attacked. Hackers copy, manipulate, and sabotage software all over the world and, thus, cause enormous economic damage or even something worse.

Blurry Box effectively protects software against cyber crime. In contrast to many other methods, the process is based on Kerckhoffs's principle. It is not the algorithm, i.e. the protection method itself, that is kept secret, but an exchangeable key. This enormously enhances security of the software code to be protected.

Blurry Box was granted the IT Security Prize, the highest award in the area of IT security, by the Horst Görtz Foundation. The process is a joint development of the Competence Center of Applied Security Technology (KASTEL) of Karlsruhe Institute of Technology (KIT), the FZI Research Center for Information Technology, and the company of Wibu-Systems.

At CeBIT, visitors will have the opportunity to assume the role of a hacker who is to hack the software, in this case a computer game. On a 3D LED cube, visitors play a flight simulation by joystick and make typical attacks that are defended effectively by the Blurry Box.

More information:

<https://www.kastel.kit.edu/> (in German only)

http://www.fzi.de/en/research/research-focuses/forschungsfelder-en/ffeld/sicherheit/tab/reiter_ueberblick/

http://www.kit.edu/kit/english/pi_2014_15864.php

ARAMiS: Safe Use of Multi-core Technology in Mobility

Information technology has given rise to a number of useful assistance systems for driving and flying and determines product properties. In the future, multi-core processors will supply the required computation capacity. They are increasingly replacing the inflexible single-core systems that are limited in capacity. But this will also change programming paradigms. For critical applications in particular, safety and reliability have to be rethought and reviewed. The recently successfully completed ARAMiS (**A**utomotive **R**ailway and **A**vionics **M**ulti-core **S**ystems) project has laid the central technical basis for the use of multi-core processors in safety-critical systems.

The KIT-coordinated ARAMiS project was funded on a 50:50 basis by the Federal Ministry of Education and Research (BMBF) and industry, including automotive, railway, and avionics manufacturers, their suppliers, and hardware and software manufacturers. Altogether, thirty companies, universities, and research institutions took part.

Within the framework of ARAMiS, demonstrators were developed to show how space, weight, and energy can be saved in cars, planes, and trains when many control devices are combined in a few, but powerful multi-core systems. Apart from safety, also efficiency and traveling comfort are increased. At CeBIT, an example of use in the automotive sector will be presented. Visitors are invited to interactively take part in a simulation drive.

More information:

<http://www.projekt-aramis.de/> (in German only)

IT Security for Smarter Mobility

Which challenges face research, industry, and users in the area of “Security and Mobility”? iPads around the research vehicle CoCar Zero, an electric vehicle modified for autonomous charging and parking under the AutoPles project, present current and future challenges in the area of secure future mobility. At the booth, researchers will inform visitors about the work performed at FZI and the challenges ahead and they will provide insight into current projects.

More information:

<http://url.fzi.de/autoples> (in German only)

<http://www.fzi.de/en/research/research-sectors/anwendungsfelder-en/afeld/mobilitaet/>

Emmtrix: Parallelization of Multi-core Processors

Emmtrix Technologies, a spinoff of KIT, also focuses on multi-core processors. These multi-core systems can be found in today's desktops, PCs, notebooks, tablets, smartphones, cameras, and many other electronic products. Several processor cores combined on a chip work in parallel and, thus, reach higher speed and power. However, these advantages can only be exploited, if the software can distribute its tasks to two or several processor cores, i.e. if it is programmed in parallel. So far, programming has required a high time and cost expenditure and special knowledge.

Emmtrix Technologies has developed an automated parallelization tool to replace complex, time- and cost-intensive parallelization. This solution will be presented at CeBIT. Visitors can interact with the system presented by movements and gestures. They will be shown how the reaction capacity of the system is improved by parallelization.

More information:

<http://www.emmtrix.com/>

More information on KIT's appearance at CeBIT can also be found at <http://www.pkm.kit.edu/cebit2016.php> (in German only).

The FZI Research Center for Information Technology at the Karlsruhe Institute of Technology is a non-profit institution for applied research into information technology and technology transfer. Its task is to provide businesses and public institutions with the latest research findings in information technology. It also qualifies young scientists for their career in academics or business as well as self-employment. Led by professors from various departments, research teams at FZI interdisciplinarily develop and prototype concepts, software, hardware, and systems solutions for their clients.

Karlsruhe Institute of Technology (KIT) pools its three core tasks of research, higher education, and innovation in a mission. With about 9,300 employees and 25,000 students, KIT is one of the big institutions of research and higher education in natural sciences and engineering in Europe.

KIT – The Research University in the Helmholtz Association

Since 2010, the KIT has been certified as a family-friendly university.

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