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New research centers in Dresden

New Fraunhofer Center for Cognitive Production Systems and AI center in collaboration with TU Dresden

Cognitive systems and artificial intelligence are key technologies in value creation and will play a crucial role in deciding Germany's future viability for technological growth. The Fraunhofer-Gesellschaft is continuously expanding its expertise in this area, on both a cross-institute und cross-institution basis; this leading research organization has simultaneously launched two new research centers at a founding event on February 11. These centers will focus on strategic technologies of primary importance to Germany's success as an industrial location. In addition to the official founding of the Fraunhofer Center for Cognitive Production Systems CPS at the Fraunhofer Institute for Machine Tools and Forming Technology IWU in Dresden, Fraunhofer and the Technische Universität Dresden also signed a Memorandum of Understanding (MoU) on the creation of the Center for Explainable and Efficient AI Technologies CEE AI.

AI-based technologies are fundamentally transforming almost every sector, from production of goods to logistics through to medical technology. The large number of possible applications alone is reason enough for public interest. In Dresden Fraunhofer has now founded the Center for Cognitive Production Systems, and the Fraunhofer-Gesellschaft has joined the Technische Universität Dresden in signing an MoU on the founding of the Center for Explainable and Efficient AI Technologies. The signing was attended by German Federal Minister of Education and Research, Anja Karliczek, Minister-President of the Free State of Saxony, Michael Kretschmer, and by Dr. Eva-Maria Stange, State Minister for Higher Education, Research and the Arts in Saxony.

Expanding research in a strategically important field

German Federal Minister Karliczek commented: "Digitalization will shape our working world even more strongly in the future. There's a strong call for greater impetus in production technology if we want to stay in the lead against global competition. The Fraunhofer-Gesellschaft is taking on this challenge by founding the Research Center for Cognitive Production Systems. Beyond the leading-edge technologies driving forward this fundamental transformation, Fraunhofer is also instrumental in pursuing another very important perception: the need for dialog with the public."

As Minister-President Kretschmer observed, "Innovations in industry and specifically in production technologies are crucial to prosperity and employment in our state of Sax-

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ony. The Fraunhofer-Gesellschaft plays an important role in this context as a major research organization because of its close ties to both companies and topics that will shape our future. The new research center symbolizes the dynamism and optimistic spirit we need to take our industry forward. The Free State of Saxony makes targeted investments in future-oriented projects that build bridges between research and industry, as is the case here in Dresden.” Kretschmer expressly thanked Minister Karliczek and the German federal government for their support.

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Dr. Eva-Maria Stange, Saxony’s State Minister for Higher Education, Research and the Arts, added: “The exceptionally equipped Fraunhofer institutes in Dresden are highly sought-after partners in the scientific community and in industry, in Saxony, in Germany and internationally. In this regard, we need only look at the great potential attached to the topics artificial intelligence and cognitive production systems at the heart of Industrie 4.0, which we want to support together. Working with its partners, the Fraunhofer IWU can apply its expertise and wide range of production technologies at many places along the process chain, making essential contributions to tomorrow’s production facilities.”

Prof. Reimund Neugebauer, President of the Fraunhofer-Gesellschaft, commented: “Cognitive systems play a crucial role in the future transformation of the economy and society. This will lead to fundamental structural changes in both international business and industrial value-creation chains. In view of these developments, it is of primary importance that Germany secure its place as an industrial location at the vanguard of technology and innovations. Founding the Fraunhofer Center for Cognitive Production Systems and the Center for Explainable and Efficient AI Technologies jointly with the Technische Universität Dresden is an important step toward further progress in these strategically important research fields.”

Fraunhofer Center for Cognitive Production Systems

The Fraunhofer Center for Cognitive Production Systems will consolidate the expertise of Chemnitz and Dresden as centers of research and industry in the fields of mechanical engineering and production technologies, as well as in microelectronics and information technologies, creating an interdisciplinary space focused on innovation. Prof. Welf-Guntram Drossel, executive director of the Fraunhofer IWU, said: “Cognitive systems allow us to combine the productivity of series production with the resource-efficiency of individual production, taking the best possible path toward sustainable value creation. Being able to offer technology and system knowledge together with the tools and algorithms of artificial intelligence is of primary importance. This is especially true for small and medium-sized companies that can advance Saxony’s international competitiveness through new business models and service portfolios.” The objective is to connect traditional and innovative production techniques with their respective digital counterparts (digital shadows and digital twins). New and established production methods are being combined to manufacture innovative products with high degrees of design freedom. This results in highly interactive and flexible process chains that must be

represented digitally, networked, and rendered manageable using cognitive production systems. Smart microsystems for machines and production plants provide a foundation for achieving this in terms of communications, sensor technologies and actuator technologies.

German federal, state and EU funding totaling 40 million euros is supporting the establishment of the “Research Center for Cognitive Production Systems”.

Center for Explainable and Efficient AI Technologies

The Center for Explainable and Efficient AI Technologies CEE AI is being sponsored jointly by TU Dresden and the Fraunhofer-Gesellschaft. Participation by the TU encompasses the Excellence Cluster Center for Tactile Internet with Human-in-the-Loop CETI and other university departments. Participation by the Fraunhofer-Gesellschaft in CEE AI comprises the Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS (with its new institute site in Dresden) in collaboration with the Fraunhofer Institute for Machine Tools and Forming Technology IWU. They are joined by the newly founded Fraunhofer CPS, the Engineering of Adaptive Systems Division EAS of the Fraunhofer Institute for Integrated Circuits IIS, as well as the Fraunhofer Institute for Transportation and Infrastructure Systems IVI.

The joint center consolidates activities relating to the topic of artificial intelligence in the region. This strengthens particularly the mechanical engineering and microelectronics sectors, both of which are highly concentrated in Dresden. The topical focus of the CEE AI covers “explainable AI”, in particular modeling of knowledge, and “efficient AI”, which drives forward High Performance Computing, Big Data and the efficient integration of AI algorithms in company-internal hardware systems.

The Center is headed by Prof. Frank Fitzek of the TU Dresden and Prof. Jens Lehmann from the Fraunhofer IAIS. The establishment of the new institute site enables the Fraunhofer IAIS to bring its leading expertise in the development of artificial intelligence to the Dresden region. The new group led by Prof. Jens Lehmann will focus its research on the area “Conversational AI”, i.e. the development of intelligent dialog systems, in particular for corporate applications.

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