

PRESS RELEASE

PRESS RELEASE

March 2021 || Page 1 | 5

Hannover Messe 2021: Cognitive Internet Technologies for an Agile, Innovative and Competitive Industry

The Fraunhofer Cluster of Excellence Cognitive Internet Technologies CCIT will showcase key technologies for an agile, innovative and competitive industry at the digital Hannover Messe (#HM21) from April 12 to 16, 2021. The scientists will present cognitive systems for future-proof assembly and production, the Dataspace Connector as a basis for sovereign data exchange through participation in GAIA-X and International Data Spaces, and transparent machine learning methods for industry.

Garching near Munich, March 2021 – Cognitive Internet technologies combine the physical world of things with the digital world of data and learning algorithms to create highly intelligent applications. They collect data from different sources, learn to understand them and optimize existing applications or open the door for new business models. "At Fraunhofer CCIT, more than 20 Fraunhofer institutes are pooling their expertise to develop cognitive Internet technologies for the industry of the future. In doing so, the researchers are taking the next step in the development of Industrie 4.0 and the Internet of Things: they are combining the strengths of people and digital technology. We look forward to presenting specific application scenarios and solutions at the Hannover Messe 2021," says Christian Banse, head of the Fraunhofer CCIT office.

Trustworthy electronics and intelligent sensor technology

In an agile and flexible industrial production, trustworthy electronics and intelligent sensor technology record and communicate data in real time. Fraunhofer CCIT shows examples at its digital #HM21 booth: With the intelligent screw connection, which permanently monitors hard-to-reach places and areas by means of a thin-film sensor system, screw connections, e.g. on bridges, wind turbines or also on machines in production lines, can be monitored wirelessly and energy-autonomously. This combination of different Fraunhofer technologies and their integration in a screw/clamp connection is already available as a product-ready technology solution.

Press contact:

Tobias Steinhäuser | Fraunhofer-Cluster of Excellence Cognitive Internet Technologies CCIT

Lichtenbergstraße 11 | 85748 Garching near Munich | Phone +49 89 322 9986-170 | tobias.steinhaeusser@aisec.fraunhofer.de

Fraunhofer CCIT is also developing a scalable sensor network that can integrate different sensors and the associated data communication for condition monitoring tasks, e.g. even directly in rolling bearings or in machine-to-machine communication. This means that these systems can be adapted to each individual case with different measurement variables for a wide range of meaningful damage characteristics. With intelligent sensor technology, radio technology and autonomous energy supply, the condition of machine tools can also be continuously monitored. This is a key element, for example, in forming and also in machining, in order to optimize processes. Among the indicators are the tightening forces and temperatures on the tool surface.

PRESS RELEASE

March 2021 || Page 2 | 5

The self-measuring localization system FlexLoc allows mobile machine tools to be placed or networked easily, flexibly and in real time in the hall infrastructure or tools in the human-machine interaction. For example, by attaching sensor nodes, automated guided vehicles (AGVs) can also interact with a person carrying an associated tag.

Secure data rooms

A controllable, sovereign and traceable exchange of data across company boundaries is essential in order to survive or even lead the market in digital competition with agile, intelligent service offerings. This requires software solutions that enable the safeguarding of complex processing chains by covering a wide range of security and interoperability requirements while being easy to integrate into existing IT infrastructures.

The Dataspace Connector (DSC), which will be presented at the Fraunhofer CCIT booth, meets these requirements: It has an extensible architecture that enables companies to exchange data in a sovereign manner and can be adapted flexibly, easily and comprehensibly to the companies' individual business processes and requirements through appropriate configurations.

Companies can integrate the Connector solution, which is available as open source, into an existing container infrastructure, for example. Since the data is protected before it is exchanged via connectors and provided with usage rules, the data provider retains control over his data even after the exchange and thus an overview of what happens to the data. Through appropriate extensions, the DSC also supports the three security levels specified in DIN SPEC 27070. This means that companies can easily and efficiently start using the European GAIA-X data infrastructure. The DSC is licensed under Apache 2.0 and freely available.

Fraunhofer CCIT is continuously developing offers for securing business processes so that conditions of use can be enforced in a comprehensible manner. These solutions enable trust in distributed business processes even with increasing complexity of processing chains and thus address the requirements of industry.

Machine Learning for Industry 4.0

Industrial companies can apply the data gained through digitization in innovative artificial intelligence solutions. "Informed Machine Learning", which was also shaped by the Fraunhofer CCIT, enables companies to transparently track the decision-making processes of learning systems and to intervene at the right points - an important prerequisite for assessing quality, reliability and risks. The research teams will be demonstrating examples of specific application scenarios in industrial production, including quality control at their digital trade fair stand.

An intelligent system consisting of a conventional image recognition process and innovative AI methods detects damage and defects such as paint inclusions or hail damage on reflective surfaces (e.g. car body parts) and automatically categorizes the defects found. Another technology combines voice and gesture control to create a multimodal dialog assistant for industry. The system enables completely digital defect documentation in production directly on the component with very little time expenditure. Users can choose between intuitive pointing gestures and a laser pointer as input method and mark defect locations on a component quickly, precisely and intuitively. Another exhibit shows cognitive tools that digitally assist workers, for example during the maintenance process on a forming press. The module attached to the screwdriver recognizes individual work steps and compares them with the target process. An additional localization system (QR code tracking) ensures that the work steps are performed at the correct location. The worker receives live feedback on the progress of his work via an app.

PRESS RELEASE

March 2021 || Page 3 | 5

Event information:

Fraunhofer Streaming Day on April 13

On the second day of the trade fair (Tuesday, April 13, 2021), Fraunhofer CCIT experts will provide information on specific application scenarios for industrial companies via live streaming at the Fraunhofer-Gesellschaft's virtual trade fair booth:

PRESS RELEASE

March 2021 || Page 4 | 5

- 8:30 - 9:00 a.m.: Live discussion on "Applied Research for Industry 4.0" (together with Fraunhofer ICNAP)
- 9:00 - 9:30 a.m.: Informed Machine Learning for Industry
- 11:00 - 11:30 a.m.: Quantum Machine Learning - Competencies, Research, Application
- 5:00 - 5:30 p.m.: Cognitive Internet Technologies in Application - Examples and Scenarios
- 5:30 - 6:00 p.m.: Application of the Dataspace Connector at GAIA-X

About Fraunhofer CCIT

In the Fraunhofer Cluster of Excellence Cognitive Internet Technologies CCIT, the Fraunhofer-Gesellschaft works on cognitive Internet technologies for an agile, flexible and competitive economy and society. To this end, Fraunhofer CCIT bundles the competencies of more than 20 Fraunhofer Institutes from the fields of microelectronics, information and communication technology, and production. The joint research and development work is concentrated in three research centers on the technology fields of IoT communication, trusted data spaces and machine learning.

Website: <https://www.cit.fraunhofer.de/en.html>

Explanatory Film: https://www.youtube.com/watch?v=XibeZmSNReE&list=PLJh2i_ls3jJuZ4t2hMH_5UUZkcG-Zexf6g

Press photos:



PRESS RELEASE
March 2021 || Page 5 | 5

Flexloc: flexible, self-measuring localization solution for automated production and logistics processes. (© Fraunhofer CCIT/Fraunhofer IIS)



Dataspace Connector: Extensible architecture that enables enterprises to exchange data with confidence. (© Fraunhofer CCIT/Fraunhofer ISST)



The Multimodal Dialog Assistant for manual quality control in industry can be controlled by voice or gestures. (© Fraunhofer CCIT/Fraunhofer IAIS)