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CeBIT 2017: Big Data and Machine Learning for Intelligent Products and Business Models

Big Data and Machine Learning form the basis of intelligent systems and are the key technologies which will allow "Artificial Intelligence" (AI) to be developed further. If machines are to be employed autonomously on highways, in factories or in companies, they cannot simply respond based on rigid programs – they must learn through experience. From 20 to 24 March 2017 at the CeBIT in Hanover the Fraunhofer IAIS and its team of experts will showcase technology which paves the way for new intelligent products and innovative business models based on a combination of machine learning processes and semantic technology.

We talk with our smartphones, we are starting to see the first driverless cars on our roads and chatbots are already having deceptively real conversations with people. Artificial intelligence has well and truly arrived in everyday life to the extent that we are often no longer aware of it. Industry is also relying increasingly on cognitive technologies which not only link data and devices, but also companies and processes. It is this type of linking that drives the development of innovative products and services, benefiting both the economy and society as a whole. At the CeBIT 2017 the Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS will take visitors on an interactive tour through its "AI Lab of the Future" and use current Fraunhofer research to illustrate how Big Data and Machine Learning products and services will lead the way in Artificial Intelligence.

According to Fraunhofer IAIS Institute Director, Professor Dr. Stefan Wrobel "Machine Learning will always reach its limits if not enough data is available to train its algorithms or if the phenomenon being assessed is still too complex for the current generation of processing power. For this reason we are now researching how the established knowledge of engineers or experts in different fields can be combined with these new approaches." These so-called hybrid research methods combine machine learning methods with semantic technology to simulate the human ability to understand meaning through context. The resulting cognitive systems will be able to support humans in a meaningful way, particularly when faced with solving complex tasks.

Digital Assistants and Real-Time Systems of Recommendation

"Tell me where you live and I'll tell you what car suits you!" Looking for a new car can be a complicated undertaking – the choice of models, specifications and technical features can be daunting. Instead of having to click through a raft of configuration

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options, Mercedes-Benz is now providing their customers with a car selection process based on lifestyle. In cooperation with Berylls Strategy Advisors, Nolte & Lauth and SBN Data Technologies, scientists from the Fraunhofer IAIS have developed a self-learning algorithm to be incorporated into the “Mercedes-Benz Lifestyle Configurator”. Instead of asking the customer questions about their preferred model, engine size and specification, the real-time recommender system is more interested in finding out information such as their favorite music, architecture and travel destinations before suggesting a selection of cars suited to their lifestyle. The more answers the real-time recommender system gathers, the more accurate it becomes.

Technology such as Question Answering, which assesses knowledge gathered from numerous sources, establishes semantic links between separate pieces of information and is ultimately able to answer the complex questions required to turn digital assistants into intelligent ones. Digital assistants react to people’s questions by scouring a multitude of knowledge sources and generating meaningful answers.

Knowledge graphs for data-driven business models

Cognitive technology can also be used to give industry a crucial knowledge-based competitive advantage. This is done when different enterprises pool their wealth of data into a knowledge graph which is then used to semantically analyze market, product and financial data. The results can also be combined with information already in the public domain or with data from partner enterprises. It is in this way that new forms of cooperation between enterprises will be developed.

To use mobility as an example, the various options available from local public transport systems, bike, car or ride sharing and taxi companies can all be exchanged between cooperating enterprises using semantic web technology. Factors such as weather, traffic volumes and disruptions can also be taken into account to ensure that customers reach their destination in comfort and via the fastest possible route. The development of its “Enterprise Knowledge Graphs” means that Fraunhofer IAIS can support enterprises and organisations in restructuring their data and knowledge bases and applying them to innovative data-driven business models.

Autonomous Navigation on Highway Construction Sites

Driverless cars are no longer a thing of the future – the automotive industry is frantically trying to bring self-driving cars to the market. The technology packed into these vehicles, however, is complex and there are still many challenges to be overcome before driverless cars can safely navigate our streets. The Fraunhofer IAIS team uses “Deep Learning Processes” to solve particularly complex problems associated with assisted or autonomous driving – such as autonomous navigation through highway construction sites.

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The basis for this new software is a camera-based pattern and image recognition system which identifies objects such as traffic signs, level crossing warnings and pylons and also recognizes text. In this way the software learns to “read” the content of specific signs or recognize, for example, that the lane ahead is narrowing. When used in combination with satellite navigation systems and on-board computers even exit points from highway construction sites with different signposting can be interpreted correctly, distances to other cars measured optimally and driving speed adjusted accordingly.

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The »AI Lab of the Future« at the CeBIT 2017

This and other exciting projects such as a system for virtual advertising on stadium boards during live sports events or an ingenious fraud recognition algorithm for the financial sector is what visitors can look forward to at the Fraunhofer IAIS stand at the CeBIT 2017 in Hanover. Visitors to Stand B36 in Hall 6 will be offered an interactive tour through the IAIS Lab of the Future and given the opportunity to get informed about Fraunhofer’s latest research into Big Data, Machine Learning and Artificial Intelligence. The Fraunhofer experts will also be available to present and discuss further education and training opportunities for technology-orientated, data-driven future jobs within “Data Science”.

About Fraunhofer IAIS

The Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS develops tailor-made IT solutions to support companies and organizations optimize products, services and processes, as well as to implement intelligent information management. There is a particular focus on the analysis, access and targeted use of Big Data, new media technologies and solutions for innovative business and security processes.

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