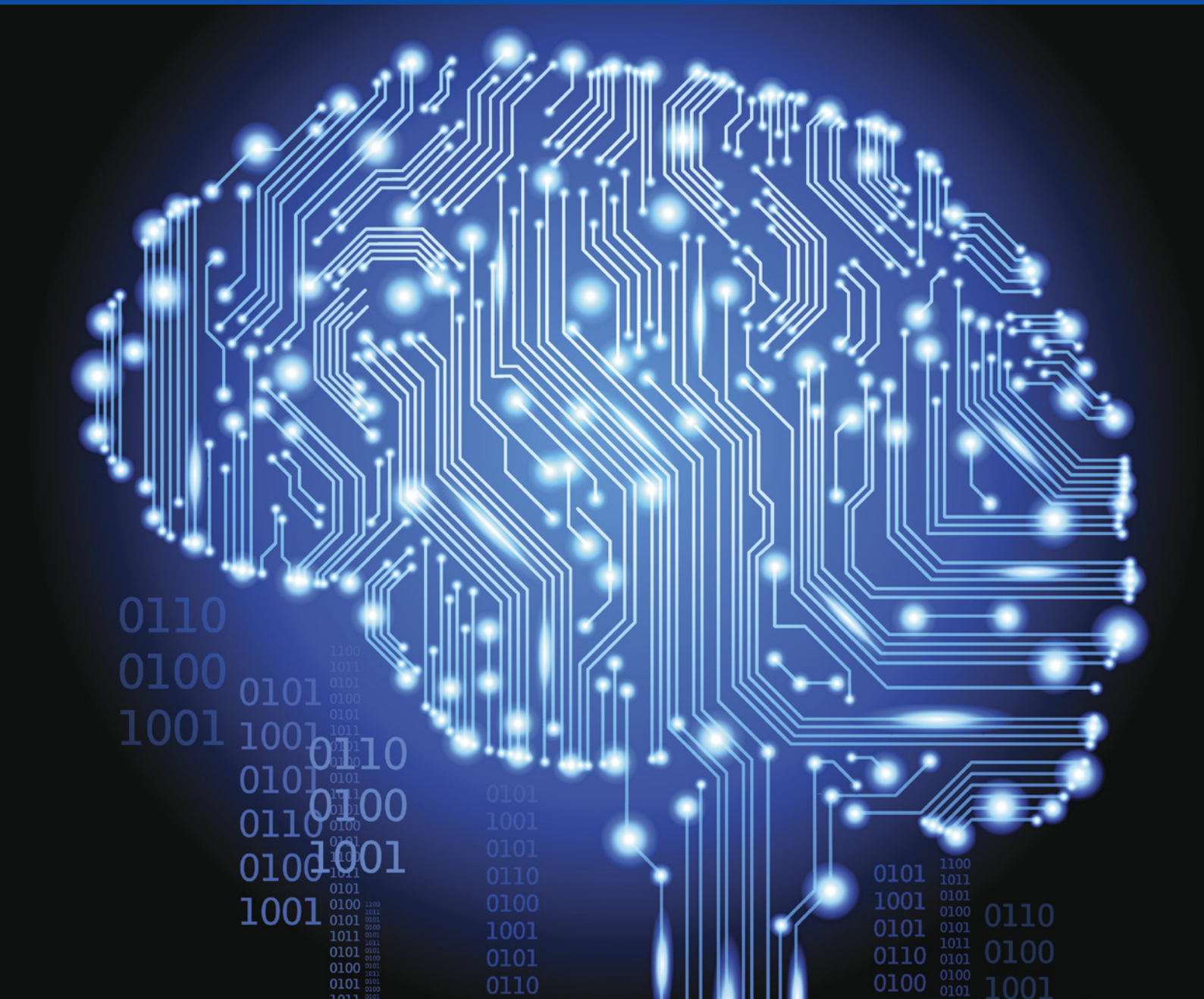
Fraunhofer
IDMT

FRAUNHOFER INSTITUTE FOR DIGITAL MEDIA TECHNOLOGY IDMT

MACHINE LEARNING – FROM MUSIC ANALYSIS TO INDUSTRIAL AUDIO DATA



AUTOMATIC IDENTIFICATION AND CLASSIFICATION OF INDUSTRIAL SOUNDS – RELIABLE SIGNAL ANALYSIS FOR EARLY RECOGNITION OF ERRORS IN MANUFACTURING PROCESSES

Even in noisy environments, the human ear is able to recognize and distinguish between individual sounds. People working in industrial plants are able to draw conclusions about the condition of a machine, a motor, or a component just by listening to the sounds these objects produce. The researchers from Fraunhofer IDMT develop systems that listen to and assess these sounds. Using machine learning, malfunctioning products or irregularities in the production process can be recognized at an early stage. The Fraunhofer solution thereby contributes to automatic quality assurance and predictive maintenance.

Automatic recognition of data patterns

Methods based on machine learning are broadly used for analyzing video content, music, or speech. A common example of applied machine learning are recommendation systems as used by popular music streaming services. Since acoustic properties like distinctive frequency and rhythmic patterns also exist in industrial sounds, the same algorithms can be applied to the manufacturing domain as well. The basis of machine learning is the use of sample data properly annotated with relevant characteristics. With the help of these annotated examples, the system learns to differentiate between sounds of individual machines, motors, or components.

Integration of additional sensor data

The solution developed by Fraunhofer IDMT is capable of integrating additional sensor data, such as operating temperature or rotation speed, into the model. For new use cases, the algorithms can be adjusted using annotated data. The required amount of data depends on the complexity of the problem and the similarity to previous use cases.

Contact-free, flexible use

Fraunhofer IDMT's machine learning algorithms can be deployed and executed on a variety of systems, e.g., integrated systems, desktop computers, mobile devices, and internal or external servers. As the system conducts contact-free measurements, it can be easily integrated into existing production lines and adapted to specific environmental conditions.

Fraunhofer Institute for Digital Media Technology IDMT

Ehrenbergstr. 31
98693 Ilmenau
Germany

Contact Person

Sascha Grollmisch
Phone +49 3677 467-145
sascha.grollmisch@idmt.fraunhofer.de

www.idmt.fraunhofer.de

photo acknowledgement: iStock.com/ VLADGRIN

version 03/2018