

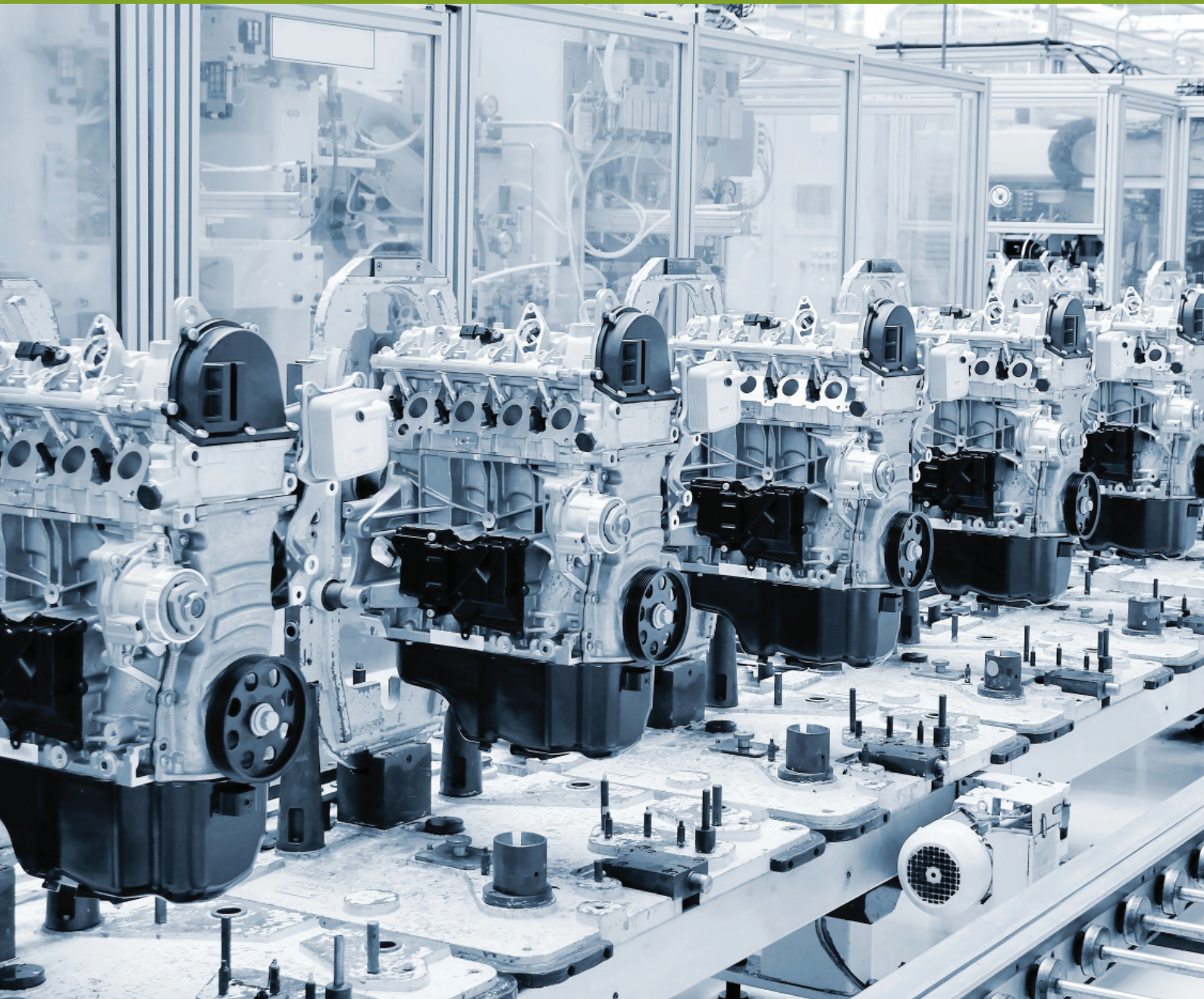


# Fraunhofer

## IDMT

FRAUNHOFER INSTITUTE FOR DIGITAL MEDIA TECHNOLOGY IDMT

# INDUSTRIAL MEDIA APPLICATIONS



# ACOUSTIC MONITORING OF PRODUCTION PROCESSES – LISTENING, ANALYZING AND SECURE PROCESSING OF ACOUSTIC MEASURED DATA IN INDUSTRIAL ENVIRONMENTS

For the purpose of assessing whether an automated production process runs flawlessly or is defective, audiovisual sensors (i.e., cameras and microphones) are increasingly replacing the human ear and eye. Using state-of-the-art digital media technology, it is possible to monitor production processes efficiently, inspect the quality of products neutrally, and predict and prevent machine downtime effectively.

With a unique combination of competences in the areas of **audiovisual signal analysis, machine learning, and media specific security technology**, Fraunhofer IDMT is addressing the industrial media application domain by developing and offering integrated solutions for acoustic condition monitoring and end-of-line tests, ranging from signal and noise capture to data analysis and secure data processing.

Applying concepts of machine learning, which is based on the recognition of data patterns, the different sounds produced by a motor can be identified, trained and classified. The assessment of the machinery's operation is fully automated and provides reliable information on whether it works fine or whether malfunction is likely to occur.

If measured data is to be transferred, stored and analyzed in a trustworthy manner, sensor data and intermediate analysis results can be validated, encrypted and signed, ensuring that data is not corrupted (intentionally or unintentionally) and that sensitive data may be accessed by authorized people and machines only. To allow analysis of sensor data by third parties without revealing the data's identity and origin, special methods and techniques for decoupling real and pseudonymous identities can be applied.

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## Areas of application

Each motor produces a specific, individual sound, which can be considered its acoustic fingerprint. If noticeable changes of this sound occur, the machinery might not be functioning as it should.

Using intelligent technology for acoustic measurement, the sound of a motor can be recorded (both in noise-free and in noisy environments) and the data captured can be processed for further analysis. In networked systems and production facilities, both one-channel and multi-channel signal processing is possible.

## Fraunhofer IDMT's areas of research

- Intelligent acoustic measurement technology (also for embedded systems)
- Signal analysis and processing
- Machine learning
- Secure storage, analysis, and processing of measured data