



PROFILE

Fraunhofer is Europe's largest application-oriented research organization. The research efforts are geared entirely to people's needs: health, security, communication, energy and the environment.

The Mission of Fraunhofer in Lemgo:
Empowering our partners for the digital age!

As a leading research institute in the field of industrial automation Fraunhofer supports suppliers, mechanical and plant engineers, as well as operators of automated technical systems in digital transformation. Our expertise lies in the application knowledge of industrial automation, including networking, analysis, monitoring and user-friendly design of technical systems.

Our business areas:

- Industrial Internet (IIoT)
- Intelligent automation
- Assistance systems
- Cyber security in production

With its SmartFactoryOWL and Lemgo Digital, Fraunhofer IOSB-INA operates two living labs for the use of IoT technologies in the factory of the future and the digital city.

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INDUSTRY 4.0 RETROFITTING

EFFICIENCY IMPROVEMENT OF EXISTING
MACHINES VIA INTELLIGENT SENSORS
AND DATA ANALYSIS





EFFICIENCY VIA RETROFITTING

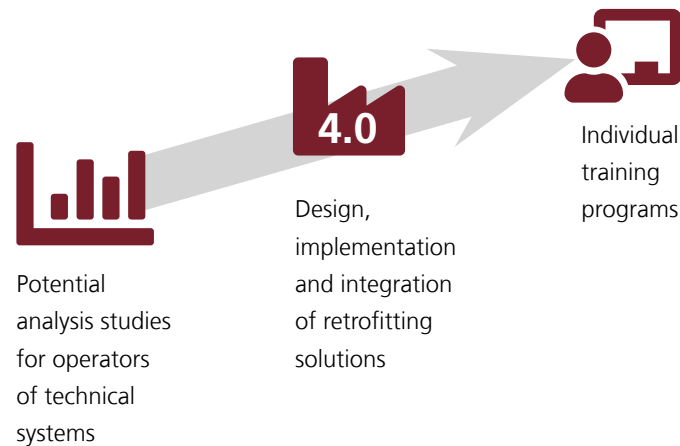
A key feature of Industry 4.0 applications is the acquisition of process data based on high-performance sensor technologies. Detailed system diagnostics and optimizations are fundamental for increasing performance and efficiency.

The implementation of Industry 4.0 applications typically requires costly investment in new infrastructures, as well as the replacement of existing machines due to missing Industry 4.0 interfaces and inadequate machine data. Retrofitting solutions in contrast are more cost-effective. They functionally upgrade existing machines and enable them for Industry 4.0.

Fraunhofer IOSB-INA develops retrofitting solutions based on smart sensor systems, cloud integration and machine learning methods for data analysis. Without high investments, these approaches support processes to become simpler in the future and to gain more transparency, control, planning, security and flexibility in your own production. Solutions cover the range of potential analysis studies based on our mobile production sensing system in suitcase form up to permanently installable retrofit solutions. Our machine learning approaches ensure a smart evaluation of your production data.

RANGE OF SERVICE

- (1)** Potential analysis studies for operators of technical systems: We investigate the commercial and technical potential for the introduction of retrofit solutions while taking the existing technical infrastructure and customer specific requirements into account.
- (2)** Design, implementation and integration of retrofitting solutions: Our approaches focus on synchronized measured value acquisition, sensor data fusion and pre-processing, cloud integration as well as smart data analysis.
- (3)** Adapted training programs: We educate your employees based on recent technologies and research results and train you in handling of retrofitting technologies.



KNOW-HOW AND RESSOURCES

- (1)** Interdisciplinary know-how in mechanical/plant engineering, automation technology, information and communication technologies, data science as well as hardware and software development
- (2)** Real-Lab SmartFactoryOWL with Industrie 4.0 production facilities and laboratories for cyber security as well as big data analytics
- (3)** Mobile production sensing system INAsense and smart sensor edge node
- (4)** Machine learning algorithms for machine data analysis in discrete, continuous, and hybrid production plants

SELECTION REFERENCES

- (1)** „INAsense“: Mobile sensor suitcase for training and analysis
- (2)** Acquisition of machine data via SecurePLUGandWORKAdapter as a retrofit solution for existing machines
- (3)** Embedded system for acquisition and transition of process and localization data of mobile waste compactors
- (4)** Fraunhofer Lead Project ML4P, machine learning for production
- (5)** Center ML in the Fraunhofer cluster of excellence: Cognitive Internet Technologies (CIT)
- (6)** Bilateral industry projects on model identification, diagnosis, optimization and predictive maintenance