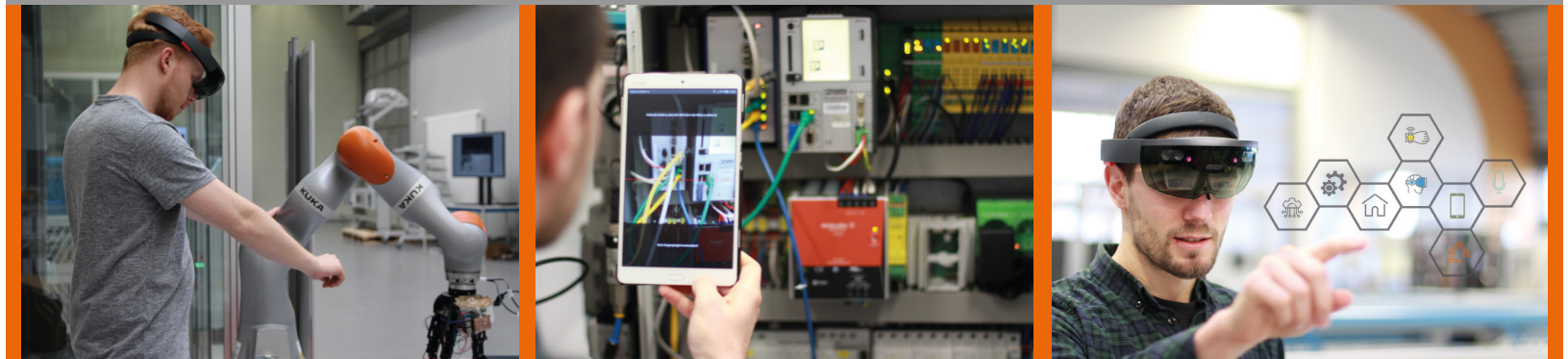




Fraunhofer

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XTEND | yourPossibilities

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XTEND YOUR POSSIBILITIES

Initial situation

Due to the expected increase in complexity in production, demographic change and the decreasing product life cycles, industrial companies have to face many challenges.

The use of computer-aided assistance systems can address these and provide individual support to employees in production environments by successfully guiding them through the entire work process. On the one hand, this enables cognitive relief for employees while enhancing both their technical and personal competences. On the other hand, from the point of view of production-oriented companies, the use of such technologies offers great potential for optimization with regard to coping with increasing product and quality requirements and the development of innovative business models. At Fraunhofer IOSB-INA, we develop application-specific assistance systems that, due to their modular design, can

be used in a wide variety of production applications. The use cases range from the guidance of untrained workers over the support of employees in complex assembly processes to the support of people with mental and physical disabilities in order to open up new perspectives in inclusive work.

XTEND your possibilities

The XTEND software platform developed at Fraunhofer IOSB-INA combines the advantages of various interaction modalities to support a wide range of industrial tasks.

XTEND augments the user's physical environment by providing process-related information in the immediate vicinity of the workspace. It offers users the opportunity to perceive important information using data glasses, mobile devices or in-situ projections without distracting them from the primary work task. The focus here is an adaptive user interface that expands oppor-



tunities for disabled workers and puts their competence at the centre of a versatile production environment.

Advantages of the technology

Modularity

XTEND is designed as a modular concept and therefore offers a high degree of flexibility. Different interaction devices such as wearables, tablets, smartphones, AR data glasses or eye trackers can be used standalone or simultaneously, depending on the context of use.

User-centered design

XTEND is developed, tested and optimized by using iterative methods of rapid prototyping approach. User requirements are considered in all stages of the development process to ensure an efficient and error-free operation as well as a sufficient acceptance of the technology.

Individual level of assistance

XTEND provides different levels of assistance during the interaction and offers users the possibility of choosing the desired degree of assistance and automation, depending on the level of users' expertise.

Easy (re-)configuration

To facilitate the introduction of new products and production steps into the workflow, new instructions can be created without additional program-

ming effort. Existing configurations of workstations (e.g. the arrangement of material boxes) can also be adapted quickly and flexibly to new work situations using Auto-ID procedures such as RFID. In addition, the utilization of drag & drop to create and manipulate tracking areas as well as the intuitive adaptation of projections facilitate the installation and configuration of workstations.

Compatible interface design

XTEND currently supports common industry 4.0 standards such as Automation Markup Language (AutomationML), OPC Unified Architecture (OPC UA), Message Queue Telemetry Transport (MQTT) or Representational State Transfer (REST). On this basis, a seamless data flow can be created and existing synergies can be used to realize a broad usability of the system. The manufacturer-independent solution also allows easy integration into existing structures and offers users the possibility to utilize their own or similar devices („Bring your own device“).

Application examples

XTEND|assembly

The stationary system XTEND|assembly enables a step-by-step guidance through complex production processes. Relevant information of a production step is projected directly onto the workstation or on the workpiece including texts, graphics or video sequen-

ces. Furthermore, built-in depth cameras can not only capture the employees and their arm movements, but also the work area and all objects therein, such as material boxes.

XTEND|training

XTEND|training enables the on-the-job qualification of employees in the domains of assembly, maintenance and repair. The assistance system is based on the user's individual needs and abilities, so it automatically adapts to the speed and the contents of the learning process.

XTEND|mobile

XTEND|mobile supports the location-independent operation and maintenance of machines and systems by displaying augmented information via mobile devices like tablets and data glasses. The assistance system recognizes the environment and the respective work context. This allows employees to interact with these components and provides situational support.

XTEND|remoteSupport

For location-distributed production, XTEND|remoteSupport relies on a networked assistance across several workplaces. In a video conferencing mode, remote users can connect to each other and gain access to the production process from different camera perspectives. Relevant areas in the workspace can be highlighted and directly projected onto the work surface.