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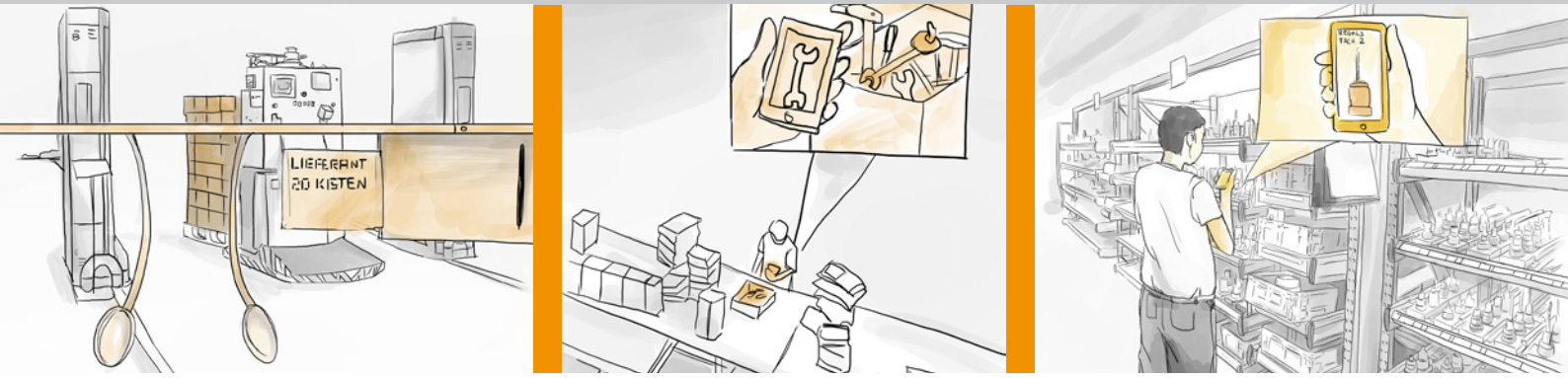

SmARPro
Smart Assistance for Humans in Production Systems

VIRTUAL SPEECH BUBBLE ENABLING INTELLIGENT OBJECTS TO TALK TO HUMANS

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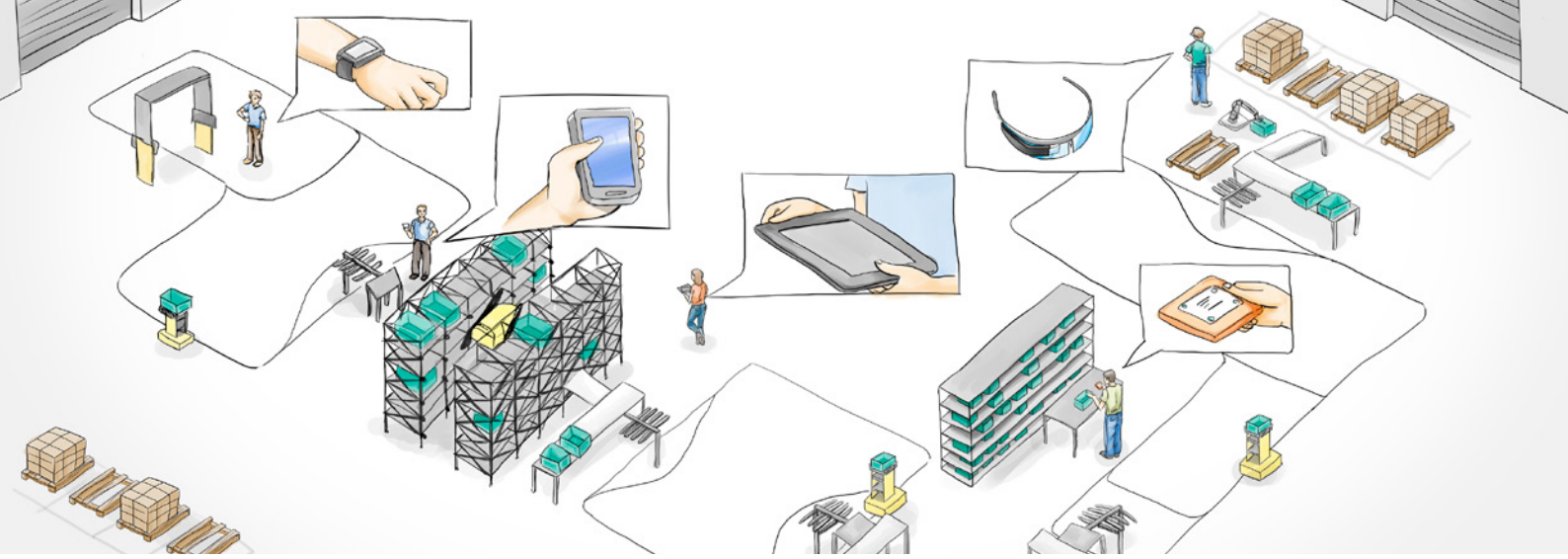
GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung

Intelligent objects and modern, self-steering processes are becoming more and more eminent emphasizing the topic "Industry 4.0". To control processes and coordinate dispersed assets information is needed which on the one hand has to be obtained and on the other hand need to be provided to users of production and logistics facilities. This leads to several challenges which are meant to be approached within the focus of the BMBF research project SmARPro - „Smart Assistance for Humans in Production Systems".

Solutions are needed in various fields, such as the data gathering directly at the machine, the further data preparation in a system as well as the visualization of information for human workers.

The overall system that is aspired to be realized in the SmARPro project is supposed to connect control systems, warehouse management systems and enterprise resource planning with the device level, which comprises machines and human workers by the use of wearables. The utilization of the SmARPro platform enables standardized business process steps for capturing and processing data. Hereby, the representation of information is being realized with the usage of Augmented Reality.
All devices within the system are meant to interact with each other through the SmARPro platform irrespectively of neither the manufacturer nor the interoperability of different interfaces. The SmARPro platform enables an easy addition and integration of new elements into the system as well as the ability to remove old elements or update current elements. This kind of system architecture is essential in the environment of mobile factories which require a rising flexibility for the production.



Intelligent Information Gathering and Preparation

To display the data in an adequate way the respective information needs to be gathered. In SmARPro this is done with the help of SmartDevices. These are technical components that collect necessary operational data in a standardized manner and transfer those to the SmARPro platform. There, in a further step all necessary information is being processed whilst taking into consideration different aspects for the preparation of the final visualisation. In order to specify the displayed content for a respective human worker crucial factors are his or her profession in the company, the current location and the prevailing task. Depending on these parameters the depth and alignment of information are customized. Exemplarily, a worker in the quality control at an assembly line requires different information than a worker who operates at a manufacturing line or a logistics order-picking worker. It is furthermore decisive how the data is featured on the wearable and how detailed the portable device can visualize the required information.

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Humans in the Main Focus

The human worker represents a crucial part in tomorrow's production and logistics business. Therefore, the human worker has to be integrated into company's processes in a way that the he will not be overwhelmed by the exponentially growing amounts of data. On the other side, the existing information should be used in a way that it actively supports a human at a respective work task. These are the aspects where SmARPro wearables are employed which have the purpose to present pre-processed information to a human worker for his current task. Depending upon his current position the worker receives context-based information in the form of augmented reality visualization. That means that information appears directly on a respective object. Thereby, wearables enable the employee to have the capability to uncover the knowledge of machines and objects that surround him. SmARPro fundamentally changes the visualization of information. Information is appearing where and when the human worker needs it. Complex technology is becoming controllable because of an easier handling and quicker learnability. A highly technological working environment establishes for a large amount of people which also takes into account demographic changes and specific traits of each individual employee with different qualifications, capabilities and requirements.

Benefit for the Industry

Main focus for the implementation of SmARPro is the optimization of processes with an infrastructure for the communication of individual components. SmARPro sets in at numerous processes; from manufacturing through order picking right up to quality management and the planning level. For example in the field of quality assurance, SmARPro has the capability to inform an employee about incorrect batches. With the utilization of SmARPro in the field of logistics information about depleted stocks within the KANBAN-system can be generated. Mobile factories are adaptable and modular, furthermore they enable increasing flexibility within manufacturing. Therefore it is important that the individual components disclose the same capabilities. The SmARPro platform enables the interaction of components with each other irrespectively of neither the manufacturer nor the interoperability of different interfaces. The outcome of this research project is seen as a job motor because elderly human workers as well as physically restricted persons will get the possibility to work in a comfortable and adequate working environment. For Germany as a production location this opens up a chance for a more efficient manufacturing of goods and simultaneously a rising quality.

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