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1 *Video recordings of the workplace, activities and Eye movements in combination with the machine data provide information on user needs.*

HUMAN-CENTERED QUALITY AT THE WORKPLACE
D²UNA - DATA DRIVEN USER NEEDS ASSESSMENTS

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Human-centered quality at the workplace: With the help of data-driven user needs analyses

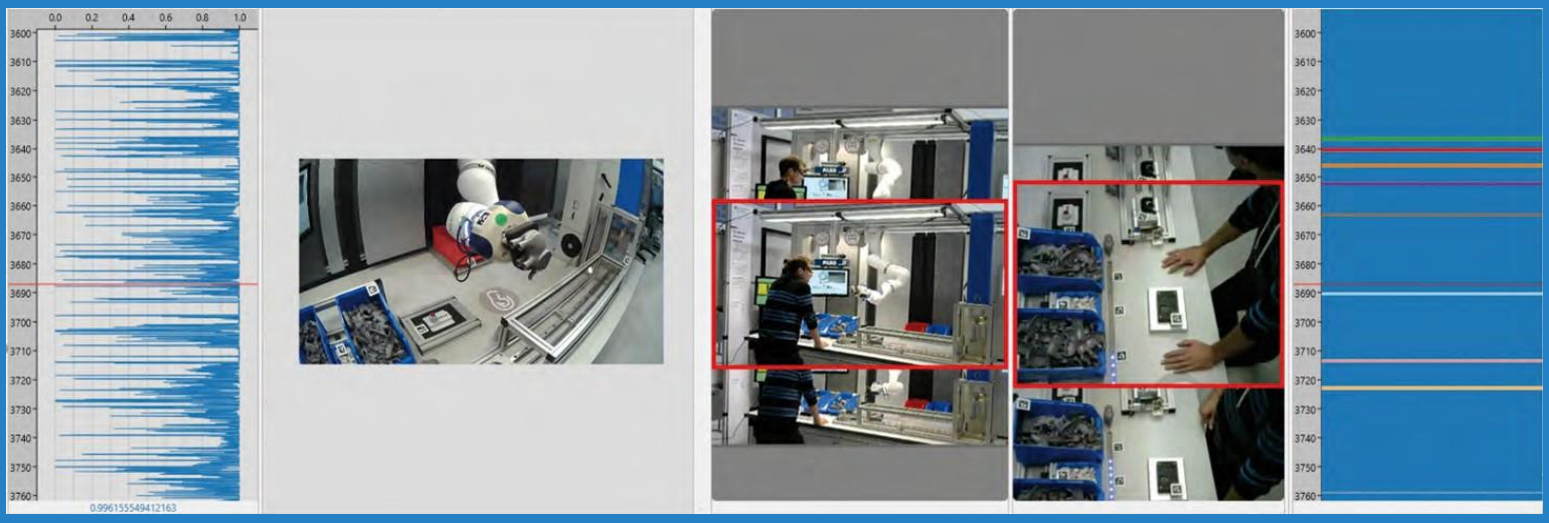
Workplaces of the future imply multi-layered human-machine interactions in networked and constantly changing work environments. Performance indicators, such as overall system efficiency, have long since ceased to be the main feature when it comes to sustainable workplace and machine optimisation.

The increasing demands on employees require an even stronger striving for human-centered quality.

Human-centered quality is the extent to which requirements with regard to usability, accessibility, user experience and avoidance of use-related damage are met (ergonomics Human-system interaction - Part 11 Usability: Terms and concepts (ISO 9241-11:2018).

Workplaces that violate quality characteristics of human-centred design have a direct effect on the behaviour, performance and commitment of employees. It is therefore essential to design workplaces in such a way that they fulfil the requirements for human-centred quality and thus enable employees to achieve better long-term results through positive user experience (UX).
to work.

For this, designers and developers must develop a detailed understanding of the employees, their work tasks and goals in the context of use. Common procedures for this are User Needs Assessments, which use qualitative and quantitative methods to identify user needs.



adorn. On the one hand, it is important to find out why employees make certain decisions and why they behave in certain ways.
On the other hand, a detailed overview of how the interactions take place and which other components influence the context of use in parallel is required.

Particularly semi-automated workstations offer the possibility of recording machine data and comparing it with user data. The results of the User Needs Assessment can be used in a variety of ways and help directly:

- Detailed images of the target group, e.g. by persona
- Detailed illustrations of the process, e.g. in User Journey Maps
- The detection of problems in the current process
- The derivation of ideas and concepts for development and optimization measures
- The goal-oriented communication among all stakeholders
- The shortening of the development time through less misguided development cycles
- Decision support for further UX organizational strategies

Sample analysis at partially automated workstation

In a project example of the Fraunhofer IPA, voice and touch inputs are recorded at the MonSiko workstation on the user's side and thought processes and feelings that cannot be observed are logged with the help of "loud thinking". Accompanied by eye tracking, eye movements and "Areas of Interest" (AoI) are recorded; further cameras record posture and activities at the workplace from various positions. On the machine side, the states of the robot arm and the welding machine as well as the outputs of the digital assembly manual and evaluations of the integrated, automatic quality control (visual inspection and audio inspection) are stored in log files over the observation period.

Later the data is plotted over the time course. This allows a comprehensive view of how the different values, AoI and processes in image sections depend on each other. The software "Blickshift Analytics" helps with the basic data evaluation. From this, concrete optimization measures of the digital assembly manual and the process itself with regard to scalability can be derived.

Our service offering: Performance through user-centric software applications

The Fraunhofer IPA supports companies in the conception, evaluation and realization of sophisticated human-machine interactions.

The D2UNA Sensor Toolbox was created to carry out user needs analyses in complex working environments. The D2UNA Sensor Toolbox provides all the necessary tools for mobile measurement. We provide support for
defining the performance indicators and UX metrics and developing the internal interfaces to record the machine data individually and according to the requirements. Together with your organization, we record the data in strict compliance with data protection guidelines.

Afterwards you will receive the concrete analysis results and optimization recommendations in order to further develop your human-centered workplace.

2 3 Screenshot from the evaluation analysis in Blickshift.