BIONIC

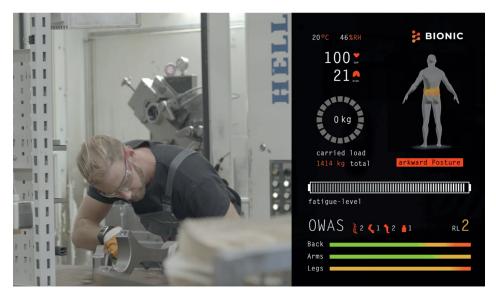## Intelligent sensor networks reduce physical stress at work

Many employees suffer from ailments caused by physical stress at the workplace. Typically, the sources are incorrect strain on the musculoskeletal system, monotonous movement or an ergonomically unfavorable posture. In particular employees advanced in age often suffer from musculoskeletal disorders or other limitations due to their numerous years in the work force.

The BIONIC project, which is funded by the European Union (EU), focuses on developing intelligent solutions to reduce such health issues. The work is coordinated by DFKI's "Augmented Vision" (AV) department and done together with the work group (AG) wearHEALTH of the Technical University of Kaiserslautern and other international partners from medicine, bioengineering, electronics, information technology, and artificial intelligence. The acronym BIONIC stands for: "Personalized Body Sensor Networks with Built-In Intelligence for Real-Time Risk Assessment and Coaching of Aging workers, in all types of working and living environments."

DFKI's AV department, led by Prof. Dr. Didier Stricker, has several years of experience in the field of specially developed intelligent sensor networks. The AG wearHEALTH team has expertise in developing easy-to-use, reliable, and mobile systems for the objective real-time motion analysis of the entire body.

Through a network of different body-worn sensors, a system has been developed that captures the health status of workers throughout the day. The analysis is done by an intelligent chip worn on the body; pre-processing raw data directly at the source allows for local processing of data streams in real time and gives the user full control over the information. Novel risk analysis methods enable direct feedback on stresses and misalignments. Playful applications and a training app motivate to counteract unilateral loads and provide personalized, medical support to train at home properly.

The smart workwear produced within the project, algorithms for ergonomics analysis, and the secure data platform designed in accordance with EU data protection laws, will be tested over an extensive period of time in everyday working conditions. This will take place during the current year through pilot tests in an industrial environment as well as in the construction sector.

Simultaneously it will be examined in laboratory conditions for the accuracy and reliability of the results.

At the Hannover Messe, the potential applications of the technology for real-time ergonomics analysis will be presented and the current state of the art within the project will be demonstrated.

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