German Research Center for Artificial Intelligence

BIONIC

Reduce physical stress at the workplace using intelligent sensor networks

Incorrect strain on the musculoskeletal system, repetitive movements or an ergonomically unfavourable posture lead to complaints for many employees. Especially older employees often suffer from disorders of the musculoskeletal system or other age-related limitations due to their long-term activities. DFKI is coordinating the BIONIC project, which is funded by the European Union. Together with ten international partners, DFKI is working on intelligent solutions to reduce such health impairments.

Body Sensor Network (BSN) for real time analysis of loads and correction of misalignments

Using a network of different sensors worn on the body, we are developing a system that measures the state of the worker‘s health based on movements over the course of the work day. The analysis is performed by an intelligent chip directly on the body, so that raw data can be preprocessed directly at the ‘source’, enabling the real-time calculation of the data flows. Innovative risk analysis methods provide direct feedback about loads and misalignments. Playful applications and a training app motivate the user to counteract unilateral stress while also providing individualized and medical support for a home workout

Biomechanical models and “Deep Learning” for ergonomic risk assessments

Algorithms for ergonomic risk assessment of physical loads are developed using biomechanical models of age-related and chronic impairments. Among the input parameters are things like posture, forces, and torques as well as physiological parameters like heart frequency and body temperature.

Objective and subjective data form the basis of procedures that are then complemented by personalized algorithms for further use in Deep Learning methods. All generated data are stored in accordance with the EU Data Protection Directive.

„BIONIC – Personalized Body Sensor Networks with Built-In Intelligence for Real-Time Risk Assessment and Coaching of Ageing workers, in all types of working and living environments “ is an interdisciplinary research project with eleven partners from medicine, biotechnology, electronics, information technology and artificial intelligence to construction and factory workers who will validate the results in pilot trials.

Partner:

- ACCIONA Construcción S.A. (Spain)
- Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) (Germany)
- Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (Project Coordination)
- Fundación Laboral de la Construcción (Spain)
- Hypercliq IKE (Greece)
- Instituto de Biomechanica de Valencia (Spain)
- Interactive Wear GmbH (Germany)
- Roessingh Research and Development, University of Twente (Netherlands)
- Rolls-Royce Power Systems AG (Germany)
- Technische Universität Kaiserslautern – wearHEALTH Group (Germany)
- University of Piraeus – Systems Security Lab (Greece)

Sponsored by:

The project is supported by the Framework Programme Horizon 2020 of the European Union for Research and Innovation under the Grant Agreement #826304.

BIONIC
body information on an intelligent chip

Contact:
Prof. Dr. Didier Stricker
Head of the Research Department Augmented Vision
Phone: +49 631 20575 3500
Didier.Stricker@dfki.de

www.bionic-h2020.eu