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IFA 2019: Intelligent sensor technology for a better posture at the workplace

Whether pain in the back, shoulders or knees: Incorrect posture in the workplace can have consequences. A sensor system developed by researchers at TU Kaiserslautern and the German Research Centre for Artificial Intelligence (DFKI) might be of help. Sensors on arms, legs and back, for example, detect movement sequences and software evaluates such data. The system provides the user with direct feedback via a Smartwatch so that he can correct movement or posture. It is possible to install the sensors in working clothes and shoes. At the International Consumer Electronics Fair in Berlin from 6 to 11 September (IFA Next, hall 26, stand 324/325), the researchers will present their technology.

Assembling components in a bent posture, regularly putting away heavy crates on shelves or quickly writing an e-mail to colleagues on the computer - during work most people do not pay attention to an ergonomically sensible posture or a gentle sequence of movements. According to a survey conducted by the German online portal Statista in 2017, around 20 percent of respondents suffer from back pain several times a year, 17 percent several times a week and 14 percent several times a month. However, incorrect posture can also lead to permanent pain in the hips, neck or knees.

A technology currently being developed by a research team at DFKI and Technische Universität Kaiserslautern (TUK) can provide for relief in the future. Therefore sensors are used which are simply attached to different parts of the body such as arms, spine and legs. "Among other things, they measure accelerations and so-called angular velocities. These data are then processed by our software," says Dr Gabriele Bleser, who heads the wearHEALTH working group at TUK. On this basis, the software calculates motion parameters such as joint angles at arm and knee or the degree of flexion or twisting of the spine. "The technology immediately recognizes if a movement is performed incorrectly or if an incorrect posture is adopted," continues her colleague Mathias Musahl from the Augmented Vision Department at the DFKI.

The Smartwatch is designed to inform the user directly in order to correct his movement or posture. Among other things, the researchers plan to install the sensors in work clothing and shoes. This technology is interesting, for example, for companies in industry, but it can also help to pay more attention to one's own body in everyday office life at a desk.

It will be some time before the technology is available, because work just started a few months ago. They are involved in the BIONIC project, which is funded by the European Union. BIONIC stands for "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" and is coordinated by Professor Didier Stricker, Head of Augmented Vision department at DFKI. The aim is to develop a sensor system with which incorrect posture and other stresses at the workplace can be reduced.

Besides DFKI and TUK, also involved in the project are: the Federal Institute for Occupational Safety and Health (BAuA) in Dortmund, the Spanish Instituto de Biomechanica de Valencia, the Fundación Laboral de la Construcción, also in Spain, the Roessingh Research and Development Centre at the University of Twente in the Netherlands, the Systems Security Lab at the Greek University of Piraeus, Interactive Wear GmbH in Munich, Hypercliq IKE in Greece, ACCIONA Construcción S.A. in Spain and Rolls-Royce Power Systems AG in Friedrichshafen.

The team will present its technology at the International Consumer Electronics Fair (IFA). They will be presenting their project at the joint stand of the Working Committee for Science Marketing on fairs in the "IFA Next" area.

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The sensor system immediately recognizes if a movement is performed incorrectly.
Credit: DFKI