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Smart soles

Measuring real time foot pressure and assessing body upper body positioning is made possible by these smart instep soles developed by Khalil Ben Mansour, a research engineer posted at the UTC-BMBI (bio-mechanical and bio-engineering) Laboratory with his team of students.

13 Sep 2017

Smart soles

Both light and supple, these 'smart' soles can adapt to all sorts of condition. *"In order to undertake field studies, until present, it took us half a day just to set up the equipment, whereas our new instep soles allow to make real-time measurements on the spot"*, summarizes Khalil, our specialist in biomechanics. The key descriptors are 'efficiency' and 'simplicity'. Five sensors integrated in both soles provide measurements of the foot pressure variations, left and right.

Simultaneously an inertial sensor worn round the athlete's waist analyses the upper body and limb position. The battery and associate wiring allow full, free movement. A Bluetooth® device forwards the data directly to a smartphone or to a computer. The system is designed to be intuitive, as the pressure exerted on each sensor in a colour scale. Another screen displays body attitude via a mock-up body.

Analysing and assessing 'live' movements

After a year's work with undergraduates in the UTC-BMBI major, the system has now become operational. *"Integrating the sensors in the instep soles and setting up the Bluetooth® link absorbed most of our time and energy"*, recalls the project manager. There are, indeed, numerous applications for the new tool, whether it be on industrial, medical or sports levels. The inexpensive price-tag for the smart soles – approx. 50 € a pair – should prove attractive to a wide public of customers.

"We are currently working with a logistics company that wishes to analyse movements and body attitudes of personnel posted to an order-preparation conveyor belt, with the aim to reduce injuries and to assess energy deployment", explains Khalil Ben Mansour. The system will also prove of interest to chiropodists to help them make more precise orthopaedic insteps. Athlete training sessions can also be envisaged with improved gestures.

A finalized prototype will be readied early 2018. *Inter alia*, an improved design with the possibility to forward data to a cloud archival storage will be proposed.

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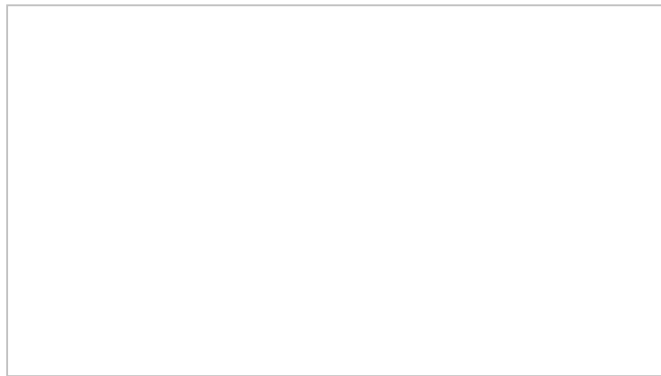
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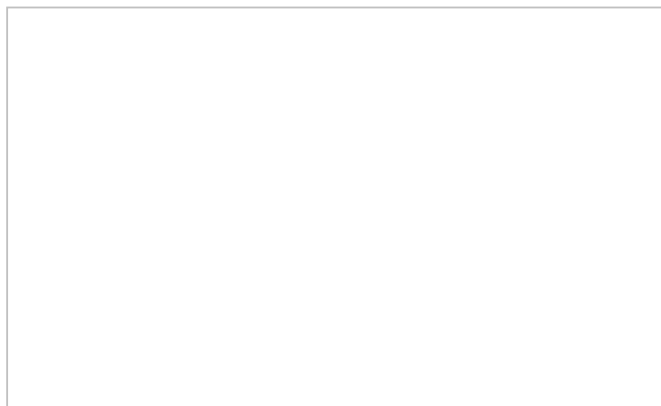
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Avec ses 9 laboratoires de recherche et son ouverture internationale, l'UTC se positionne parmi les meilleures écoles d'ingénieurs dans le monde.

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