Wearable technology for improving sports performance

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In cooperation with Finland's national swimming team and archery association, VTT Technical Research Centre of Finland has developed wearable technology for improving sports performance. Wearable sensors can be attached to, say, a swimmer's hand paddles or an archers' equipment. From there, data is wirelessly transferred to the coach's smartphone or tablet.

The sensors embedded in the paddles provide surprisingly precise and varied data on the wearer's swimming technique. This covers stroke length and changes in it during swimming, the relationship between the outward stroke and recovery, the structure of the stroke and the average pull, the hand position and the pressure exerted by the stroke in different directions.

"Swimming is an unusual sport because it is not easy for the athlete to check his or her own performance in the water. In addition, very few means are available of measuring development in the swimmer's technique, in terms such as the efficiency of hand strokes. VTT's technology provides a means of directly observing the power of each hand stroke and its trajectory through the water, without disrupting performance," says Simo Karvinen, the Finnish Junior Olympic Team Coach.

The measurable quantities in archery include the amount and directions of movement when aiming, the timing of the different phases of the performance, and the movement made when releasing the arrow.

Wearable sensors and the related applications can be used during practice, when testing equipment and to some extent in competition, in order to analyse the quality of and changes in performance.

"Archery involves a dynamic technique, but the movements involved are extremely small and sensitive to changes. The movement analysis solution developed by VTT adds data of a new kind to the observation of such movements. Further development of the solution will be hugely beneficial to coaching in the sport," comments Juhana Rüster, Head of Coaching at the Finnish Archery Association.

"VTT's wireless sensor technology can be embedded in a range of sports equipment, such as ski poles, skis, racquets and bicycles, and can even be used in horse training," says Raimo Korhonen, Head of Research Area at VTT.

The technology is ready for use in training. VTT is now seeking partners to commercialise its sensor technology and expand the related areas of application.

Provided by VTT Technical Research Centre of Finland