Experimental Study of Upper Limb Movement for Creating a Natural and Universal Interface: Innovative Applications

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The purpose of this project is to create a natural and universal interface between humans and computers, by studying the movement of upper limbs. The study is based on a physical prototype referred to as “Dextra”, which works by transforming acquired sensory data into packets which are used through common peripheral protocols. The prototype closely resembles a pair of regular gloves, but the embedded electronics continuously transmit data while powered. Different sensors, both inertial and tactile, are used to capture specific limb movement. The project has a wide spectrum of applicability. A few domains in which it brings improvements are: health, media and entertainment, art and design, and industry. Data sets containing numerical recordings of the device usage consist of information regarding finger patterns and upper limb positioning. The data has been stored and analysed through virtual reconstruction of recorded movement in a 3D engine, and numerically, through several statistical functions. By embodying a large number of useful operating modes into a single package, such an interface becomes a universal and natural control system for computers.

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