

Ergonomics and Natural Interaction

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Editorial

Society is moving towards a global communication and the integration of the technology is becoming almost absolute. The omnipresence of computers and smart devices on any social discipline is unstoppable, and the emergence of new “gadgets”, as a result of the technological advance, forces people to continuous adaptation and learning. Thanks to this, more information is within easy reach and more new information that is created can be reached for others. With the use of new technologies people acquire new habits and learn new languages of communication with machines (emoticons, avatars, metaphors).

Although technology should be to make life easier, the “side effects” must be assessed from the point of view of ergonomics. Reading miniature text, written in small keyboards or use headphones can have detrimental consequences for the long-term health. On the other hand, it seems that sometimes technology is transforming old habits with new ones to do simple tasks of daily life in an arduous task.

The first microwave ovens had two dials, one for the time and the other for power, with a few recommendations and uses the person could intuitively choose the value of the two dials for use in a particular food. When the dials are replaced for a multifunction keyboard and a digital display, complexity increases and naturalness and immediacy in the use are lost, which presents a problem of information overload [1]. This is described by the Hick’s law, where the reaction time increases with the number of options to choose from.

In the natural interaction, people naturally communicate through gestures, expressions, movements, and receiving information from the environment looking around and manipulating physical objects [2]. Some of the disciplines working towards a natural human-machine interaction are gesture recognition, speech and writing recognition, biological signals (EEG, EOG and EMG) recognition, interaction with tangible elements, and virtual reality and augmented reality.

Is about different input and/or output communication channels, and each one of them allows a different flow of information between man and machine, both qualitative and quantitative. Although some

channels can transmit more information than others, it is the combination between them what brings to a closer communication with the person and his senses. This leads to the multimodal interaction [3], a human-computer interaction system that responds to inputs in more than one modality or communication channel.

An example of an interface device “unnatural” would be the QWERTY keyboard for entry of textual information, compared to its natural counterpart as a spoken or handwritten input. The QWERTY keyboard, which was conceived in the beginning with a key layout aimed at slowing the rate of typing and not clog the first typewriters, requires practice time and adaptation allowing its use becomes more natural, since the muscle memory allows automatizing the process, similarly as it does handwriting. This usually happens with any tool used frequently.

Some questions may arise, to transmit certain information to a machine, what is the best channel (or combination of channels) of communication? From the point of view of ergonomics, the one involving less mental and physical workload. Will it be the most “natural” channel for the person? Not necessarily, considering that the use of tools allows performing tasks more quickly and efficiently.

Writing text on a Smartphone can be tedious, but if this is supported by predictive text and auto-correction tools the total workload is greatly reduced. In this regard, the evaluation methods of the interface [4] are essential in determining the impact of a form of interaction with respect to another.

However, what makes the natural interaction an effective way of communication with machines is its immediacy, its intuitive operation, which is a non-invasive method that is transparent to the person, because it uses its own resources to perform the interaction. On the other hand, natural interaction is the best way to transmit emotions and other aspects of human nature. In this sense are appearing new disciplines, such as social robotics, where machines interact and communicate with people emulating and interpreting human emotions and gestures.

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