**Human-Computer Interface using** **Facial Expressions: a Solution for People with Motor Disabilities**

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**INTRODUCTION / HYPOTHESIS**

Brazil has 13.2 million people with some sort of motor disability [1].The technology improvement dedicated to this theme originated a study area called Assistive Technologies [2]. Rodrigues e Teixeira claim that technology products become support, contents and ways of inclusion processes [3]. It is possible to see that people with motor disabilities have difficulty to control their mobile devices, since in most cases they do not have enough skills to touch the screen as a form of interaction. This paper presents a proposal of mobile interaction using facial expressions.

**OBJECTIVE**

This work proposes the development of a human-computer interaction for mobile devices based on computer vision. It features a solution for people with motor disabilities such as: cerebral palsy, muscular dystrophy, amyotrophic lateral sclerosis, [cerebrovascular accident](http://www.linguee.com.br/ingles-portugues/traducao/cerebrovascular%2Baccident.html) among others. It allows using a front camera already existing in most devices and controlling them through expressions or facial movements. People with disabilities can also control a robotic wheelchair or even a smart home, equipped with sensors that interact with their mobile device. In addition, an Intel RealSense 3D camera-based solution will be implemented to compare the benefits of their approaches.

**METHOD**

In performing this work, it is first necessary to define which facial expressions should be used in the proposed human-computer interaction. We should analyze a range of possible facial expressions and observe which are frequently used involuntarily and those that are used voluntarily. This phase is important because it prevents us from adopting an interaction that generates false negatives or false positives throughout its use.

From this point will be implemented computer vision techniques through the OpenCV library in the Android environment using the front camera of low cost smartphones and tablets and a RealSense 3D camera with Raspberry Pi. These applied techniques should identify the different facial expressions already defined in the previous step and associate each one with the computer human interaction functions available in the Android environment and later interact with other devices such as a robotic wheelchair or a smart home equipped with sensors.

**RELEVANCE**

This work proposes a solution that will offer to the person with motor disability, independence and autonomy of locomotion, in addition to the control of the environment where it is inserted, thus, improving its quality of life and social inclusion.

**References:** [1] Instituto Brasileiro de Geografia e Estatística. (2010) Censo Demográfico. [2] BRASIL. Decreto 6.949 de 25 de agosto de 2009. Convenção sobre os direitos das pessoas com deficiência. Diário Oficial, Brasília, DF, 25 de agosto de 2009; [3] RODRIGUES, Cleide Aparecida; TEIXEIRA, Ricardo Antonio. Tecnologias em Processos de Inclusão. Revista Inter Ação. 31, n. 2, p. 261-276, ago. 2007.