A face recognition based game for users with disabilities

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1 Introduction

The Human-Computer Interaction field proposes a set of principles focused on improving the user experience with computer systems. Considering this, we have designed a prototype oriented to people with some grade of disability meeting the HCI principles[1]. On this way we try to improve the user experience and to use new interaction types, in this case, the human face recognition.

Due to the big number of people with some kind of disability so physic as mental, we think that it is appropriate to apply HCI principles in order to decrease the complexity in using classical electronics game controls. In this way we will provide the means that allow people with disabilities to interact naturally with software application, including to compete with another players.

2 Description of prototype

In summary, our prototype allows to recognize a random number of human faces (between one and five), that are capture through a webcam connected to the computer. The main objective of the game is to achieve that the software application recognizes human faces as soon as possible. In short, the application asks user that show a determined number of faces, this request is released through prerecorded voice, as well as text and for one image of the correct card. In addition, the screen shows a clock that count the seconds elapsed. It also shows the question number and a block with the video capture where is visualized what will be recognized by the application. The game requires the following input devices: a webcam, a computer screen, a mouse and a set of speakers. To programmatical level, the software application was built using the Java programming language and three additional libraries: OpenCV[2] for video capture, Processing[3] for draw figures and JMyron[4] , a wrapper for Java of Myron library focused to recognition and computer vision.

3 Usability Test

We submitted our prototype to an usability test with three real users over 65 years old. It was explained only that cards should be put in front to the webcam for to be recognized. The first interaction of the users with the application was very natural. The users easily achieve the target raised by the game mechanics. Even though response times were registered, they were not suficient for generate a really conclusive analysis. However the user criticism was very positive, highlighting in all moment only positive features of the prototype.

Figure 1: A user testing the application

4 Conclusions and Future Work

The main finding of this work is that the use of HCI principles improve signifcantly the user experience, specially for those with some kind of disability. Other advantages of HCI usage were enabling as well as more attractive applications, more accessible and naturally controllable applications for the users. As future work we will add new features to the application, improve the graphic design of the user interface, provide more stability and improved face recognition capabilities.

References

[1] Dünser A., Grasset R., Seichter H., Billinghurst M. - Applying HCI principles to AR systems design, HIT Lab NZ

[2] Open source computer vision - http://opencv.willowgarage.com/wiki/

[3] Processing - http://www.processing.org/

[4] JMyron - http://webcamxtra.sourceforge.net/