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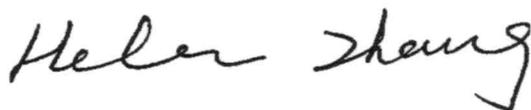
## Certification on SCI indexing

This is to certify that on 25<sup>th</sup>, June, 2009, Dr. Oscar DENIZ, Dr. Modesto CASTRILLON, Dr. Javier LORENZO, Dr. Luis ANTON, Dr. Mario HERNANDEZ and Dr. Gloria BUENO contributed their paper "*Computer vision based eyewear selector*" to JZUS-A (ZUSA-D-09-00377), and under our journal rigorous international peer reviewing (reject rate is about 78%, calculated among a total of more than 1230 contributions to JZUS-A), their paper was accepted for publication by JZUS-A on 27<sup>th</sup> November 2009.

Due to our journal's adjusting and development according to world-class publishing standards, we split the Computers & Electronics area into the new journal JZUS-C beginning in 2010. So some papers accepted by JZUS-A in 2009 will be published in JZUS-C depending on their topic. Their paper will be published on JZUS-C, in the second issue, 2010 (<http://www.zju.edu.cn/jzus/current.php#c>).

So in order to protect the authors' copyright and safeguard the paper's quality, we hereby offer the official certification to prove that this paper was accepted by our SCI journal (JZUS-A) in 2009 and should retain full merit for that.

Sincerely



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## Computer vision based eyewear selector

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**Abstract:** The widespread availability of portable computing power and inexpensive digital cameras are opening up new possibilities for retailers in some markets. One example is in optical shops, where a number of systems exist that facilitate eyeglasses selection. These systems are now more necessary as the market is saturated with an increasingly complex array of lenses, frames, coatings, tints, photochromic and polarizing treatments, etc. Research challenges encompass Computer Vision, Multimedia and Human-Computer Interaction. Cost factors are also of importance for widespread product acceptance. This paper describes a low-cost system that allows the user to visualize different glasses models in live video. The user can also move the glasses to adjust its position on the face. The system, which runs at 9.5 frames/s on general-purpose hardware, has a homeostatic module that keeps image parameters controlled. This is achieved by using a camera with motorized zoom, iris, white balance, etc. This feature can be specially useful in environments with changing illumination and shadows, like in an optical shop. The system also includes a face and eye detection module and a glasses management module.

**Key words:** Face detection, Eye detection, Perceptual user interfaces, Human-computer interaction

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### 1 Introduction

The widespread availability of portable computing power and inexpensive digital cameras are opening up new possibilities for retailers in some markets. One example is in optical shops, where a number of systems exist that facilitate eyeglasses selection. These systems are increasingly necessary as the market is saturated with an increasingly complex array of lenses, frames, coatings, tints, photochromic and polarizing treatments, etc. (Roberts and Threlfall, 2006). The number of clients can increase only if the selection process is shortened or automated. A number of deployed systems have already demonstrated that eyeglasses selectors can increase sales and customer satisfaction (Kuttler, 2003; Morgan, 2004).

From a research viewpoint, such systems represent an interesting application of Computer Vision, Multi-

media and Human-Computer Interaction. The Augmented Reality (see a survey in Azuma (1997)) of watching ourselves and trying different 'virtual' spectacles can be achieved by combining computer vision and graphics. The Magic Lens and Magic Mirror systems, for example, use the ARTag toolkit (Fiala, 2004), which mixes live video and computer-generated graphics. People can wear cardboard patterns that ARTag can detect. The graphics are placed in the visible positions of the patterns. The system can work in real time on general-purpose hardware, although people have to wear the cardboard. Another approach was taken by Lepetit *et al.* (2003), where virtual glasses and moustaches are added to live video. Although the system works with an impressive frame rate of 25 Hz, the user must start the tracker by reaching a position close to a generic triangle-based face model shown on the screen. The ARMirror is a kiosk-based entertainment setup that shows live video overlaying virtual hats,

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