

RIAD, Rabiâ & HARBA, Rachid & Hassan, Douzi & Ros, Frederic & El Hajji, Mohamed. (2016). Robust Fourier Watermarking for ID Images on Smart Card Plastic Supports. *Advances in Electrical and Computer Engineering*. 16. 23 - 30. 10.4316/AECE.2016.04004. Security checking can be improved by watermarking identity (ID) images printed on smart cards plastic supports. The major challenge is resistance to attacks: printing the images on the plastic cards, durability and other attacks then scanning the image from the plastic card. In this work, a robust watermarking technique is presented in this context. It is composed of three main mechanisms. The first is a watermarking algorithm based on the Fourier transform to cope with global geometric distortions. The second comprises a filter that reduces image blurring. The third attenuates color degradations. Experiments on 400 ID images show that the Wiener filter strongly improves the detection rate and outperforms competitive algorithms (blind deconvolution and unsharp filter). Color corrections also enhance the watermarking score. The whole scheme has a high efficiency and a low computational cost. It makes it compatible with the desired industrial constraints, i.e. the watermark is to be invisible, the error rate must be lower than 1%, and the detection of the mark should be fast and simple for the user.