A Secure Visual Cryptography System for Identification Cards (SVCSIC)

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Abstract

This thesis presents a comprehensive overview of the problem of preserving information from hackers, especially those hackers who are experts of hacking. How to hide the information in an image and how to build security system for authentication that uses computer which is not available all the time? Our methodology considers a sufficient solution for this problem because it depends on two levels of security: first one is Visual Cryptography (VC); a color visual secret sharing scheme is a type of secret sharing scheme with the special property that a secret image can be recovered visually by human eyes and does not require any calculations on computer, and secondly, beside this method we use a very important biometric technique which is face recognition method; specifically face detection that considers an important part of face recognition as a first step of automatic face recognition. Although face detection isn't considered straightforward approach, because it has a lot of variants of image appearance like: pose variant, occlusion, illumination, image orientation,

and facial expression. This technique we use it to test restored images after share images are overlapping. Also we used a pattern recognition technique especially optical character recognition (OCR) to extract numbers or characters from an image.

Our security system has significant results: firstly, this system takes two cases ratio rate (RR) the number of recognized images from tested images and Running Time. We observe that when we compare share images with restored images ratio RR is 0.98 in 23 second. That means easily we can reveal restored images from shares after stacking it top of each other. In another side, we make a comparison between restored images with original images, we observe that, when we use an Eigenfaces algorithm, this algorithm is able to detect and recognize faces in satisfied speed and simplicity. It transforms faces into a small set of essential characteristics, which are the main components of the initial sets of learning images called (training set). Recognition of faces is done by making a new image (testing set); using this algorithm we have RR 0.41 in 8 seconds. Also we use another face recognition algorithm to see how it influences our security system which is Principle Component Analysis (PCA); based on information theory concept where it is suitable strategy for face recognition because it identifies variability between human faces. We observe that by this technique to reveal an original image from a share images RR is 0.53 in 8 second. From that we conclude PCA has more significant result; that means easily can retrieve or reveal the original images by share images when we use this algorithm than Eigenfaces algorithm.

The majority of this work that has been done in the area of Visual Cryptography presents color secret sharing scheme to construct scheme for RGB model. The secret images decomposed to two share images, then stacking these shares top of each other to obtain restored images, after that, by face recognition technique we need to test these restored images to determine if the user is legal or illegal. By comparing restored images or share images to original images. By this technique we increase the quality and reliability of our system. Here

we can say that, this developed system can be used in sensitive applications that need high level of security like military, banking, jewelry, etc.