

Authentication in Face Recognition by Defending Against Replay Attacks with a Fake Picture of Authorized User

Abdullah-Al-Zubaer Imran

ABSTRACT

In order to defend the replay attacks by any attacker using photo of any authorized users, a facial verification technique will be incorporated with any available face recognition technique. There will be stored templates of all the authorized users in the system. A sensor in the system will capture fifty consecutive photos of the user attempting to log in system. All of the captured photos will be compared based on their histograms. If the histograms have minimum differences, then the system will not process further and notify about invasion. If the histograms of the captured images are comparatively larger, then the system will go for face recognition as face is verified. In face recognition step, one randomly chosen picture among the captured pictures will be used to find a match with any of the stored templates. If there is any matching found, then the user will be allowed to enter the system.

INTRODUCTION

Authentication is one of the biggest concerns in security purposes. Facial images/videos based authentication has gained already popularity in this regard. There are so many face recognition techniques those are available to use in authenticating any authorized user. Facial recognition without proper verification of face-whether the input facial image is of real person or of any fake photo of an authorized

user, can easily be invaded. The intruders might break the facial image based authentication system using printed images of authorized users. Therefore, the necessity to adapt a facial verification technique prior to the face recognition or matching becomes apparent. The synthesis of facial verification and face recognition techniques will mostly defend the replay attacks by the invaders.

BACKGROUND

Various face recognition techniques have been developed and some tried to accomplish the facial verification technique as well. Rowe et al. proposed a multimodal based technique which requires a camera and a fingerprint scanner to fuse face authentication and fingerprint authentication together [1]. Wilder et al. took facial thermogram from an inferred camera and face biometrics from a generic camera in authentication process [2, 3]. Eigen face [4] method is the most popular linear techniques for face recognition. Eigen face applies Principal Component Analysis (PCA) to project the data points along the directions of maximal variances. Eigen face method is unsupervised, ability to learn and later recognize new faces. Maatta et al. determined the liveness of a user based on the local binary patterns extracted from a single image [5]. The proposed synthesis of facial verification and face recognition techniques will be made possible to defend the replay attacks.

PROPOSED METHODOLOGY

At first, the system actually differentiates a real person and a picture of an authorized user. Then for any real person, the system will further proceed for the face recognition.

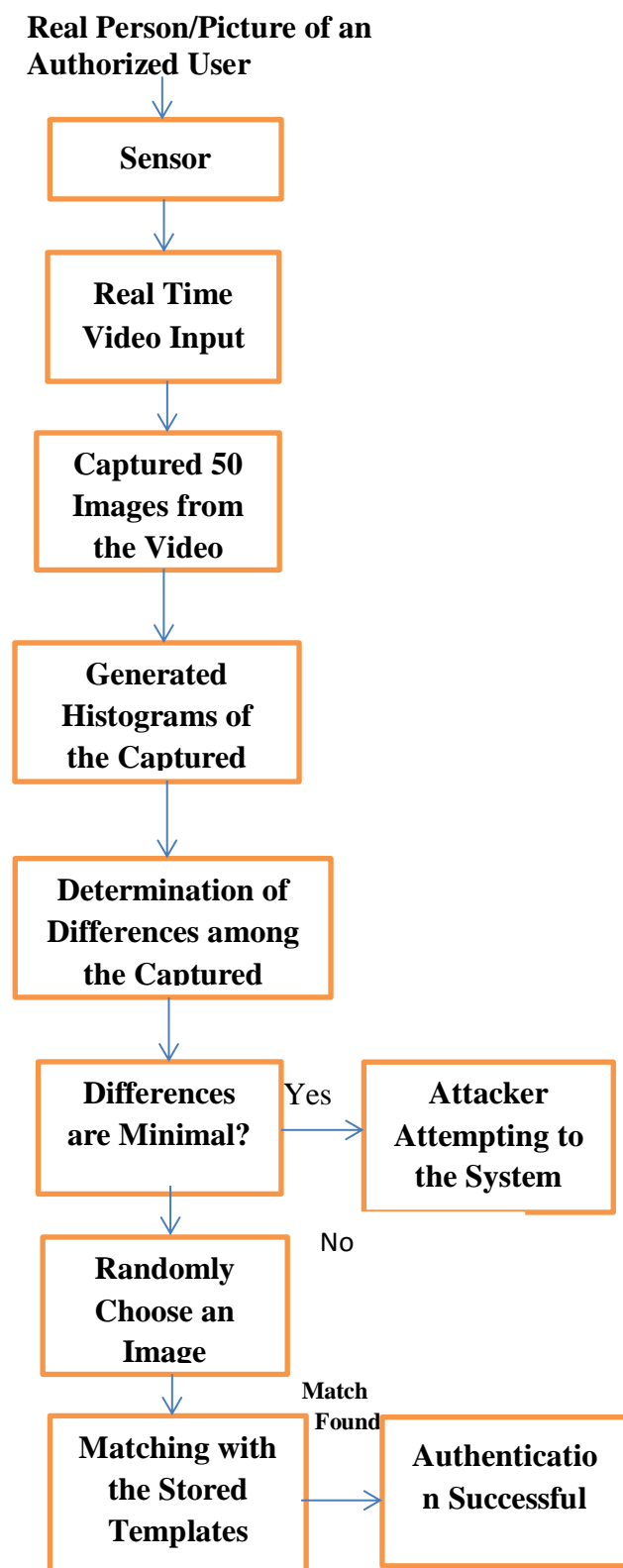


Fig. 1: The proposed synthesis of facial verification and face recognition.

DISCUSSION

Any available face recognition technique will be incorporated with the newly developed facial verification technique in the proposed approach. This approach will mostly deter any attacker in attempting to the system with the picture of any authorized user. Through some image processing techniques, the facial authentication will be accomplished. However, we have only histogram matching in our proposed approach and based on the performance, some other features such as: noise, distortion, and color can be compared to improve the system for the authentication.

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