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Efficient Yet Robust Biometric Iris Matching on Smart Cards for Data High Security and Privacy

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Abstract

Smart control access to any service and/or critical data is at the very basis of any smart project. Biometrics have been used as a solution for system access control, for many years now. However, the simple use of biometrics cannot be considered as final and perfect solution. Most problems are related to the data transmission method between the medias, where the users require access and the servers where the biometric data, captured upon registration, are stored. In this paper, we use smart cards as an effective yet efficient solution to this critical data storage problem. Furthermore, iris texture has been used as a human identifier for some time now. This biometric is considered one of the most reliable to distinguish a person from another as its unique yet perfectly stable over time. In this work, we propose an efficient implementation of iris texture verification on smart cards. For this implementation, the matching is done on-card. Thus, the biometric characteristics are always kept in the owner's card, guaranteeing the maximum security and privacy. In a first approach, the False Acceptance Rate (FAR) and False Rejection Rate (FRR) are improved using circular translations of the matched iris codes. However, after a thorough analysis of the achieved results, we show that the proposed method introduces a significant increase in terms of execution time of the matching operation. In order to mitigate this impact, we augmented the proposed technique with acceptance threshold verification, thus decreasing drastically the execution time of the matching operation, and yet achieving considerably low FAR and FRR. It is noteworthy to point out that these characteristics are at the basis of any access control successful usage.

Key words: Biometrics, iris texture, smart card, privacy, security.

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