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Biometric Data Plays an Important Role in Forensic Analysis

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Editorial

Identity science is not complete without biometrics, and several biometric modalities, including voice, iris, face, and fingerprints, are used to identify people. The Office of Biometric Identity Management (OBIM) in the United States, the Aadhaar project in India, and the National ID project in Indonesia are a few examples of large-scale biometric applications. In addition, several law enforcement organisations and crime scene investigators employ biometrics to identify people. A reliable biometric system must rely on a variety of sources of data in order to make a judgement. For instance, a face recognition system might compile data from multiple video frames to create a person's facial profile; a fingerprint system might combine data from all 10 fingers; a recognition system might use multiple modalities, like face, fingerprint, and iris; or an application might combine biometric data with demographic and soft biometric data, like age, gender, and ethnicity. Recent research studies have also explored the possibility of mixing biometric information to impart privacy to biometric templates.

In the context of security, methods for integrating an anti-spoofing module with the biometric matcher are also being studied. Thus, the topic of biometric fusion is an important one in biometrics. This special issue's goal is to bring together academics and industry experts in biometric fusion to discuss their most recent findings. Nine excellent pieces were chosen for publishing in this special edition after being peer reviewed by a group of specialists who assessed all submitted papers. The papers in this special cover a wide range of topics, including databases, security, and applications as well as fusion methods. The chosen articles vary in the modalities they employ, which can range from face and voice to eye-movement and vascular patterns [1-3].

These publications emphasise the value of information fusion in the context of biometrics once again. Facial cosmetics are known to impact the performance of face matchers. They propose a patch-based ensemble method for recognizing faces with makeup variations. Each patch is represented by three different feature descriptors, and multiple subspaces corresponding to different subsets of patches are generated. Two classifiers - one based on sparse representation and the other based on collaborative representation - are used to match face images in these subspaces. Experiments are conducted on multiple databases and the performance of the proposed ensemble method is compared with other schemes including commercial matchers. Although the field of signature verification has been extensively studied, it is still difficult to identify a combination of qualities that can reliably identify a large number of users. For offline signature verification, provide score-level fusion of classifiers. The authors investigate the use of scale-invariant feature transforms, local binary patterns, histograms of oriented gradients and their combination at both feature-level and score-level using global classifiers and user-dependent classifiers. Comparison with existing algorithms shows that with sufficient training data, user-dependent training yields state-of-the-art results for signature recognition.

It is crucial to design new algorithms to advance state-of-the-art fusion, but it is also crucial to build datasets that reflect actual problems and give academics a place to test their methods. A sizable multimodal biometric video database with 8,160 videos belonging to 60 people is created by Rios-Sanchez et al. The database includes data on hands, irises, and faces that were photographed in two different infrared wavelengths as well as the visible spectrum. Apart from classification accuracy, the security of the biometric system and fusion algorithm is also of utmost importance. In the paper titled “Optimal sequential fusion for multibiometric cryptosystems", Scientist suggest that from a security perspective, feature-level fusion may be more effective in the context of a biometric cryptosystem. The authors first propose a framework for feature-level sequential fusion followed by a sequential fusion algorithm that minimizes the average number of inputs while constraining the false accept rate to be less than or equal to the required value. In addition to being helpful for person authentication, biometric data can also be crucial for forensic investigation. For forensic investigation, offer a fusion-based technique to find blood vessel patterns in colour photos. To replicate the formulation of skin colour, the authors first create three optical models. They next suggest a feature-level and score-level fusion approach to merge the data from the three models [4,5].

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Conflict of Interest

The Author declares there is no conflict of interest associated with this manuscript.

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