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The Application of Particular Biometrics to Faces with Partial Masks

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Introduction

One of the promising biometric characteristics for human recognition is the periocular. It includes the eyebrows, eyelids, eyelashes, eyefolds, shape of the eyes, and skin texture of the surrounding area of the eyes. Because of the masked faces, its significance is emphasized more during the COVID-19 pandemic. In order to comprehend the current state of periocular biometrics, this article provides a comprehensive review. The various face and particular techniques used to identify people wearing face masks are first discussed in this paper. The following sections examine various periocular biometrics aspects:a) the periocular anatomical cues that are useful for recognition; b) the various feature extraction and matching techniques that have been developed; c) recognition across various spectra; d) fusion with other biometric modalities (such as the face or the iris); e) recognition on mobile devices; f) its usefulness in other applications; g) periocular datasets; and h) competitions that have been held to determine how effective this biometric Finally, periocular biometrics-related issues and potential future paths are discussed.

Description

The COVID-19 pandemic has brought about a number of considerations for biometric systems. Biometrics is the automated or semi-automated recognition of individuals based on their physical (face, iris), behavioral (signature, gait), or psychophysiological (ECG, EEG) traits. Similarly, the widespread use of face masks and social distancing protocols has refocused attention on occluded face recognition and, inevitably, ocular biometrics. In the context of fingerprint recognition, for instance, researchers are now investing more effort in the design of contactless fingerprint systems. Biometric cues from the pupil, iris, sclera, conjunctival vasculature, periocular region, retina, and oculomotor plant—which includes the eye globe, muscles, and the neural control signals—can be found in the ocular region.

By comparing it to the face and iris modalities, the relevance of it was established by other researchers. The periocular region even performs better than face and iris modalities in some less-than-ideal conditions. Images of humans in the near-infrared spectrum to determine whether or not it could be used as a biometric trait. Beyond the current pandemic, there are numerous applications for periocular recognition. Numerous benefits of periocular biometrics support its application: The sensors that capture face and iris modalities can be used to acquire periocular modality. Therefore, there is typically no need for additional imaging.

Periocular images can be captured in a less constrained, non-cooperative environment than iris or other ocular traits (such as retina or conjunctival vasculature).Additionally, they are less prone to occlusions caused by deviated eyesight, eyeglasses, or eyelids. The periocular region, which is, of course, a component of the face, is less affected by variations in pose, expression, aging, plastic surgery, and gender transition, making it relatively more stable in comparison to the face modality. It is also rarely obscured when face images are taken in close quarters or when masks, scarves, or helmets are present. The information provided by the iris and face modalities can be enhanced by the periocular modality. As a result, it can be used in conjunction with the iris and face modalities to improve the biometric system's performance without affecting the acquisition setup. It can also be used for soft-biometrics and presentation attack detection. Cross-spectral iris recognition can benefit from it because periocular features (the shape of the eye, eyelashes, and eyebrows) are relatively stable in images captured in different spectra. Because it is shared by both modalities, it also makes cross-modal (face-iris) matching easier.2019) focused on periocular cross-spectral recognition. A comprehensive discussion of periocular biometrics is presented in this paper.

The paper discusses various classifications of periocular biometric techniques after providing a brief overview of recent face and periocular techniques for recognizing individuals with partial face masks. The orders depend on physical signs used for acknowledgment, highlight extraction and matching technique, imaging spectra, and combination with different modalities. The techniques for periocular recognition for mobile devices, other applications, and special circumstances are then discussed. The remaining parts of the paper are laid out as follows: The paper is divided into eleven sections: Section 2, which focuses on various face and particular techniques that are specifically applied to masked faces for human identification; Section 3, which categorizes particular techniques based on anatomical cues used for recognition; Section 4, which focuses on various particular features extraction and matching techniques; Section 5, which categorizes techniques based on imaging spectra of input images; Section 6, which discusses fusion techniques with other biometric modalities; Section. The steps that make up a typical periocular recognition system are as follows: securing, pre-handling of the gained picture, confinement of locale of-interest (return for capital invested), include extraction, post-handling of separated includes, and matching of two capabilities [1-5].

Conclusion

Periocular images can be captured in a less constrained, non-cooperative environment than iris or other ocular traits (such as retina or conjunctiva vasculature).Additionally, they are less prone to occlusions caused by deviated eyesight, eyeglasses, or eyelids. The particular region, which is, of course, a component of the face, is less affected by variations in pose, expression, aging, plastic surgery, and gender transition, making it relatively more stable in comparison to the face modality. It is also rarely obscured when face images are taken in close quarters or when masks, scarves, or helmets are present.

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