Facial Recognition Technology

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According to Lin (2000), Facial Recognition Technology (FRT) is one of the few biometric systems that help identify an individual based on their biological characteristics. Researchers from diverse fields including security, computer vision, image processing, and psychology have gained a deep interest in the technology, owing to its high accuracy and low intrusiveness. FRT works by identifying and verifying an individual's still image or video of a scene and confirming it with one stored in a database. This paper aims at investigating the basic functioning of FRT, areas of applications, and challenges in FRT.

Bobde and Deshmukh (2014) explain that the authentication procedure takes place in four stages; capture, extraction, comparison, and the match. During enrollment, identification, or verification, the system captures a physical or behavioral sample. Next, there is the creation of a template from data extracted from the sample. Unique data is then compared with this new template, and finally, the system decides whether there is a match or not. The algorithms for the framework is also composed of several modules; first, a face image detector identifies locations of the face from a complex background, then the face recognizer determines who the individual is. Both modules utilize the feature extractor which converts the pixel representations to vector representations, which can derive useful information through pattern recognizers (Lin, 2000). The latter searches for the best match for the input image in the database to help identify the individual in question.

The technology has found numerous application in diverse fields according to a study by Tsalakanidou (n.d.). In civil applications and law enforcement, for example, it is used in the surveillance of public places, forensic applications, border control, passport, and national ID. Security applications for electronic transactions as well as access control also use this technology

widely to secure their infrastructure and networks. Additional areas include ambient intelligence for natural human-machine interaction and in the smart home, as well as wearable systems such as memory aids and context-aware systems. The possibilities are endless considering entertainment such as interactive movies and computer games currently apply FRT.

Tsalakanidou (n.d.) points out that interclass similarities and interpersonal variations tend to pose a challenge to the system. In the former, twins, strangers, or even relatives could look alike, whereas in the latter the appearance of ones face could change due to factors such as illumination and pose variations, facial expressions, and use of cosmetics. Others could even disguise themselves to avoid detection by the system. However, despite facing these drawbacks, researchers are continually working to find better algorithms to help work around these. Consequently, there exist several face detection techniques such as the knowledge-based, structural matching, appearance-based, template matching, and the feature invariant.

In conclusion, FRT is a biometric ID method that uses the face as its input to help identify individuals. The technology finds application in various fields such as security and law enforcement. Although the technology faces several challenges, researchers are still working on it to develop better algorithms. Additionally, there exists some techniques that one may combine to help enhance the efficiency of the system.

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