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DEFINITION

facial recognition

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🐦 in ✉

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Facial recognition is a category of biometric software that maps an individual's facial features mathematically and stores the data as a faceprint. The software uses deep learning algorithms to compare a live capture or digital image to the stored faceprint in order to verify an individual's identity.

How a facial recognition application works

The software identifies 80 nodal points on a human face. In this context, nodal points are endpoints used to measure variables of a person's face, such as the length or width of the nose, the depth of the eye sockets and the shape of the cheekbones. The system works by capturing data for nodal points on a digital image of an individual's face and storing the resulting data as a faceprint. The faceprint is then used as a basis for comparison with data captured from faces in an image or video.

Even though the facial recognition system only uses 80 nodal points, it can quickly and accurately identify target individuals when the conditions are favorable. However, if the subject's face is partially obscured or in profile rather than facing forward, this type of software is less reliable. According to the National Institute of Standards and Technology (NIST), the incidence of false positives in facial recognition systems has been halved every two years since 1993.

Examples of facial recognition

High-quality cameras in mobile devices have made facial recognition a viable option for authentication as well as identification. Apple's iPhone X and Xs, for example, include Face ID technology that lets users unlock their phones with a faceprint mapped by the phone's camera. The phone's software, which is designed with 3-D modeling to resist being spoofed by photos or masks, captures and compares over 30,000 variables. Face ID can be used to authenticate

purchases with Apple Pay and in the iTunes Store, App Store and iBooks Store. Apple encrypts and stores faceprint data in the cloud, but authentication takes place directly on the device.

Smart advertisements in airports are now able to identify the gender, ethnicity and approximate age of a passersby and target the advertisement to the person's demographic.

Facebook uses facial recognition software to tag individuals in photographs. Each time an individual is tagged in a photograph, the software stores mapping information about that person's facial characteristics. Once enough data has been collected, the software can use that information to identify a specific individual's face when it appears in a new photograph. To protect people's privacy, a feature called Photo Review notifies the Facebook member who has been identified.

Other examples of facial recognition include Amazon, MasterCard and Alibaba, who have rolled out facial recognition payment methods commonly referred to as selfie pay. The Google Arts & Culture app uses facial recognition to identify museum doppelgangers by matching a real person's faceprint with a portrait's faceprint.

Developers can use Amazon Rekognition, an image analysis service that's part of the Amazon AI suite, to add facial recognition and analysis features to an application. Google provides a similar capability with its Google Cloud Vision API. The technology, which uses machine learning to detect, match and identify faces, is being used in a wide variety of ways, including entertainment and marketing. The Kinect motion gaming system, for example, uses facial recognition to differentiate among players.

Uses of facial recognition technology

Facial recognition can be used for a multitude of applications, from security to advertisements. Some example use cases include:

- Mobile phone manufacturers, such as Apple, for consumer security.

- S. government at airports, via The Department of Homeland Security, to identify individuals who may overstay their visas.

- Law enforcement through collecting mugshots to compare against databases from local, state, and federal resources.

- Social media, such as Facebook, to tag individuals in photographs.

- Business security, as businesses can use facial recognition for entry to their buildings.

- Marketing, where marketers can use facial recognition to determine age, gender and ethnicity to target specific audiences.

Benefits

With the use of facial recognition comes with it a host of potential benefits, including:

- No need to physically contact a device for authentication- compared to other contact-based biometric authentication techniques such as fingerprint scanners, which may not work properly if there is dirt on a person's hand.

- Improved level of security.

- Requires less processing compared to other biometric authentication techniques.

- Easy to integrate with existing security features.

- Accuracy of readings has improved over time.

- Can be used to help automate authentication.

Security and privacy concerns

Currently, there are no laws in the United States that specifically protect an individual's biometric data. Facial recognition systems are currently being studied or deployed for airport security and it is estimated that more than half the United States population has already had their faceprint

captured. Data from a facial recognition system may be captured and stored, and an individual may not even know. The information could then be accessed by a hacker, and an individual's information spread without ever knowing it. This data could be used by Government agencies or advertisers to track individuals as well. Even worse, a false positive may implicate an individual for a crime they are not guilty of.

[Margaret Rouse](#) asks:

What concerns do you have about privacy as the use of facial recognition and other biometric technologies increase?

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According to the Department of Homeland Security, the only way to avoid having biometric information collected when traveling internationally is to refrain from traveling. The General Data Protection Regulation ([GDPR](#)) for European Member States does address biometric data.

Kim Komando explains facial recognition technology:

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