

In this assignment, I explored the applications, uses, and future developments of facial recognition technology. Facial recognition is a face analysis software that identifies a person's identity using their facial features and other detection methods. It has evolved the way we approach security, identification, and authentication in the real world and as a whole by using software to measure facial features in an image ("What Is Facial Recognition?").

Facial recognition systems essentially identify faces in images and videos, then determine if 2 different images belong to the same person. Facial recognition can also search for a specific face among a large collection of pictures ("Pros and Cons of Facial Recognition."). This technology integrates well with security software; and is also used in most front-facing smartphones that enable Face ID as a security measure. Biometric security systems use facial recognition to identify individuals during the on-boarding process during when logging into their accounts. These systems prove to be a quick and efficient verification system that allow for fewer touch-points as opposed to a retina scan or even fingerprints.

Facial recognition is essentially made up of 3 components: detection, analysis, and recognition. Detection is the process of discovering a face in a picture. Computer vision allows for facial recognition technology to identify individual's faces from images that contain multiple faces. Machines use computer vision to identify entities in pictures with a human, or above human, accuracy level in a faster and more efficient manner. The system then maps out the facial features and characteristics before it analyzes the expressions. A face-print is then derived from a string of numbers that are converted from the facial recognition data. The system is then able to identify an individual by comparing the faces in multiple pictures to determine

facial match probability. The system is able to recognize if a distinguish if a selfie is the same as a picture on a passport. Predicting the accuracy rate of this technology is actually quite difficult because no single measurement provides a complete picture ("What Is Facial Recognition?").

In today's age, facial recognition technology is becoming one of the safest security measures available as they reduce the risk of unauthorized access, although, the amount of publicly available images data does create a risk of security fraud and facial spoofing ("The Pros and Cons of Face Recognition."). These systems use math patterns to ultimately store biometric data to be interpreted by a machine. Factors such as aging and facial feature structure alteration can ultimately breed difficulties for the machine to accurately match images that were taken years beforehand. Machines can also face challenges when distinguishing between twins in photos. As multi-factor authentication features continue to improve, so does facial verification technology which also aid in privacy and security.

Facial recognition technology can be used for good as well as very negative purposes. It can be used for driver monitoring, which is a future development that can be essential for drivers when they are drowsy on the road. Sound alarms can actually be installed and signaled to deploy after the car, using computer vision, recognizes the driver getting sleepy and distracted ("7 New Facial Recognition Technology Trends To Boom In The Future."). This technology can also be used to find missing individuals and children, which can impact the world positively as a whole. On the other-hand, users essentially sign over certain rights, sometimes unknowingly, to access the certain rights and privileges to use these systems; which can obviously breed a level of distrust and scrutiny.

Overall, facial recognition technologies are what allow machines to detect, analyze, and recognize entities from images and their utilities are endless. These technologies utilize their computer vision capabilities and computations to be able to make accurate predictions. These facial recognition applications that are integrated into machines have allowed for numerous advancements in machine learning and artificial intelligence.

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