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Facial Recognition Tech in the Real World

Current estimates state that the facial recognition subset of computer vision is projected to hit $32.53 billion by 2034. This means facial recognition technology is being rapidly adopted, with integration spanning from phones, to cameras, and verification uses alike. This technology has many core components, benefits, challenges, and potential future impacts on our society as a whole. Computer vision is necessary for AI. In order for our AI to progress, it must be able to take photo or video input. These tasks can obviously introduce challenges, how can we turn an image into something a computer can understand? Thankfully, through research and technological progression, we can see the impacts of this revolutionary technology around the world.

Facial recognition technology is a facet of computer vision as a whole. Instead of classifying objects, this technology deals mostly with facial features to grab its data. For example, details involving eye distance, jaw contour, and facial structure help in verifying identity for our applications. One major use for this technology is law enforcement and security. Police departments could utilize this tech to find suspects in crowded spaces, or implement them as they have in London. In the London Heathrow airport, Facial Recognition tech is used for border control. Public uses for security aside, one of the most prominent integrations is in the iPhone’s TrueDepth sensor. This uses facial mapping and recognition to allow for phone unlocking or payment authorization. While Apple puts this tech into our phones, many companies use it for their storefronts. Walmart for example, uses this tech for preventing shoplifting. There are so many uses already at play, that it is no wonder the facial recognition market is exploding.

While we understand facial recognition is on the rise, what goes into it? Facial recognition tech relies on image capture, preprocessing, feature extraction, database matching, and decision making. All of these are allowed via 3D sensors and an elaborate process flow. Breaking it down into manageable steps, the system must first capture an image of the user's face. After this, the image is normally reduced to grayscale for easier processing. Once preprocessing is finished, the image is sent for features to be extracted. These features match information against a facial feature database, in order to move to the final step, decision making. Decision making is the final step, where it is determined whether or not the access should be granted. Once the confidence of the user is determined, if above a certain level, the user is allowed access.

With these implementations and the tasks behind them, what benefits does facial recognition have, given our eyes do it all the time? The major benefits come from efficiency, security, and user experience. Given the confidence is high enough, this process removes the need for human verification. This allows for faster processing, larger amounts of processing, and more effective repetitive tasks. While there are many benefits associated with this tech, challenges are bound to arise. Inevitably we will reach technical limitations, but even further we find ethical concerns, privacy issues, discrimination, and cost all becoming limiting factors. For example, if lighting is poor, this may impact whether or not the images can be processed at all. This problem extends outward as well, impacting those with darker complexions. Studies show that recognition algorithms struggle more with those bearing darker skin tones. This can lead to bias in the applications utilizing facial recognition tech, such as law enforcement or security. Correcting these issues also brings up the problem of cost. Implementing facial recognition tech on a wide scale might save time, but it will be a costly expense to set up, and maintain.

In order to more effectively utilize facial recognition technology, we should bear in mind its future use cases. For example, many fear the use of facial recognition tech being used to create a surveillance state. China has implemented this practice, being able to find people jaywalking with their technology. Although security may be enhanced, personal privacy has been lost. Even though technology ushers in efficiency and convenience, we must always remember the rights we surrender in order to achieve this.

Facial recognition technology has many benefits, challenges, core components, and future impacts. While ushering in this new era of change, we must remember to do so ethically, and with nuance. This provides a safe, efficient, and secure future, with AI vision guiding us to see a better future.

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