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Was Face ID the Right Move for Apple's New iPhone?

New technology such as facial identification on Apple's new iPhone X, brings about the question: Is facial identification (Face ID) truly a stronger biometric authentication factor than touch identification (Touch ID)? Apple completely eliminated touch identification as an authentication factor on their new phone, implementing only Face ID, in order to achieve a supposedly long term goal of releasing an entirely touch screen phone. But was this release a good move for the company in terms of producing a more secure biometric authentication algorithm, or did Apple's new and improved phone just become less secure? Regardless of the strong supporting ideas for each of the opposing sides, the best next move for the success of Apple would be to release a phone with both methods of authentication. This would ultimately lead to the most secure type of phone in the industry, a goal that they are looking to soon accomplish.

A reliable method for biometric authentication is imperative in many situations: ones where highly secure information needs protected, such as a data center, and ones where the information at question is on a personal device where private information about one's life is stored. Biometric authentication is the idea of verifying one's identity through use of a biological identifier, confirming that the consumer obtaining access is the person they are supposed to be. It is expected that by 2020, biometric authentication will begin to replace the need for ID cards and passwords in many digital systems.[1]

[1] ACCEO Tender Retail Team, "Biometric authentication is an important factor," https://tender-retail.acceo.com/blog/biometric-authentication-is-an-important-factor-for-a-more-secure-and-stronger-mobile-payment-system/, (March 7, 2018).

The most reliable verification method is a controversial topic nowadays, as many companies such as Amazon, Apple, and ResolutionView are using facial recognition software as their main method of corroboration, while many other companies are using touch identification as their main method. Amazon has been working to use facial identification to allow consumers to simply scan their face in order to make a purchase, placing the entire security of one's bank account into the hands of their software. Apple has begun using facial identification to unlock their phones, making the only two options of unlocking their phones entry with a standard password or scanning one's face through Face ID. Lastly, ResolutionView has identified facial recognition software as a reliable manner to track that employees are arriving and leaving at the time they state on their time cards, by identifying their face through video cameras when they enter and leave the building.

No Two Fingerprints Are Identical

Arguments against facial identification software have identified other types of recognition methods such as touch identification to be much more reliable. The first main reason for the support of touch identification is that no two fingerprints have the same dermal ridge characteristics and therefore no two fingerprints can be identical.[2] Dermal ridges are the small indents in the finger that in combination with each other make up an entire fingerprint. They are produced because during development in a mother's womb, the innermost layer of fetal skin is very unstable, becoming indented as the fetus moves around throughout the womb.[3] Through this process, each person's fingerprint becomes a unique combination of different stresses. These characteristics allow every individual to

[2] Michael Kucken and Alan C. Newell, "Fingerprint formation," https://math.arizona.edu/~anewell/publications/Fingerprint_Formation.pdf, (February 25, 2005).
[3] Kucken and Newell, "Fingerprint formation".

be represented by a distinct pattern of ridges; supporting the case that touch identification is a matchless way to characterize a person. With facial recognition, the software could identify identical twins or even people with incredibly similar faces as being the same person. Each person's face is unique, however the similarities in facial structure and facial composure are so alike in many cases that the potential for two to be overwhelmingly similar is not uncommon. While identical twins can have the same face, they do not have the same ridge patterns composing their fingerprints and therefore can be distinguished from one another by fingerprint. In this case, fingerprints are a much more reliable method of authentication.

Fingerprints Do Not Age

Another compelling reason why fingerprints are a strong method of recognition is that they do not age. The fingerprint that one is born with is the fingerprint that will represent them for the rest of their life. Faces on the other hand, do age and tend to do so drastically as years progress. The way one's face looks as a young child evolves throughout the different stages of their life, and often times grown adults are unrecognizable from their photos as a child. In addition, according to a an article produced by McMaster University in Ontario, Canada, many studies have been performed where the accuracy of facial identification has been found to be much less accurate in older people than it is for young adults.[4] As people age, the structure of their facial bones shift, including a widening of the eye sockets as well as a decrease in the angle of the brow bones, nose, and upper jaw bones.[5] With these shifts, faces of middle-

[4] Yaroslav Konar, Patrick J. Bennett, and Allison B. Sekular, "Effects of aging on face identification and holistic face processing," https://www.sciencedirect.com/science/article/pii/S0042698913001466, (June 25, 2013).
[5] Live Science Staff, "Our Face Bones Change Shape as We Age," https://www.livescience.com/35332-face-bones-aging-110104.html, (January 5, 2011).

aged people become more similar as the bones shift into a less unique structure. Based on these claims, it appears that fingerprints are a more reliable method of authentication as they are a way to identify a person throughout one's entire life rather than having to reset authentication as the person grows in age.

Faces and Fingers Can Be Easily Replicated

Just as faces can be replicated on IDs or Passports, they can also easily be duplicated in order to unlock a device. In 2017, a Vietnamese security firm was able to easily create a replica of a face that contained enough features to unlock a phone within a week of the release of the software. This incredibly short time frame proves just how easy it is to break into the phone where facial identification is the only authentication factor. As the only method of authentication, facial identification appears unreliable, however touch identification is also easily replicable. Both methods of authentication share the weakness that once they are stolen, they can be simulated, creating vulnerability forever.

Incorporating the previous argument about aging into this flaw of both technologies, the argument for facial identification becomes stronger. If facial characteristics are stolen and replicated, a person aging and changing facial features allows their identity to be slightly more secure, as the replication would also have to follow the aging patterns of the face they have copied. As fingerprints never evolve, once the print is stolen, it is stolen for the person's entire lifetime.

Protecting Identity

Strong biometric authentication is becoming inherently crucial as smartphone technology is increasingly relied on for banking as well as other industries with high cyber risks. If these methods of verification are not strong enough, consumers as well as

companies can be subject to fraud or even breaches in data that could jeopardize their success. A consumer's trust in the privacy of their data is a large factor in choosing which businesses and accounts they wish to place their information, making the need for reliable authentication even more prominent. According to ACCEO, a Tender Retail Team, in an article publish in March of 2018, "biometrics is going to be the most important mobile payment in 2020" and "the use of biometrics to protect mobile payments will affect more than 65 percent of smartphone users."[6] With protection rates projected to be that high, it is incredibly important that the use of biometrics is strong enough to protect against theft and replication. If this is so important, why didn't Apple choose to include both methods of authentication into their latest iPhone, rather than only including Face ID?

Apple's Next Move

Large news companies such as Forbes and Fast Company published articles critiquing Apple's decision to completely get rid of touch identification. According to Forbes, Apple has been working on developing a new generation of fingerprint scanning technology, which they hope to be able to incorporate into their next generations of phones. The claim stating that "Face ID was superior to Touch ID and marked the beginning of the end for fingerprint sensors," which Apple first made when they first released their phone without touch identification, seems to be contradicted by the work they are reportedly completing.[7] BGR, a business reporting website, published in an article in August of 2018 that, "Apple continues to work behind closed doors on different ways to bring fingerprint sensors back to its devices. And now, it may have found the

[6] ACCEO, "Biometric authentication is an important factor".

[7] Gordon Kelly, "Apple Plans Touch ID Phone Comeback," https://www.forbes.com/sites/gordonkelly/2018/08/19/apple-iphone-x-plus-se2-x2-upgrade-release-date-price-cost-face-id-touch-id/#76b66654647a, (August 19, 2018).

perfect solution that will allow it to bring back Touch ID on devices that still have "all-screen" displays, like the iPhone X."[8] If Apple is able to release a phone that can in fact utilize both methods of biometric authentication, they may once again lead the industry in having the most innovative and verifiably secure phone.

Conclusion

Completely removing touch identification from their phone may not have been the strongest move in terms of reliable corroboration methods, but insight into further developments of this new phone help support the idea that Apple did not entirely make the wrong move in removing the feature. Touch identification is a very reliable way to test authentication, but so is facial identification. Combining the two into one single platform would lead to an incredibly secure phone, something that would help boost their product in the industry. As advances are made, consumers should continue to hope that Apple works to bring back touch identification, but likewise works to keep the authentication methods they already have, ultimately not favoring one over the other.

[8] Zach Epstein, "Apple may have found a brilliant way to bring fingerprint sensors back to all-screen iPhones," https://bgr.com/2018/08/15/iphone-x-plus-release-date-soon-next-gen-touch-id-after/, (August 15, 2018).

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