

Jasmin Rae

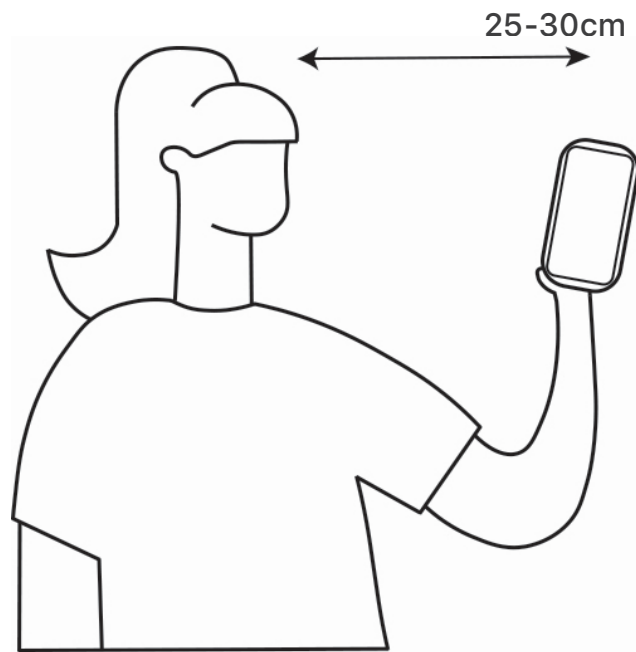
Pay with your Face

What Apple's facial recognition and learning machines really have in common



Facial Recognition

Jasmin Rae



Within the technological world, humanity has always strived to improve security and overall user convenience. With Apple's launch of FaceID in 2017 consumers have the ability to unlock their phone with a simple scan of their face. Although there are some legitimate fears with facial recognition technologies, as mentioned by Jay Stanley who is apart of the American Civil Liberties Union 'There are real reasons to worry that facial recognition will work its way into our culture and become a surveillance technology that is abused'.

How to set up FaceID?

If you own an Apple product from the iPhone X series or later, your device should have the ability to use FaceID. If you want to use FaceID, you will first need to enroll your face. This can be done throughout the initial setup of your device or at any other time by going into settings > Face ID & Passcode. To use apples facial recognition, you will only need to follow and complete the provided prompts. If you

have not previously set a passcode to the device you will also be required to make one as an alternative way to verify your identity. Once set up, you will only need to glance at the phone for it to unlock.

The system will require that the true depth camera can detect your face. The camera has a similar field of view to when taking a selfie, and so the device must be within arm's length or 25-30 cm away from your face to work.

You will also be able to use FaceID to authorize purchases from the App Store including books and iTunes and also make payments using Apple Pay or to sign in to secure apps. Apple also claims that any apps that support TouchID will automatically support FaceID.

So how does FaceID work?

Apple's facial recognition utilizes a three-dimensional scan into a hand-held device. This scan is created through the application of the True Depth Camera System. The system is made up of over

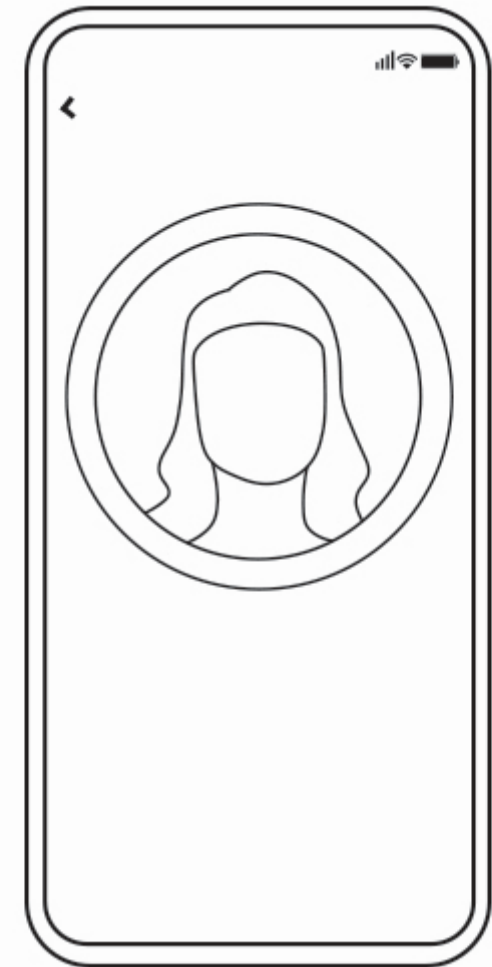
30,000 infrared dots that map out a face. The mapping won't keep track of the proportion of the user's face but will also collect data on any wrinkles and curves of the face. After mapping the face your device will convert this into a two-dimensional image that will become a master key for future usage of FaceID.

Not only has Apple integrated a True Depth System into FaceID but a Smart Learning Machine has also been orchestrated into the iPhone. This Smart Learning Machine uses artificial intelligence to continually gather data on the shape and structure of your face. For example, the device will be able to tell if your eyes are open or closed and also what way your attention is directed towards. In applying this technology to FaceID, your device will be able to improve its skills in recognizing your face for a more consistent and potentially secure approach.

Security concerns or just conspiracy?

With a great deal of science fiction appearing to become closer to reality there is a great concern regarding individual privacy and anonymity. Even though Apple does have a security standard, there is a great distress regarding database breaches. Jennifer Lynch a senior staff attorney of the Electronic Frontier Foundation has expressed that she is 'more concerned about the larger privacy issues around facial recognition technologies, including compelled unlocking and — in the context of face ID databases — the risk from hacking and identity theft when there's no way to change your face-print'. This may be deeply unsettling to individuals as society becomes closer to the end of anonymity. Although it should be considered that FaceID has significantly improved the overall accessibility and usefulness of Apple products for the everyday consumer.

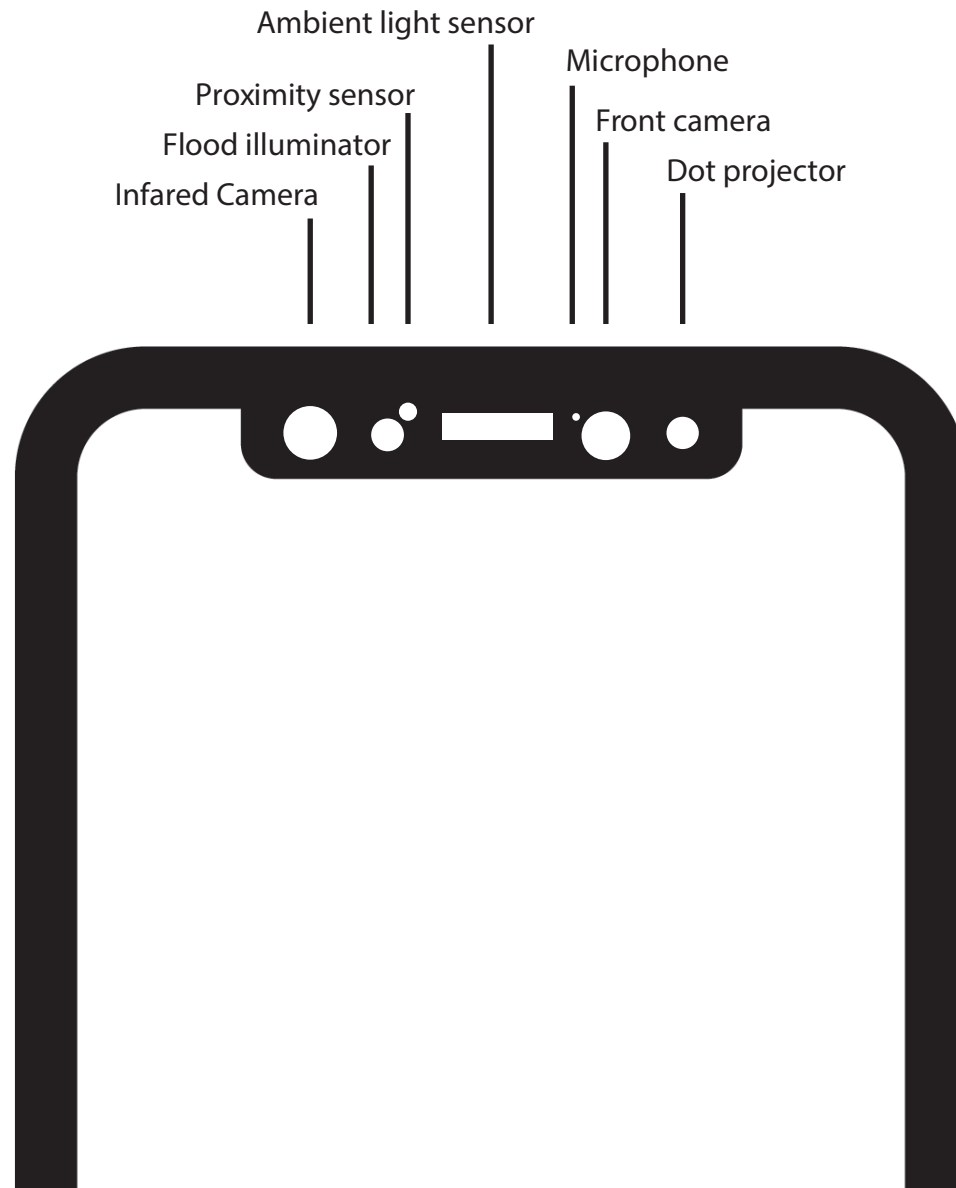
FaceID Scanning Screen



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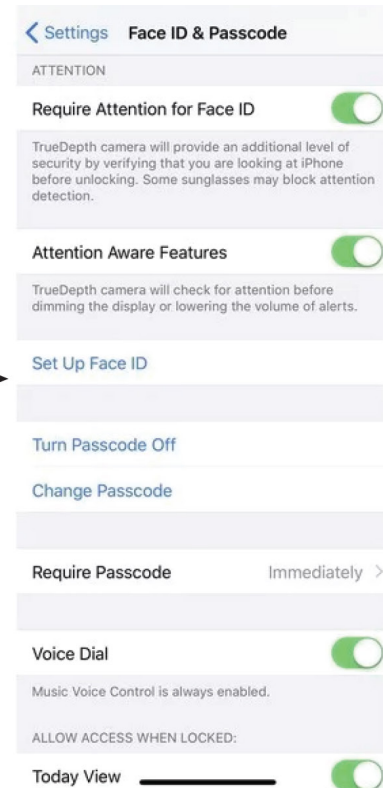
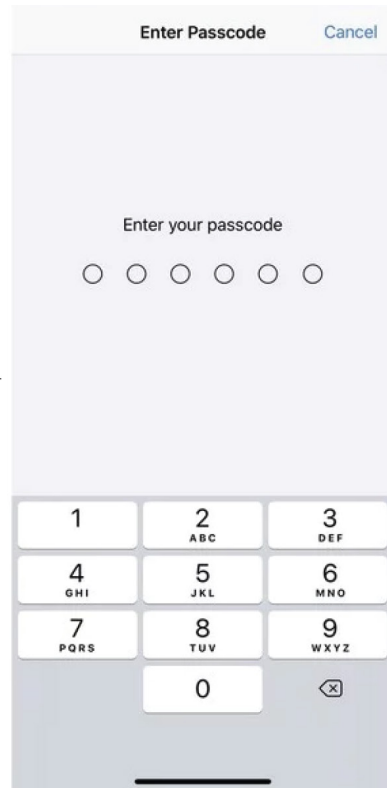
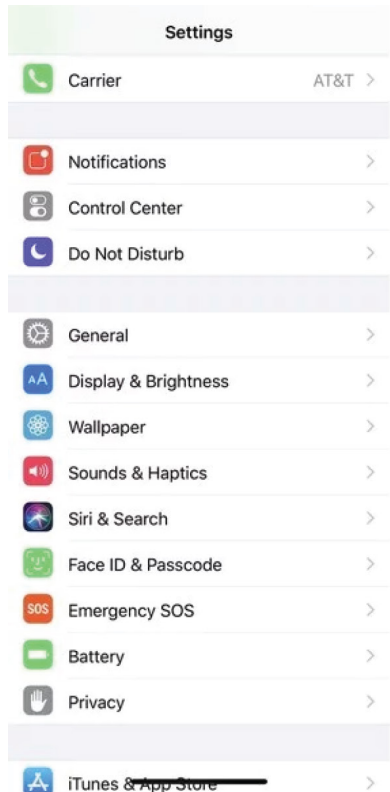
Iphone 11 Camera Diagram



Process in detecting your face:

1. Proximity sensor:
Activity near the device is detected.
2. Flood illuminator:
Face and eye detection.
3. Dot projector & IR camera:
Whole face (ie curves and general structure) is recognized, unlocking the phone.

How to access FaceID



1. Navigate to the settings application within the iPhone. After doing so, select the 'security/privacy' option.

2. You will then be prompted to unlock this setting with your phone's pin.

3. Now you are able to choose to set up FaceID, simply tap on the 'Set up faceID' prompt.

4. The device will now show a screen to officially set up FaceID. Choose the 'Get Started' option to begin.