

Problem Statement

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Face recognition technology has been used for a variety of applications from automatic Facebook photo tagging and Snapchat lenses to phone security and surveillance. Facial recognition systems rely on unique facial features as an additional layer of security to identify and distinguish people whether they're new faces or old ones in a database.

Although facial recognition technology offers another layer of security for applications, it's accuracy is highly dependent on lighting and uniqueness, and it's vulnerable to simple hacking techniques like impersonating users with pictures. For instance, the face recognition system of Samsung Galaxy S8 is very convenient for easy unlocking, but it can be easily fooled by a photo of the user.

Apple has provided a solution to solve this photo trick by relying on dual cameras and an array of projected infrared dots to detect depth in its new facial recognition system. However, such a solution is limited to devices with expensive hardware upgrades and can't be applied to lower cost applications. Higher costs often limit other improvements, complicate manufacturing, and raise the price for consumers.

Our solution will focus on a more detailed facial motion recognition to ensure that the software can distinguish a real person from an image or video. Requesting and detecting a facial gesture will protect against images, while assigning the gestures at random, implementing depth perception, and training the software beforehand with a large training set will prevent videos from circumventing its security. Our solution is pure software-based, requiring no additional hardware expenses than a camera and can be applied to a wide range of applications including building security and unlocking cellphones.