Nanotech to Secure the World

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Abstract

Nanotechnology is a growing technological advancement with many potential application processes. With its microscopic size, it has helped to make advancements in the medical field and computer processing capabilities thus far. Biometric scanning spans many different methods and fields as a mean of physical security for most devices and institutions today. The purpose of this nanotechnology research project is to explore the potential application and or the advancement of nanotechnology in combination with biometric scanning methods in the information security field as a means of identification and verification for individual users. At this stage of research, nanotechnology will be generally defined as "the study and use of matter at sizes invisible to the human eye, unless viewed beneath a microscope, to create scientific advances to enrich our daily lives" (Lozano, 2014).

Introduction & Research Question

Introduction

Biometric scanning, mainly fingerprint recognition software and systems are becoming more widely available and utilized in commercial devices everyday. But how accurate are they and how can they potentially be further improved?

Research Question

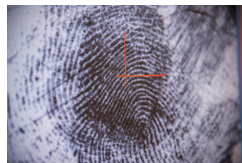Is there a way to implement or improve the use of nanotechnology in biometric scanning devices?
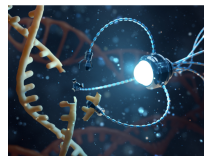
Research Design & Data Collection

Through analyzing current success and fail rates of different biometric scanning technologies, propose a potential application with nanotechnology that could increase the success rate.

Results

When looking at the success and fail rates of different biometric scanning technologies that exist today, the most accurate scanning methods are facial/retina recognition and DNA. DNA recognition software is not available for general public use due to the high cost of the technology needed to utilize such software at this time.

Discussion

Security and convenience are becoming more of a concern in today's modern world. On one hand, security is always important regarding personal information and access to personal devices. And with fingerprint, facial, and voice recognition software being implemented into personal devices like phones and tablets, they are adding a kind of alternate method of security with added convenience. The problem though is that these devices tend to only use one method of unlocking the device, like through biometrics, a pin, or a password, instead of a combination of two or more methods. Combining more methods of user recognition is often the best form of security, but also is quite costly. The goal of the potential to utilize nanotechnology with biometric scanning is to create that dual method user recognition software to increase security without sacrificing convenience.

Conclusions

Nanotechnology can potentially increase the accuracy of fingerprint scanners, but the technology itself is expensive to release to the public. At the EPFL's School of Engineering and at Australian National University (ANU), phys.org reported on June 7, 2018, that a compact nanophotonic device was developed as a means of increasing the success rate of fingerprint recognition technologies.

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Table 1. Success and Fail Rates of different Biometric Scanners

	Success	Fail
Fingerprint scanner	98.6%	1.4%
Facial/Retina Recognition	99.97%	.03%
Voice	95%	5%
Signature	95%	5%
DNA	99.92%	.08%

Figure 1. Close up of a fingerprint to represent The view on a fingerprint scanner.

Figure 2. Example of nanotechnology shown on medicaldevice-network.com (full link in References)

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