

Research Article

Open Access

Future Effects and Impacts of Biometrics Integrations on Everyday Living

Amjed A. Ahmed*

Department of Physics, Imam Kadhum College (IKC), Iraq.

*Email: amjadabbas@alkadhum-col.edu.iq

Article Info

Received
12/10/2018

Accepted
28/10/2018

Published
10/03/2019

Abstract

Identification and access have been a concept that has evolved over time as the need to constantly identify people and grant them access to sensitive and classified data and information became very important. The effect is felt in most organizations, especially multinational companies that deal in highly classified research that has to do with pharmaceuticals, technology, power as well as the human biology coupled with security. The most common form of implementation of biometrics is facial recognition, fingerprints, iris recognition, a retina scanner, and voice recognition into so many applications and scenarios. The integration of this biometrics has had a rising effect and impact of everyday life and has practically changed some daily routines. This paper will examine future integrations of biometrics and it will in time affect everyday life and routine.

Keywords: biometrics, fingerprints, facial recognition, voice recognition, iris, retina, identification, authentication, verification.

الخلاصة

يعتبر التعريف والتوصل من المفاهيم التي تطورت بمرور الوقت ، نظراً لأن الحاجة إلى التعرف باستمرار على الأشخاص ومنحهم إمكانية الوصول إلى البيانات والمعلومات الحساسة والمُصنَّفة أصبحت مهمة جداً. ويظهر التأثير في معظم المنظمات ، لا سيما الشركات متعددة الجنسيات التي تتعامل في أبحاث سرية للغاية تتعلق بالأدوية والتكنولوجيا والطاقة بالإضافة إلى البيولوجيا البشرية المقترنة بالأمن. إن أكثر أشكال تنفيذ القياسات الحيوية شيوعاً هي التعرف على الوجه ، وبصمات الأصابع ، والتعرف على قزحية العين ، وفتحة شبكية العين ، والتعرف على الصوت في العديد من التطبيقات والسيناريوهات. حيث ان لتكامل هذه القياسات الحيوية تأثيراً متزايداً وتأثيراً للحياة اليومية ، وقد غير عملياً بعض الروتين اليومي. في هذه الورقة البحثية سيتم دراسة التكاملات المستقبلية للقياسات الحيوية وكيف ستؤثر في الوقت المناسب على الحياة اليومية والروتين.

Introduction

There is no doubt that Biometrics, as a technology has become part of our everyday living, giving us the desired security we need. As described by Margaret (2017) "Biometrics is the measurement and statistical analysis of people's unique physical and behavioral characteristics. "The biometric technology is used specifically for two main things: Identification as well as Access Control, two process that work together to provide security at different levels. This is also dependent on the type of biometrics that is integrated to be used. Applications of biometrics are numerous and cut across different industries, providing security to different entities. The effect and

impact biometrics integration has on our lives is that is has been able to increase security, opened up news areas for consideration for more research and also pointed the fact that human body is a lot more advanced than we can imagine and can be coupled alongside emerging technologies such as the biometrics. The current applications and effects are considered to predict future effects and impacts on our daily living.

Materials and Methods

How does Biometrics Work

Biometrics works on a simple principle known as authentication. The authentication is achieved by biometric verification.

Authentication is the process of proving an individual is who he/she claims to be. Biometric verification is the process of identifying an individual by evaluating distinguished biological features as described by Margaret (2008) saying “Biometric verification is any means by which a person can be uniquely identified by evaluating one or more distinguishing biological traits.” Further explanations reveals that the unique identifiers could be “fingerprints, hand geometry, earlobe geometry, retina and iris patterns, voice waves, DNA, and signatures”

In recent time, biometric verification has gone from what used to be a simple process to a considerably advanced process especially with the advent of databases that are computerised as well as digitalisation of the analog data. This allows the instantaneous identification of an individual. The effect of these can be felt in a number of industries.

1. Iris and Retina: both patterns authentication methods have already been integrated into banks especially with Automated Teller Machines (ATM)
2. Voice Recognition: this is a method of verification been used for a long time alongside tape recording as well as wiretaps. It's been used for access databanks especially in research facilities
3. Facial Recognition: this technology is important as it has been adopted by law enforcement to identify individuals especially when it comes to crime suspect identification.
4. Hand Geometry: this technology is handy in the industry especially in providing physical access to buildings
5. Earlobe Geometry: this has become useful in security as it is used to disprove identity of individuals that claims to be someone else while they are not

Irrespective of the type of biometric method or technology been used, the identification process involved is standard and remains same. This involves capturing a person's unique characteristic and saving it in a database. During identification verification, a new record of a person's unique characteristic is capture and compared to the existing one. If there is a

match, the individual's identify is confirmed. If otherwise, access is denied.

Components of Biometric System

In order to perfectly understand a typical biometric system, there is a need to examine the components of a biometric device. The components of a biometric device basically form the basis for the biometric system. These include:

- *Sensor*

This is what collects the biometric data from an individual which could be scanning of fingerprints, vocal or voice prompts, scanning of the iris of the eye or any other form of biometric scanning. Data is collected and converted into digital format.

- *Data Storage*

This is where biometric data of individuals or authorised users. The biometric scanner is used to scan individuals, takes biometric measurement and further converts the data obtained into digital format. The data is later stored in the database

- *Match Algorithm*

This is what is used to compare the already stored data in the database with fresh scanned data. Authentication is done on the individual to identifying authorized user.

- *Decision Process*

The decision process is used to decide the next stage of authentication. If the user is authenticated, the device can grant access to the system.

A typical example of a biometric system is described by Manju. It shows an individual accessing a system via his fingerprint. This could be facial recognition, voice recognition, iris and retina recognition.



Figure 1 showing biometric system for Vehicle Access

TYPES OF BIOMETRICS

There are basically two main types of biometrics which are

- *Physiological Identifiers*

As described by Margaret (2017) "Physiological identifiers relate to the composition of the user being authenticated and include facial recognition, fingerprints, finger geometry, iris recognition, vein recognition, retina scanning, voice recognition and DNA matching." This refers to physical traits found on the individual

- *Behavioral Identifiers*

The behavioral identifiers are a bit different from physiological identifiers in the sense that it looks for unique ways in individual act. Margaret (2017) described this saying "Behavioral identifiers include the unique ways in which individuals act, including recognition of typing patterns, walking gait and other gestures." This refers the pattern deduced from the way an individual does something, captured over time to create a definite pattern that could only be matched by that specific individual

APPLICATIONS OF BIOMETRICS

Airport Security

Thousands of people pass through airport terminals and identifying these passengers can be very difficult. Biometric technology to verify passenger identifier is now used in many airports across the globe. The top modality choice for immigration control is iris recognition in many airports and in order to be able to use the iris recognition, travelers have to first go through a process of enrolment by having their iris and face captured by a camera. These captured details contain unique details which are stored in an international database. The database is then used at points of entry and exit for traveler's identification verification. The verification is done first by allowing the camera capture the iris again and then uses a software program to match what is stored in the database. If there is a match, access is granted.

Time and Attendance

In organizations that have thousands of employees, workforce management has become priority and the use of biometrics has been able to be integrated to accurately calculate time spent working as well as employee attendance. In this case, a biometric time and attendance system is integrated; this provides an automated method of recognizing employees based on both physiological and behavioral characteristics. Different features can be used but the most common ones used for employee identification are faces, fingerprints, finger veins, palm veins, irises, and voice patterns. Verification is done by allowing an employee to attempt identification by biological traits, a biometric hardware device then compare the new capture or scan to the already existing one in the database. In recent times, government organizations and agencies are beginning to use this form of biometrics for ensuring timely attendance of employee as well as payroll calculation.

Law Enforcement

Biometrics is also used in organizations such as Federal Bureau of Investigations (FBI). It can be used in the identification of criminals. It is also widely used for jail and prison management whereby it provides a solution that can safely and securely manage prisoner identity.

Access Control

Access control is another area that biometrics have been able to integrated into. As a matter of fact, the primary reason behind organization as well as personnel are adopting biometric technology especially for access control as well as Single Sign On (SSO) is due to the fact and realization that passwords are insufficient for personal identification. The effect of this is that password only provides evidence or proof of knowledge. In the case of biometrics, it gives unique advantage simply it relies on identification of an individual by who they are and not necessarily what you know. The effect of this can be seen in Home Access Control,

Mobile Phone Access and Vehicle Access Authentication.

Banking

Global banking has increased worldwide and most of the financial entities have become digitally based. The effect of this is that banks are implementing biometric technologies to further improve customer and employee identity management. The reason behind this is to help in combating fraud as well as increase transaction security across different platforms and also enhance customer convenience.

Surveillance

This is also linked in a way to security and crime fight, biometrics have been put in in so many places. Screening large crowds for fugitive criminals or missing children or border control is a typical example of the integration of biometrics.

Effects and Impacts of Biometrics

There is no doubt that the integration of biometric system has had significant effects and impacts of our everyday lifestyle. The effect are visible in almost every industry and has reached the extent where manufacturing processes, access modes and identification have been totally changed and has become more efficient, fast, safe as well as enhanced.

Access

Biometric has changed the way we access a lot of things including devices, automobiles and even corporate and education buildings.

- **Mobile:** the new generation of mobile phones produced in the last 3 years now has integrated biometrics to allow users access their mobiles through facial recognition or fingerprint scans which clearly personalize as well as customize mobiles phones to the owner or user. Examples of such mobile phones include Xiaomi Redmi 5 Plus and Honor 9 light
- **Cars:** cars that are produced in recent times have also integrated biometrics and is used to access the whole vehicle and in some instances is used to start the engine. This is beginning to become a standard as more automobile makers are looking into integrating

as much technology into their product for more convenience for its users.

- **Attendance Systems:** Educational Institutions have been able to integrate biometrics into capturing student attendance in respective classrooms across their premises. Classes are assigned to specific intakes with time interval taken into consideration. Biometrics is used capture entry time into the classroom.

Security

In the case of security, the integration of biometrics has become very handy as it has been integrated into surveillance and identification

- **Surveillance:** in the case of surveillance, facial recognition software can be used to scan through large crowds to pick out a fugitive. It further helps to isolate a wanted criminal where authorities can now apprehend the suspect
- **Identification:** in huge research centers that store very sensitive data about newly developed drugs or technology, biometrics helps in identifying who gains access into the facility as well as the sensitive data that is currently under development. Identification becomes very important because not everyone is expected to gain access into secured area in the facility.

Healthcare

The healthcare industry has also adopted the integration of biometric in some processes which have become easy to handle and enhanced identification process

- **Patient Identification:** in the healthcare industry, one of the most felt effect and impact of the integration of biometrics is in secure patient identification. Health records are considered one of the most valuable personal documents that the industry does everything to protect. This is because medical identify fraud can endanger individual health and place one at a high risk of a victim of medical errors

Social and Religious Integrations

Biometrics plays a lot of role especially in the area of management of members in social

gathering as the more the number of members; the more difficult it becomes to manage.

- **Membership Management:** In social activities such as gym, churches, clubs and libraries, the threat of security breaches as well as unauthorized facility access pushed a lot of member driven companies to the point where the search for a safe and effective way to manage their huge database has become priority. Membership access system basically works on the principles of plastic ID card or even pins. The integration of biometrics has made membership management safer and more effective.

In view of the current effects and impact that the integration of biometrics has had on our daily life, the future promises to be fascinating as technology continues to evolve.

Future Effects and Impacts of Biometrics Applications

Security

There has been a tremendous shift more towards security than privacy due to the fact that global threats such as terrorism impact our lives in one way or the other. Biometric technology will continue to provide certainty of identity that cannot be rivaled in terms of accuracy this means it becomes more difficult to by-pass personal and organizational security in future.

Personal Belongings

When people move around, they usually do carrying their wallets which would normally contain banks or credit card and other personal identification. The future of biometric technology will make that thing of the past as people would be able to pay for items using biometric authentication. In reality, this means an individual becomes his own password or access code that is validated against the individual's unique biometric data. This could be fingerprints, facial recognition, palm or even iris identification.

Advanced Access

In certain instances, the way we access our home or work building has changed due to biometrics technology and it has actually become main stream particularly in the working environment. The greatest place it would affect is how we access our home. Biometric technology is growing to the stage where people would access their home using biometric technology put in place. This means there is no need for keys anymore. This is also in one way connected to security as it means a family of four all would have to access their home using their biometric feature. Once they are all in, it means no one can gain entry anymore and in case there is an attempt to force entry, it raises an alarm

Business Processes

This is another area biometrics will really impact the future. In recent times, especially in business processes that are manual nature rely on multiple steps which always require verification of identity or validation each time. These verification processes could be sign off, access control or even usage tracking. With the full integration of biometric technology, workload can be dramatically streamlined. The impact of this is that it saves running cost as well as execution time.

Mobiles People can access their mobile phone using fingerprints or facial recognition at present. The future may move toward voice recognition where a mobile phone would only come alive when the real owner speaks to the phone. This in a way also increases personal security as no two people can have same voice. In the instance where the owner is force to access his mobile with his voice command, a slight change in tone may just be enough from unlocking the mobile Automobiles

For automobile, biometric technology can be used now to access and even start the engine. With this biometric technology does only empowers the owner to just start the engine but to also have personal setting automatically applied based on the user identification. This may include seat position, steering wheel

height, kind of music to play, radio station to select and temperature. The reality of this is that user experience in terms of travel is bound to be improved and enhanced in a way that cannot be imagined.

Conclusion

In conclusion, the effect and impact of biometrics technology cannot be overemphasized it has also become a part of our daily live. We enjoy the effects and impact now because of way of enhancing or completely changing the way some processes are carried out. The future is unpredictable and the achievements to come cannot be confined. Biometric technology would become a standard in future as many industries have started to go all out to fully integrate it into their respective business in order to enhance and improve services rendered as well as revolutionize business processes.

References

- [1] Margaret. R (2017) Biometrics. Available at: <https://searchsecurity.techtarget.com/definition/biometrics>. Accessed on the 1st of July, 2018
- [2] Margaret. R (2008) Biometric Verification. Available at: <https://searchsecurity.techtarget.com/definition/biometric-verification>. Accessed on the 1st of July, 2018
- [3] Pierce. I (2016) Understanding biometric technology and biometric devices. Available at: <http://www.engineersjournal.ie/2016/04/17/understanding-biometric-technology-and-biometric-devices/>. Accessed on the 2nd of July, 2018
- [4] John. T (2016) The Top 5 Uses of Biometrics Across the Globe. Available at: <http://www.m2sys.com/blog/biometric-hardware/top-5-uses-biometrics-across-globe/>. Accessed on the 3rd of July, 2018
- [5] Manju. M (2016) The Emerging Importance of Biometric Vehicle Access available at: <https://tiresandparts.net/news/new-business-ideas/emerging-importance-biometric-vehicle-access/>. Accessed on the 4th of July, 2018
- [6] Brendan. F (2017) Three ways biometrics can impact health IT security. Available at: <https://www.himssanalytics.org/news/three-ways-biometrics-can-impact-health-it-security>. Accessed on the 6th of July, 2018
- [7] Tim. C (2013) The Boring and Exciting World of Biometrics. Available at: <http://www.pbs.org/wgbh/nova/next/tech/biometric>
- [8] Aaron. O (2016) What does the future of biometrics mean for your business? Available at: <https://www.wideband.net.au/blog/future-biometrics-mean-business/>. Accessed on the 7th of July, 2018
- [9] Ken. F (2017) The future is now: How biometrics will shape our world. Available at: <http://www.argustrueid.com/2017/09/27/future-now-biometrics-will-shape-world/>. Accessed on the 6th of July, 2018