EFFECTS OF USING BIOMETRICS AS AUTHENTICATION TOOL IN SECURITY SYSTEMS IN THE DEVELOPING COUNTRIES

Ugwu Gabriel E.
Computer Science Department
Ebonyi State University, P. M. B. 053, Abakaliki - Nigeria
Email: ugwugabrielevo@yahoo.co.uk

ABSTRACT

The developing countries have been faced with a lot of security challenges in the world today. Security threats in areas of food, Lives, climates, and properties have remained a thorn in the flesh in developing countries. One of the greatest concerns among the inhabitants of Nigeria as one of developing countries of the world today is how to secure Lives and properties of the citizenry. The introduction of Biometrics security technology into access control systems and other security mechanisms has brought big relief to the society. Biometrics uses the physiological and behavioural characteristics of a person to properly identify him and help to tell the class of person he belongs based on the available data. Sometimes these treats are adversely affected in the developing countries. We used verification and authentication methodology to verify how fingerprints and facial screening can explore the different aspects of the face structure and pattern of arrangement of the fingerprint ridges that implement a unique personal identification system are used against the owner. It measures the different components of the face structure, such as the nose position, the mouth, the distance of the left eye to right eye and the actual location of the eyes to the mouth, nose, and the fingerprint ridges and its bifurcations etc and stores the bio-information extracted from every person that enrolls in a database. These form the basic identification data. It has increased denial of access to personal data and right of ownership to personal properties. It has also reduced unauthorized access to confidential documents.

Keywords: Security, Effects, Behavoural, Authentication, Physiological,

1.0 INTRODUCTION

Worldwide the issue of security of life and property cannot be over emphasis. Individuals, Communities and Nations pay primary attention to the security of lives and properties of their citizenry. The way it is carried out may not be disclosed to the public. Every government in one way or the other creates a measure to safeguard life and property against bandits, terrorist and men of the underworld. Most of these measures centre on identification of these individuals, and disclosure of vital information concerning them, and subsequently, bringing any culprit to book. Sometimes it could be for proper access control or true identification over an ownership of a property or otherwise. A person can be recognized by his various characteristics such as behavioural or physiological treats that he or she

possess. Identity verification has originally been by passwords, keys, pins, etc. These are used to realize the actual person, who owns and/or has a right off, as the case may be. But these are not absolute ways of identification because, keys sometimes get stolen or lost and passwords are often forgotten or disclosed.

However, to achieve a more reliable identification, we should use something that gives us real points of measurement. The biometrics of a person actually provides vital points that can be used to properly identify him. In [2] observed that biometrics is a secured and reliable mechanism for a proficient implementation of e-payment system in the country. This method of identification is based on the principles of measurable physiological or behavioural characteristics of the person. Such characteristics as fingerprint, voice sample, pattern of the face, DNA etc, are peculiar to an individual. These characteristics are measurable and are readily available for any given person. This type of security measure are with its own disadvantages which may be too hard on people if adequate care is not taking. For instance in the developing countries where things are not well organised, the use of biometrics as an authentication tools may be a problem. The reason may not be far fetched because illiteracy and fear. Secondly diseases and sicknesses may cause serious harm to the skin, voice etc, where the actual biometrics data is derived from any user. Minor Farm accidents that affect the biometrics features on the body are not left out as most developing countries are yet to embrace mechanised farming.

2 LITERATURE REVIEW

2.1 BIOMETRICS SECURITY AUTHENTICATION

Application of Biometrics to security system has been proven to be authentic and best implemented in environments with critical physical security requirements or prone to identity theft, [6]. The recent Central Bank of Nigeria (CBN) proclamation of biometrics verification number (BVN) to Nigerian bank operators is a clear indication of the importance of biometrics to security of life and property. Biometrics can be used to sanitise the banking industry because it is difficult to be fooled. In [10] described biometrics technology application to ATM security as a means to reduce fraud in ATM in the Bank industry. Biometrics application may not fit well in developing countries as it effect when compromise may be catastrophic. [11] described biometrics as the most secured and convenient authentication tool that cannot be stolen, forgotten, borrowed or forged. If biometric authentication is used in government offices and individual homes for access, it will reduces kidnapping, fraud, assassination, etc: Using biometrics technology as a tools can ensure that correct working times are recorded and that only authorized personnel have access to government property and resources [13].

2.2 BIOMETRICS PROPERTIES

What conditions must be satisfied for a biological measurement to become biometrics value? However, any human physiological or behavioural characteristics becomes a biometrics value [3], if and only if it satisfies the following basic properties such as Universality- must be available on all people. Uniqueness-it implies that no two persons should have the same

feature. Permanence-it must not change with time. Acceptability- it must not be intrusive and/or invasive, that is the characteristics is suitable for use by everyone. Collectability - it must be a measurable quantity. That is to say it must be easy to collect. Circumvention - This means that it will be difficult to fool the system using fraudulent techniques.

According to [4], human face when observed critically, has some distinguishing landmarks. These he called valleys and peaks, they make up the different features of the human face. These landmarks are called node. The human face contains about 80 nodal points, which include the following and more:

Depth of the eye socket, Cheekbones, Distance between eyes and Jaw line, Width of the nose, Chin, etc Computer reads in these measurable points, and covert them into numerical codes, (that is numbers that represents the face), and stores it in the database. These codes are known as face print.

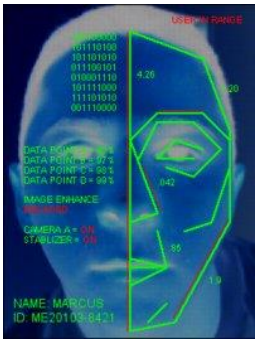

Fig 1 A face recognition scan showing some nodal points [5] (Vijaventhiran, 2008)

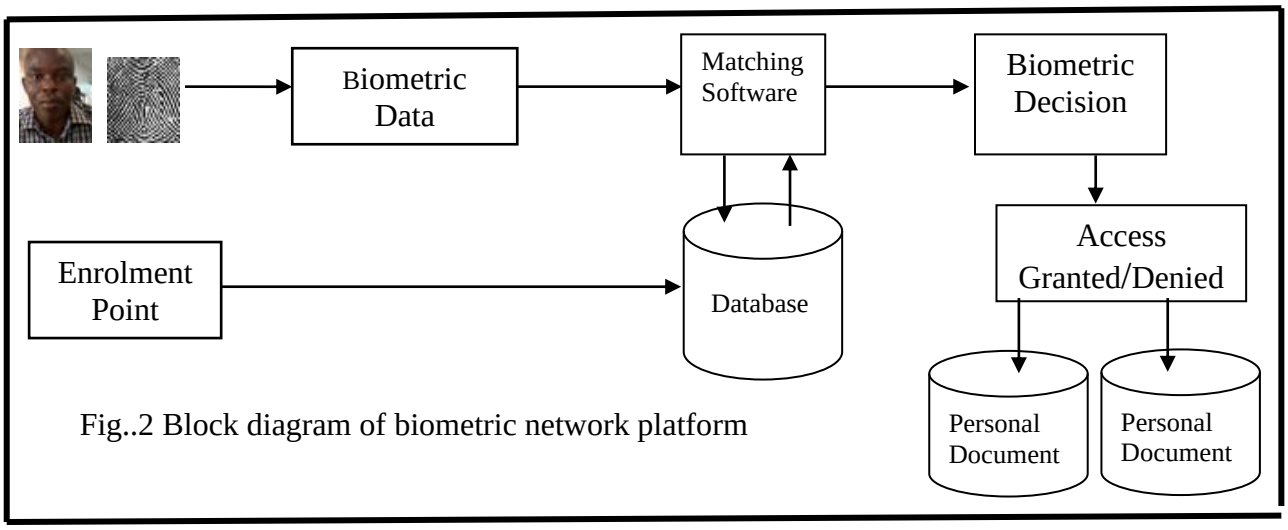

Fig..2 Block diagram of biometric network platform

2.3 BIOMETRICS AUTHENTICATION AS THREATS TO DEVELOPING COUNTRIES LIKE NIGERIA

The Central Bank of Nigeria (CBN) has recently directed that all bank operator in Nigeria should submit his or her biometrics data to his/her banker. This is biometrics verification

number (BVN) which is linked to his operating bank account. It is clear indication of the importance of biometrics to security of life and property. This is good but what becomes of our brothers and sisters in the remote villages who are predominantly farmers and fishermen. These class of people are exposed to different skin hazards that have militated against their natural skin. They are exposed to various kinds of skin diseases as a result of poor health system, farm accidents and other disasters that affect their skin. For instance, the 2015 election in Nigeria the voting failed in the middle of an election [9] making it impossible for SCRs to consistently identify voters' fingerprint especially in the remote villages. Diseases have a strong influence on skin when it affects the fingers, it makes the process of fingerprint recognition difficult. People with fingerprint diseases cannot use fingerprint scanners, which is discriminating to them, since they are not allowed to use their fingerprints for authentication purposes Martin [7] may run the risk of denial to their personal belongings. Accidents can cause somebody to lose his finger or deform his face which may result to losing his data as he cannot be authenticated by the biometrics system, [5] in paper 'A Survey of Biometrics Security Systems' observed that problems can arise during verification if a user loses his finger in biometrics security system that uses fingerprints to identify its users. Most of our rural dwellers are predominantly farmers. Most farm implements used for farming are locally made and not trusted, some of this result to farming accidents like machete, hoe cuts, stick piecing through ones hand or some other accidents that may be detrimental to the skin especially the finger, eye and the face at large.

Fig 3: Different types of finger prints [12]

3.0 DISCUSSION

Biometrics application in security system remains one of the most effective means in checking financial fraud, unauthorized access to confidential documents, impersonation etc. It properly identifies the user since it is difficult for two persons to have the same biometric traits. The use of Physiological properties like depth of the eye socket, Cheekbones, Distance between eyes, Jaw lines, Width of the nose and Chin in facial biometrics, the ridges and bifurcations in fingerprint for identification and verification gives it an age over other security measures because these traits cannot be cloned. Amjed A. Ahmed [1] in "Future effects and Impacts of Biometric Integration on Everyday Living" observed that in near future people will no longer carry bank notes or credits cards for transaction but rather becomes a password or access code of their own that is validated against the individual unique biometric data. He further stressed that biometrics is gaining as padlock to our homes.

If these become true in developing countries, what becomes the faith of those individuals with defects of fingers, eyes or faces etc. As good as biometrics security system is, it has some flaws which makes it not completely perfect. There should be allowances that may enable those who are hit by natural disasters such as age, sickness or accidents to be able to cope. To this end we are suggesting that biometrics should not be used as the only authentication system in the developing Countries. Passwords, Pins or Keys should also be incorporated with biometrics for a healthy authentication.

Fig 4. A Typical fingers in the rural Area that has laboured for many years [12]

3.1 PROBLEMS OF USING BIOMETRICS AUTHENTICATION TOOL IN DEVELOPING COUNTRIES.

Developing Countries are more populated in the rural Areas than in the urban areas. Most of them preferred living there and only visit the town for transactions because they are predominantly farmers and fishermen. Rural areas are prone to epidemics especially in developing countries and as such are the worse hit when it comes to biometrics authentication. Some of the major fears are mentioned below.

1. Accidents sustained from the farm can cause a farmer not to have access to his bank account because he has lost his biometrics features during his farming expeditions.
2. Diseases that affects the skin like Hand eczema, Pyoderma, Pompholyx, Tinea of the palm etc can deny a user access to his personal information because the biometrics features have been affected [7].
3. In voice recognition, illnesses such as strep throat can make it hard for authorized users to get access to their information.
4. In the event of retinal or iris scanning, users may find it very disturbing and not willing because of the concern they have for the safety of their eyes during the retinal or iris scan.
5. Illiteracy is another big problem that faces the developing countries on the use of biometrics authentication.
6. Fear is also a major problem, what might become of their biometrics data collected.

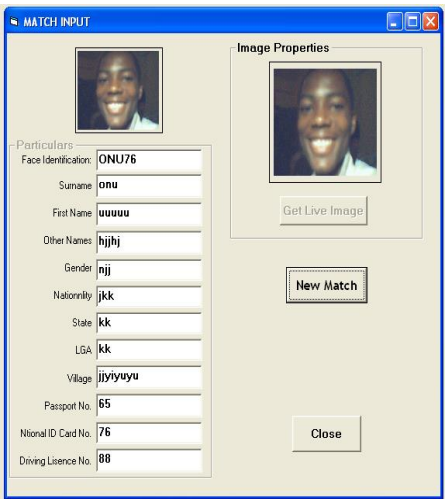

Fig 5: output sample for a match situation when all were well

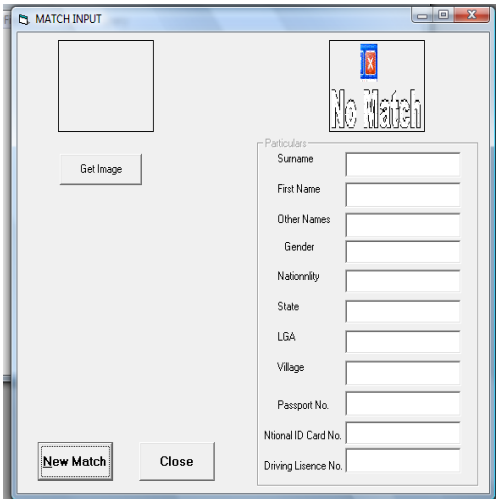

Fig 4: output sample for a non match situation due to disease or accident from the farm work.

4. CONCLUSION

Biometrics authentication is believed to be one of the most efficient authentication technologies because its parameters cannot be forged but it has its own limitation. In the developing countries especially the rural areas the use of biometrics becomes a threat, because people biometrics features have been adversely affected as a result sickness or minor accidents sustained from the farming which affects the biometrics features in the body. Since biometrics cannot be clone it is difficult for such individuals to get access to their personal documents, data or access their accounts. It is therefore suggested that biometrics should be combined with knowledge-based methods such as passwords, token-based or keys in authentication system where ever it is used in the developing countries. We encourage the Government at both federal and state, levels and even individuals, who use this type of security system to consider the suggestions made as lost biometrics features may be difficult to replace.

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