Case study of Aadhaar Card: An Implementation of Biometric System in India

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Abstract: This paper analyze the implementation of biometric system i.e. Aadhaar in India. The Aadhaar program is one of the technology success stories of India and is an initiative unparalleled in scope anywhere else in the world. India is leading the way in the implementation of a national identification program linked to biometric data as of march 2017. It is successfully used in plethora of areas such as banking, health and education.

Keywords: Biometric, Aadhaar, database, banks, identification, India, unique.

I. Introduction

A biometric system is a technological system that uses information about a person or other biological organism to identify that person. Biometric systems rely on specific data about unique biological traits in order to work effectively. A biometric system will involve running data through algorithms for a particular result, usually related to a positive identification of a user or other individual. Biometric systems focusing exclusively on the identification of humans have become the major kind of biometric system in today's IT world. Governments, businesses and organizations can use biometric systems to get more information about individuals or about a populace as a whole. The chances of perpetrate of crime is minimal with adoption of biometric system in numerous domains.

II. Types of Biometrics

There are enormous kinds of biometrics that are implemented on basis unique traits of humans which are stated below:

A. Face Recognition

Face recognition is one of the most flexible, working even when the subject is unaware of being scanned. It also shows promise as a way to search through masses of people who spent only seconds in front of a scanner i.e. an ordinary digital camera. Face recognition systems work by systematically analyzing specific features that are common to everyone's face - the distance between the eyes, width of the nose, position of cheekbones, jaw line, chin and so forth. These numerical quantities are then combined in a single code that uniquely identifies each person.

B. Fingerprint Identification

Fingerprints remain constant throughout life. In over 140 years of fingerprint comparison worldwide, no two fingerprints have ever been found to be alike, not even those of identical twins. Fingerprint identification involves comparing the pattern of ridges and furrows on the fingertips, as well as the minutiae points of a specimen print with a database of prints on file.

C. Hand Geometry Biometrics:

Hand geometry readers work in harsh environments, do not require clean conditions, and form a very small dataset. It is not regarded as an intrusive kind of test. It is often the authentication method of choice in industrial environments.

D. Retina Scan

There is no known way to replicate a retina. As far as anyone knows, the pattern of the blood vessels at the back of the eye is unique and stays the same for a lifetime. However, it requires about 15 seconds of careful concentration to take a good scan. Retina scan remains a standard in military and government installations.

E. Iris Scan

It is like a retina scan, an iris scan also provides unique biometric data that is very difficult to duplicate and remains the same for a lifetime. The scan is similarly difficult to make However, there are ways of encoding the iris scan biometric data in a way that it can be carried around securely in a barcode format.

F. Signature

A signature is another example of biometric data that is easy to gather and is not physically intrusive. Digitized signatures are sometimes used, but usually have insufficient resolution to ensure authentication.

G. Voice Analysis:

Like face recognition, voice biometrics provides a way to authenticate identity without the subject's knowledge. It is easier to fake using a tape recording but it is not possible to fool an analyst by imitating another person's voice.

III. Biometrics Applications

Biometrics is successfully adapted by various sectors which are illustrated below:

A. Biometrics for Governments

Biometrics enables the secure delivery of government services to the citizens. In 2010, the India's Aadhaar program was launched by the Unique Identification Authority of India (UIDAI), aimed to provide each Indian resident with a unique identification number to enable easier, more efficient and secured access to citizen services and make sure the welfare benefits go directly to the right person. The Unique Identification Authority of India (UIDAI) was the world largest biometric project in history run by Indian government to register its 1.2 billion people with biometrics data.

B. Biometrics for Education

Biometrics in schools has long been used primarily in developed countries such as the UK and US. Nowadays, biometrics has been applied widely in education in many developing countries including Asia and Africa countries. With the use of iris technology, it can address many problems occurring from elementary to university such as truancy, library books borrowing, cashless canteen systems, vending machines, class attendance, payment into schools and home/school bus journeys.

C. Biometrics for Healthcare

The World Health Organization has defined that accurate patient identification is one of the nine priorities to improve patient safety. According to statistics recently, 67% of the errors in blood transfusions are due to misidentifications, 13% of all adverse effects that harm patients in surgeries are due to wrong identifications and ID wristbands only reduce errors by 50%.

D. Biometrics for Micro ATM

In remote villages and deep hinterland of India, installing ATMs have many limitations including the low number of accounts, low volume & value of transactions and high cost of setting up an ATM machine. However, banking needs in India to be spread and rural population are demanding easier methods of withdrawing and depositing cash, says a report of KPMG.

IV. The World's Largest Biometric Database:

Aadhaar

Aadhaar is a 12-digit unique identity number issued to all Indian residents based on their biometric and demographic data. The data is collected by the Unique Identification Authority of India (UIDAI), a statutory authority established in January 2009 by the government of India, under the jurisdiction of the Ministry of Electronics and Information Technology, following the provisions of the Aadhaar. It is the world's largest biometric ID system, with over 1.19 billion enrolled members as of 30 November 2017. By linking individuals to their biometric details, India has provided a form of identification for rural Indians, making it easier for them to register for bank accounts, get a driver's license, or receive government subsidies. Registered users need only scan a fingerprint or retina to confirm their identity and access government or even private services. That is at least how the scheme was supposed to work – a voluntary system which would improve the livelihood of rural Indians. Since its inception the scope of Aadhaar has expanded massively – it has become a de facto requirement for participating in even the simplest aspects of daily life. It began as a facilitating tool for certain activities, such as setting up a bank account, and is now mandatory as a form

of identification. In June, the government made it mandatory for banks to link their customers Adhere information with their bank accounts. Any accounts not linked by the 31st December 2017 will be shut down until the account has been linked. SIM cards will also have to be linked to Aadhaar by February 2018 or else be deactivated. Each extension in the scope of the project is explained as boosting efficiency or combating criminality. The government claims that by linking bank accounts to Aadhaar it will be able to prevent money laundering and tax evasion since it will be able to tie every transaction to an individual and every individual to their transactions. By linking SIM cards to Aadhaar, the system would further be able to prevent criminals and terrorists from using unverified mobile phones.

V. Aadhaar-based Biometric Authentication for E-payment: A Recent Development by RBI

In a recent development pertaining to biometrics in India, RBI has mandated that all scheduled commercial banks, urban and state cooperative banks, payment banks, ATM operations and authorized card payment networks migrate to Aadhaar-based biometric authentication for electronic payment transactions by June 30. An action taken under the guidance of finance ministry, RBI intends to improve upon the security as the nation continues to shift into cashless transactions.

VI. The Future of Biometric Identification

According to Tech Sci Research report, "India Biometrics Market by Type, By End Use Sector, Competition Forecast & Opportunities, 2016-2021", the country's biometrics market is projected to grow at a CAGR of around 31% during 2016 – 2021. Growth in the market is anticipated due to wide deployment of biometrics technology across various government projects such as Aadhaar program (UIDAI), coupled with issuance of e-passports & visas, etc. Moreover, rising technological advancements across various end user sectors such as banking & finance, energy & power, consumer electronics, etc., is driving demand for biometric systems in the country. Rising number of ATMs, coupled with growing number of smart phone and internet users is also expected to have a huge positive impact on the country's biometrics market during the forecast period.

VII. Conclusion

Aadhaar undoubtedly has its benefits and thriving market. It would certainly make the delivery of benefits and services to Indian citizens more efficient. It also has the potential to reduce corruption and tax evasion. But the loss of privacy is equally great and it remains unclear as to whether the data will be sufficiently protected. Cyber vulnerabilities of Aadhaar are a bigger concern than the possible commercial misuse of data. In an era when cyber threats are frequent, the major challenge for UIDAI is to protect the data under its control since the biometrics is now an important national asset which has huge ramifications for various government programmes and the banking system .Also the possession of a physical Aadhaar card should not be considered as identification in airports, trains and other places. UIDAI does not include holograms or physical signatures or any other security information in the Aadhaar cards. These drawbacks must be diminished to amplify the effectiveness of Aadhaar card.

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