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Biometrics as an effective technology in attaining Social Security

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ABSTRACT

In this paper a study is made to use Biometrics as a technology to attain social security. It is usually observed that in developing countries, the government has adequate funds and excellent infrastructure schemes for the development of the country, but the issue lies in an effective implementation of the schemes and judicial utilization of the funds in achieving inclusive growth. In this paper various biometric techniques such as face, fingerprint, voice, palm-print, hand geometry, iris and retina scan, voice and DNA recognition are addressed [4]. The main motivation factor for such a study is that, the social security is for the people of the society and here people them self will be acting as a tool is achieving social security as the world is rapidly progressing towards digitization.

1. Introduction

The term biometrics has it origin in greek language which translates into measuring the life, which means various human organs acts as a tool to establish and verify whom one claims to be. Social security can be visualized as a Governmental initiative to enable the underprivileged in the society to attain the basic requirements to attain and lead a decent life. In India various initiatives such as national pension scheme, monthly maintenance allowance for the disabled person who is poor, are some examples to name a few. As the society is slowly but contentiously converting into digitized society, it is the need of the hour to explore efficient and secure methods for the same.

2. Literature Survey

It is believed that the term biometrics was first used in 19th century by Alphonse Bertillon who developed a system known as Bertillonage which was then used to identify the criminals based on the features such as body shape, gesture, scars etc. Bertillonage was one of the early systems which was actionable even though it was not accurate due to initial anomalies. There are few traces back in 14th century in china where finger prints were used in biometric identifications. Dr. Henry Fauld published an article in Nature in the year 1880 where he used fingerprints in the identification of criminals.

3. Biometric Technologies at a glance

In the following section at attempt is made to analyse various biometric technologies which can be used for social security.

Model

The following model [Figure – 1] is the backbone of all the biometric identifications. The algorithm of the model is as below:

- **Step 1: Registration**. In the registration step, for the first time the sample is captured. During this step, three to four samples are captured as single sample may not be sufficient to extract the features as it may contain some noise.
- **Step 2: Feature Extraction**. In the second step, the key feature such as color, texture, orientation, nearest neighborhood, edge, corner, ridge, and shapes are extracted using various image processing technique.
- **Step 3: Storage**. In this stage, the extracted features from second step are orderly stored in the database.
- **Step 4: Verification and Validation**. This is the final step where is a person who claims he/she claims to be is verified and validated in order to make decision whether he is entitled to claim the resources.

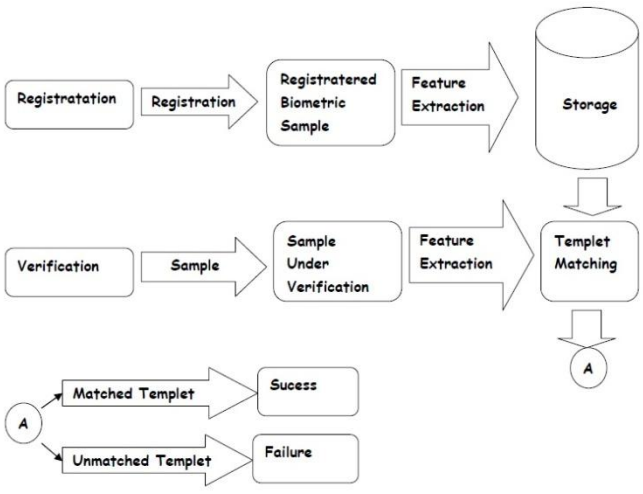

Figure 1.

- **Fingerprints**: It is believed that every human being has a unique finger print which is proved with the accuracy of 99 %. In fingerprints biometric identifications [2], the mains feature captured for the identifications include loops, whorls, minutiae and arches. It is the most widely used and effective biometric identification system for social security available in Karnataka today.

- **Face recognition**: In face recognition system, image of the face is captured through a live camera or it can be captured off-line with the help of digital photographs or videos. The features of face recognition include texture of the skin and color of the skin. It is mainly used in identifying people in the crowded place in order to track unusual and suspicious behavior of the people who may be the potential criminals. The biggest advantage of face recognition is, the system can be used without the knowledge of the person being tracked. Recently this method is being widely used by cellular phones for the identification.

- **Iris recognition**: In iris recognition system, the image of the iris is captured and various mathematical pattern recognition algorithms are used for the verification [4]. Iris recognition is not widely used because of its inherited disadvantage of wide resistance from the society and high false acceptance ratio. Iris recognition was first used in cellular phone identification by Fujitsu, in 2015.

- **Voice recognition**: In voice recognition system voice of various individual are captured and various distinct features of the speech present in voice such as pitch, style, tone, wavelength and frequency are analysed for the match.

- **DNA recognition**: This method is widely used in medical forensics to establish the genetic relationships. Here small tandem of unique repetitive sequences in the nuclus or in mitochondrial DNA are compared.

4. Summary

From the above discussions it implies that all the biometric systems are built around unique characteristics of the individuals where no two individual can have same data. It is also well known fact that these unique characteristics can not be shared unlike passwords. It is also observed that the accuracy of biometric systems is very high compared with other identification systems and more ever these systems are less time consuming while they are in use. They are also user friendly unlike passwords where the people can forget easily. These systems can be used in rural areas where literacy rate is low which in turn back fires the verification system as a whole where illiterates share their passwords with the admins itself and which can be easily misused by the admins. The scaling of biometric systems is very much easy as all the processes involved needs very less change when the user base grow exponentially and hardware rates are contentiously decreasing. From the above discussions, it is very much clear that biometric systems can play a major and effective role in attaing social security through schemes such as public distribution system, social security number and various health insurances initiated by the Government for the needy.

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