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THE ISSUE OF RECOGNIZING A PERSON BASED ON HIS VOICE

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Abstract. Automated voice-based identification and authentication systems are useful for many applications in national security, electoral integrity, cybercrime prevention, and access control. Initially, traditional methods such as names, codes of personal identification numbers, passwords were used for the use of biometric systems in identification. Face, fingerprint, eye color and various other methods have been used for personal identification. This article analyzes voice-based personal identification systems and personal biometrics over the past five decades.

Keywords. PIN, ID cards, DNA, automatic identity verification, automatic identity identification, one-to-many.

Introduction

Personal identification is the process of recognizing an individual based on unique characteristics, the most common method being name recognition. Early personal

identification technologies were developed based on secret knowledge (password and personal identification number (PIN)).

There are two ways to identify an individual. These are biometric and non-biometric identification. non-biometric methods include shared secret knowledge and physical tokens. Secret knowledge is in the form of a PIN code, a password or an answer to some secret question. physical tokens include keys, ID cards, security fobs, driver's licenses and passports. Biometric identification is based on measuring the unique characteristics of a certain person. As such features, fingerprints, eye color, DNA, behavior, etc. can be used as unique features. In addition, a person's voice, his gait, gestures, handwriting, etc., are also considered to be his own characteristics.

Unfortunately, in the traditional way, the password or PIN code can be forgotten or even guessed. Tokens are commonly copied and stolen. In addition, tokens cannot guarantee accurate identification of an individual.[1]

In contrast, biometric data is more secure against copying, tampering, alteration or theft. Also, in terms of the intrinsic security of voice biometrics, a voice fingerprint is a derivative code, it is not an audio recording, and speech cannot be reconstructed using it. Even if a hacker was able to find it, the data could still appear as a string of meaningless numbers that are functionally useless.

Review of related works

Identification of a person cannot be imagined without the biometric characteristics of a person, because this type of recognition system has many advantages. Biometrics is the science of measuring and analyzing human physiological and social data [2]. A person's biometric characteristic refers to the measurement of all his properties and characteristics (phenotype) or specific behavior [4]. These characteristics are divided into statistical and dynamic types based on the physiological characteristics that are common during a person's life. Statistical characteristics are physical characteristics that are usually measured at a certain moment in time, which are characteristic of a person from birth. Examples of these include fingerprints, pupils, and the location of blood vessels. Dynamic characteristics are a sequence of actions lasting a certain period of time, and these characteristics of a person are formed based on the actions that he involuntarily performs in the course of performing certain actions. Examples of dynamic features include signature, voice, and walking movements.

In general, the use of biometrics has emerged as the best way to identify an individual because no two people have exactly the same biometric characteristics [3]. Biometric presence, based on the measurement of physical characteristics, uses characteristics that are common and available to all categories of people. These features are distinguishable, easily assembled and tested, and have high variability to replicate a class of data.

In a voice-based recognition system, the characteristics of a person's voice are based on the physical characteristics of their vocal tract, nasal cavities, and articulators (including the mouth, lips, teeth, etc.) used to produce sound. These characteristics are immutable to the individual, but behavioral characteristics may change over time depending on age, location, medical conditions, or emotional state [4]. Voice-based recognition methods are divided into two types: automatic identity verification (AIV) and automatic identity identification (AII) system [4]. The limitations of conventional

personal identification systems have always been challenging, hence the need to explore new biometric features using the most modern biometric technologies that can be offered. Biometric technologies mean automatic or automated methods of recognizing a person based on his biological or behavioral characteristics. Innate or slowly changing features that are individual for each person, such as fingerprints, face shape, iris, voice, handwriting, etc., can be used as biological markers. Review related cases.

A lot of research has been done on biometric technology for personal identification. Biometric features fall into two main categories. The first category is physiological characteristics based on what a person is, using data (features) obtained as a result of direct measurement of parts of the human body (fingerprints, face, ear, iris, hand geometry, finger veins, etc.) shown in Figure 1. The second category, which is based on behavioral characteristics and actions of a person, uses information obtained as a result of indirect measurement of a person's movement (voice recognition, signature, gait, etc. shown in Figure 2 [5].

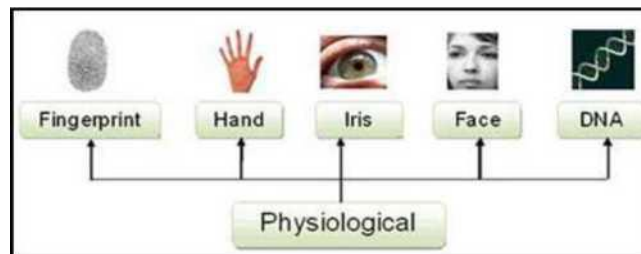


Figure 1 : Selected physiological biometrics in use [3]

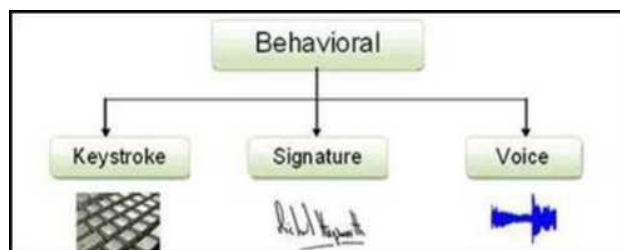


Figure 2: selected behavioral biometrics in use [3]

A biometric authentication system can be classified as an identification or verification system. An identification system is a one-to-many system in which biometrics is used to recognize the identity of several individuals by comparing the information stored in a database. For example, internal affairs may try to identify a person's fingerprint or face from a forensic database. On the other hand, authentication is a one-to-one identification system where biometric data is used to verify identity for access control.[6]

Conclusion

Although biometric technology has some challenges, it is widely used in today's information technology age. The choice of biometric type depends on the measurement of features and user requirement. Other factors influencing the selection of a biometric framework are sensor and device availability, computation time and reliability, cost, sensor size, and power consumption. In addition, cultural bias is also a factor influencing the choice of biometric technology.

Looking at the evolution of technology, moving from paper to electronics and online medical databases to the banking and financial industry as well as social media. Big and personal data must be adequately protected against hacking. However, a voice-based recognition system is considered the perfect biometric for this task, given its speed, efficiency and customer relations.

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VIDEOKUZATUV VOSITALARI AXBOROTLARIGA RAQAMLI ISHLOV BERISH DASTURIY VOSITALARINING YARATILISH BOSQICHLARI

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Annotatsiya: Xavfsizlikni ta'minlash bugungi kunning eng dolzarb masalalaridan hisoblanadi. Shuning uchun videokuzatuv vositalari orqali olingan