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Multi-Biometric System for Authentication Using Human Voice and IRIS

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Abstract- The term Biometrics is becoming highly important in computer security world for authentication. The human physical characteristics like voice, iris and other physical characteristics are known as biometrics. These features are used to provide a secure authentication for computer based security systems. The existing computer security systems used at various places like banking, passport, credit cards, smart cards, PIN, access control and network security are using username and password for person identification but in this system we used voice and iris for identification. The username and passwords can be replaced or provide double authentication by using iris and voice of the biometric features. In this paper different techniques of multi-biometric system are discussed.

Keywords – Biometric, Biometric recognition system, Principles of Biometric Recognition System, Multi-biometric System performance.

I. INTRODUCTION

The biometric is the study of physical or behavioral characteristics of human being used for the identification of a person. These physical characteristics of a person include the features like fingerprints, face, hand geometry, voice, and iris biometric features. These biometrics features can be used to make computer systems more secure for authentication purpose in computer based security systems. The ID can be stolen; passwords can be forgotten or cracked but the physical characteristics of a person cannot be stolen or hacked. The biometric identification overcomes all the above. Additional security barriers can be provided using those characteristic of a person which are unique in nature. The biometric systems offer several advantages over traditional authentication systems. We have presented the voice and iris of biometrics, their applications and the biometric recognition systems. During the last decades, biometrics has been an intensive felid of research and consequently the number of recognition approaches has been proposed by using either single biometric or multiple biometrics. In this paper, we have presented the voice and iris biometrics, their applications and the multi-biometric recognition systems for authentication. It describes multi-biometric recognition system and its various modules. We are presenting the unique biometric systems and their applications. The multi-biometric system performance depending on the matching score which is described from false accept rate (FAR) and false reject rate (FRR). The conclusion and finally references are given.

II. DISCUSSION

In this paper we are presenting multi-biometric recognition systems which are more secure for authentication. It uses the physical characteristics of a person. It has some benefits which overcome the drawbacks of traditional security systems, such as it permits the particular person in their presence only, it cannot be hacked or cracked, it uses the physical features of a person with its uniqueness, it can be used or installed anywhere for security, etc. After this we discuss more about the biometric recognition systems, there uses and performance.

BIOMETRIC

The physical or behavioral characteristics of a human like fingerprints, hand geometry, face, voice and iris are known as biometrics. Each biometric trait has its strengths and weaknesses. The suitable or unique biometric feature of a person can be selected depending upon the application in various computer based security systems.

VOICE

The voice recognition systems have been currently used in various computer systems for authentication. Voice is a combination of physical and behavioral biometrics of a person. The features of person like voice are based on the vocal tracts, mouth, nasal activities and lips movement that are used synthesis of sound. These physical characteristics of human voice are invariant for individuals. The behavioral part of the voice of person changes over time due to age, medical conditions, and emotional state. The speaker dependent voice recognition system is more difficult to design but provides more protection.

IRIS

The iris is a biological feature of a human body. It is a unique feature of human which remains stable over a person lifetime. The iris is the annular region of the eye. The left and right irises of a person can be treated as separate unique identifier. The iris information can be collected by iris image sample. The accuracy of iris based recognition system is more capable. Each iris is believed to be different and even the irises of identical twins are also different. The iris

recognition system has become more users friendly and cost effective but difficult to implement. The iris recognition system have a very low false accept rate (FAR) as compared to other biometrics like finger print, face, hand geometry and voice.

III. LITERATURE SURVEY

Multi-biometric authentication system has been receiving huge attention over the past decade with increasing demands in automated personal identification systems. Among many biometrics techniques, iris recognition and voice recognition systems are the most promising approaches due to its good consistency for personal identification of a person. Most of the commercial iris recognition systems implement a famous algorithm proposed by John Daugman.

MULTI-BIOMETRIC RECOGNITION SYSTEM

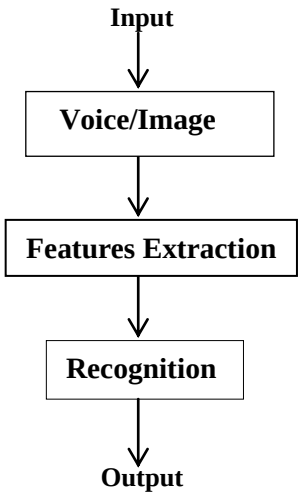

Figure: Block Diagram of Multi-biometric Recognition System

The multi-biometric recognition systems are used to identify the person based on the feature vectors of any one of the biometric that the person possesses. These systems are human authorized systems hence, offer more secure and suitable process of identification. The computer based security systems are used in various commercial, civilian and forensic applications. The biometric system uses the individual's physical characteristics like voice, iris and other features. They are more dependable and secure as compared to other security systems as they provides the access to authorized users in their physical presence. A simple biometric system consists of three modules: Voice or Image sample input, Feature extraction and Recognition as shown in figure. The planned system should be able to collect the biometric image or voice sample form user, to encode the input to get feature vector, to match the features to recognize the person.

VOICE

The voice recognition system is main research area in the today's world for authentication. There are various voice recognition approaches; automatic voice recognition approach. The performance of voice recognition system depends on various factors some of them are speaker variation, surrounding noise, and variation in the tone of the same person, distance and regular variations. The speaker recognition system is most suitable in phone based applications, the entertainment TV channels. The voice recognition biometric systems are used for access control, banking, government offices and entertainment applications, smart cards, PIN and other security purposes.

IRIS

The iris image consists of the colored tissue surrounding the pupil .The iris recognition systems are known as real time, high confidence recognition of person identification for authentication. These systems are used in many applications like passports, activation security, and calculating access to restricted areas at airports, database access and computer login, access to building and homes, border crossings and other government purposes.

IV. MULTI-BIOMETRIC SYSTEM PERFORMANCE

The recognition system accuracy is depending on the image or voice sample, environmental changes, noise, and bad user's interaction with the system. Therefore the two images sample may not be having same characteristics. The biometric matching systems are used to find the matching score between the two image samples. The threshold t is assumed and the matching score is less than t then the image is considered as the different person. Then two errors are measured in terms of false reject (FRR) and false accept rate (FAR).

FAR: The biometric measurement between two persons is same.

FRR: The biometric measurement between two persons is different.

If the system decreases t to make the system more tolerant to input variation and noise, FAR increases. On the other hand if the system increases t to make the system more secure, FRR increases accordingly.

V. CONCLUSION

The multi-biometric recognition systems are the automatic recognition systems, in this paper we uses the physical characteristics of a person like voice and iris. These systems help to minimize the drawbacks of the traditional computer systems which did not use the physical characteristics of a person for authentication. The multi-biometric recognition systems have been proved to be proper and very useful in various applications. Hence these systems are proved highly private computer based security systems.

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