A Review Paper on Biometrics: Fingerprint and Speech Recognition

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Abstract - **With the advancement of automated system the complexity for integration & recognition problem is growing day by day. The impasse is found more compounds when dispensation on randomly varying analog signals such as speech signals or physical traits like fingerprints. This paper contain survey of papers which present a range of approach for the recognition of speech and fingerprint.**

Keywords - Finger-Print minutiae, Recognition Rate, characteristic mining, Back Propagation Neural Network.

I. INTRODUCTION

Biometric identification and biometrics, refers to the process of identifying an individual based on his or her distinguishing oddity. It comprises method for uniquely recognizing humans based on one or more intrinsic physical or behavioral traits [3].
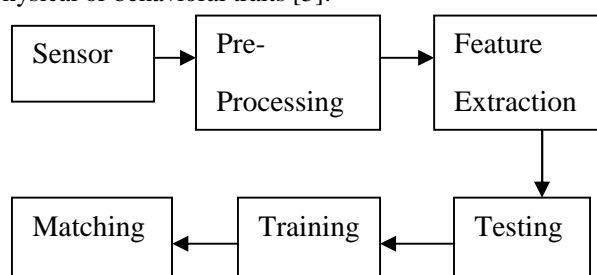

Figure. 1 Basic Block Diagram

Identity authentication becomes a challenging task when it has to be automated with high accuracy and hence with low probability of break-ins and reliable non-repudiation. The user should not be able to deny having carried out the transaction and should be inconvenienced as less as possible, which only makes the task more difficult [7], [12]. In biometrics, there are two distinct authentication methods in addition to they are: 1. corroboration: It is based on a unique identifier which singles out a particular person (e.g. an ID number) and his/her biometrics. It is based on a combination of certification modes. 2. Recognition: It is based only on biometric measurements. It compares these measurements to the entire database of enrolled individuals instead of just a single record selected by some identifier.

This paper seeks to analyses two biometric technologies fingerprint recognition, speaker recognition and their advantages and disadvantages.

II. RELATED WORK

Qijun Zhao et al [12] proposed a method for fingerprint recognition based on adaptive pore model for fingerprint pore exclusion. To distinctively and strongly extort pores, we suggest an adaptive anisotropic gap model, whose periphery is adjusted adaptively according to the fingerprint rim method and period. The fingerprint image is partition into blocks and a local pore model is strong-minded for each wedge. With the local pore simulation, a matched filter is used to extract the pore inside each knob. Testing on a high declaration fingerprint dataset is performing.

Moheb R. et al [6] proposed a method for fingerprint recognition based on approach to image extraction and accurate skin detection on or after web page Also various work of creative writing change like segmentation using Morphological operations, better tapering, false details taking deficient method, minutia splotch with particular bearing in mind the triple branch counting, minutia combination by perished a branch into three terminations, and analogous in the unified x-y coordinate system after a two-step alteration are used in the work.

Manvjeet Kaur et al [7] proposed a method for fingerprint recognition based on a fingerprint verification system using minutiae withdrawal technique. But, this technology still suffers from problems connected with the behavior of poor quality replication. One nuisance besetting fingerprint matching is twist. Bend changes both geometric arrangement and trail, and leads to difficulties in establish a match among multiple impersonation acquired from the same finger tip. Red mark all the details precisely as well as reject false minutiae is one more issue still under look over. This work has joint much method to build a minutia extractor and a minutia matcher.

Zbancioc et al [11] proposed that Linear Predictive Coding (LPC) was good method for speech revealing. Powerful speech analysis technique is very usual for encoding speech at a low bit rate and provides extremely accurate estimates of language restraint, life form disciplined for computing. LPC - based on the statement that speech signal is produced by a buzzer at the finish of a tube. The replica is less efficient for momentary, unwoven or not motionless region.

N.Pushpa, R.Revathi et al [10] proposed two methods for speech recognition based on two popular feature extraction techniques Linear Predictive Cepstral Coefficients (LPCC) and Mel Frequency Cepstral Coefficients (MFCC) have been examine the public who face selection of complexity to use the processor. Such learn in Automatic Speech Recognition is investigated for different language because each verbal communication has its exact features.

Nidhi Desai et al [4] show that, language is the majority natural form of human communication and speech processing has been one of the most inspiring expanses of signal processing. A multilayer view based baseline phoneme recognizer has been built and all the experiment has been carried out using that recognizer. In the current study, attempt has been made to assess the presentation of the speech recognition organization with diverse feature set in quiet ecological form as well as at diverse level of noise.

III. PREVIOUS TECHNIQUES

A. Fingerprint Recognition

It is the most extensively second-hand biometric vigilance. Fingerprint odd behavior can be defined by analyzing the trivia of a individual [8]. Details include sweat pore, distance stuck between ridges and split.

Advantages of finger print recognition
- Subjects have multiple fingers
- Easy to use.
- Systems require less space

Disadvantage of finger print admiration
- Public Perceptions
- Seclusion concern of criminal implications

Technique:
1. *Minutia Extraction:* Minutiae are almost certainly the most significant fingerprint facial appearance. Details are the range of ridge discontinuities of a fingerprint [7]. There are two types of mostly used details which are bifurcations and finish. Details are characterized by their spot and direction (tangent direction at the appropriate crest). Minutia base algorithms valor not be unnatural by reinstallation, but at a close down face diverse difficulty with going round.
2. *Back Propagation Neural Network***:** Back propagation, an contraction for "backward extend of blunder", is a daily means of training artificial neural networks used in union with an optimization method such as gradient descent. The method calculates the incline of a loss function with respects to all the weights in the scheme. The position is supply to the optimization method which in turn uses it to inform the weights, in an effort to diminish the loss function.
3. **SVM:** Support vector machines (SVMs) are used for data group. It is used for mapping facts into a high dimensional gap and for the maximal margin [7].

   Given training vectors,

   $xk \in R^n, k = 1, \ldots, m,$

   in two classes, and a vector of labels

   $y \in R^m$, such so as to,

   $y k \in \{1, -1\},$

   SVM solve a quadratic optimization obscurity.

B. Speech Recognition

Voice recognition technology does not measure the visual features of the character ruins. In voice thankfulness sound sensations of a person is measured [5].

The creature to be recognized is usually required to speak a secret code, which facilitate the verification process.

Advantages of voice recognition:
- Public acceptance
- No contact required

Disadvantages of voice recognition:
- Tough to deal with sensor and channel variances that significantly impact

Techniques:
1. **GTCC:** GTCC algorithm is used for characteristic extraction. It include Fast Fourier revolution used to convert the time domain signal to frequency domain for specter inspection, filtration growth like hamming window which is a type of filter to attenuate the unwanted frequencies and accepts the required frequency to boost up the frequencies and Error rectangular bandwidth which is the process of bandwidth approximation and to increase the strength of the signal in noisy environment.
2. **Neural Network:** Neural networks are composed of simple elements which drive comparable. A neural network can be educated to perform a particular function by adjusting the values of the weights between elements. Network function is determined by the connections between elements. There is activation functions used to produce relevant output [10].
3. **SMO:** Speech Recognition System consists of training part and testing part. So, basically SMO is used for training of SVM part. In particular SMO is designed to speed up the rate of algorithm based on optimization techniques.

IV. CONCLUSION AND FUTURE SCOPE

This paper attempts to provide a comprehensive survey on speech recognition as well as fingerprint recognition and to deliver some progress to this topic and it is challenging and interesting problem in and itself. Speech and fingerprint gratitude has concerned scientist as an important regulation and has created a technological maneuver on society. It is hoped that this paper brings out encouragement amongst the research group of fusion of Biometrics.

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