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DIGITAL RECOGNITION

Jill Kothari[1], Yash Mehta[2], Asst.Prof. Vatsal Shah[3]

[1] IT Department, Birla Vishvakarma Mahavidyalaya Engineering College, jillkothari45@gmail.com
[2] IT Department, Birla Vishvakarma Mahavidyalaya Engineering College, yashmehta.1202@gmail.com
[3] IT Department, Birla Vishvakarma Mahavidyalaya Engineering College, vatsal.shah@bvmengineering.ac.in

Abstract *— Digital Recognition is a process in which one entity is differentiated from another on the basis of parameters like Biometrics, Text, Image, Pattern, Handwriting, and Gesture. Biometrics is used in forensics and secured access. With growth in the needs for embedded computing, it is required that the speech recognition systems are available. Handwriting Recognition lists and clarifies the components that build related to technologies like OCR. Gesture recognition enables humans to communicate with the machine and interact naturally. Pattern recognition is nearly synonymous with machine learning. Patterns are learned from labeled "training" data, but when no labeled data are available other algorithms can be used to discover unknown patterns. OCR is the electronic conversion of scanned images of typewritten or printed text into computer-readable text. It is a method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly, displayed on-line, and used in machine.*

Keywords- *Digital Recognition, TTS, STT, OCR, Biometrics, Gesture, Pattern, Recognition*

I. INTRODUCTION

The speech recognition process is performed by a software component known as the speech recognition engine. The primary function of the speech recognition engine is to process spoken input and translate it into text that an application understands. The application can then do one of two things: The application can interpret the result of the recognition as a command. In this case, the application is a command and control application. An example of a command and control application is one in which the caller says “check balance”, and the application returns the current balance of the caller’s account. If an application handles the recognized text simply as text, then it is considered a dictation application. In a dictation application, if you said “check balance,” the application would not interpret the result, but simply return the text “check balance”.

II. SPEECH RECOGNITION

2.1.Utterances

When the user says something, this is known as an utterance. An utterance is any stream of speech between two periods of silence. Utterances are sent to the speech engine to be processed. Silence, in speech recognition, is almost as important as what is spoken, because silence delineates the start and end of an utterance. The speech recognition engine is "listening" for speech input. When the engine detects audio input - in other words, a lack of silence -- the beginning of an utterance is signaled. Similarly, when the engine detects a certain amount of silence following the audio, the end of the utterance occurs. Utterances are sent to the speech engine to be processed. If the user doesn’t say anything, the engine returns what is known as a silence timeout - an indication that there was no speech detected within the expected timeframe, and the application takes an appropriate action [1].

2.2.Pronunciation

The speech recognition engine uses all sorts of data, statistical models, and algorithms to convert spoken input into text. One piece of information that the speech recognition engine uses to process a word is its pronunciation, which represents what the speech engine thinks a word should sound like [1].

2.3.Grammar

Grammars define the domain, or context, within which the recognition engine works. The engine compares the current utterance against the words and phrases in the active grammars. If the user says something that is not in the grammar, the speech engine will not be able to decipher it correctly [1].

2.4.Speaker Dependency

Speaker dependence describes the degree to which a speech recognition system requires knowledge of a speaker’s individual voice characteristics to successfully process speech. The speech recognition engine can “learn” how you speak words and phrases; it can be trained to your voice. Speech recognition systems that require a user to train the system to his/her voice are known as speaker-dependent systems. If you are familiar with desktop dictation systems, most are speaker dependent. Because they operate on very large vocabularies, dictation systems perform much better when the speaker has spent the time to train the system to his/her voice [1].

2.5.Accuracy

Accuracy is whether the engine recognized the utterance exactly as spoken. This measure of recognition accuracy is expressed as a percentage and represents the number of utterances recognized correctly out of the total number of utterances spoken. It is a useful measurement when validating grammar design [1].

2.6.HMM

Template comparison methods of speech recognition (e.g., dynamic time warping) directly compare the unknown utterance to known examples. Instead HMM creates stochastic models from known utterances and compares the probability that the unknown utterance was generated by each model. HMMs are broad class of doubly stochastic models for no stationary signals that can be inserted into other stochastic models to incorporate information from several hierarchical knowledge sources. Since we do not know how to choose the form of this model automatically but, once given a form, have efficient automatic methods of estimating its parameters, we must instead choose the form according to our knowledge of the application domain and train the parameters from known data. Thus the modeling problem is transformed into a parameter estimation problem [2].

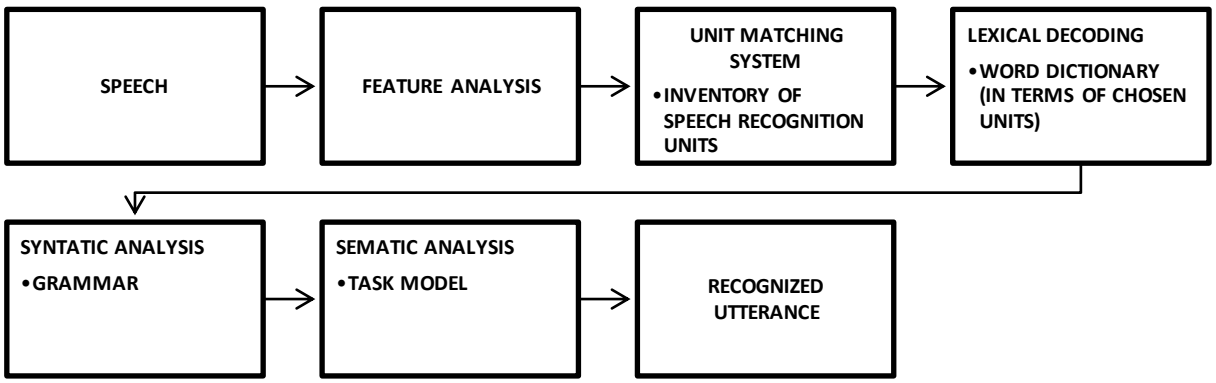

Figure 1. Block diagram of a speech recognizer

III. FACE RECOGNITION

Biometrics is automated methods of recognizing a person based on a physiological or behavioural characteristic. The past of biometrics includes the identification of people by distinctive body features, scars or a grouping of other physiological criteria, such like height, eye colour and complexion. The present features are face recognition, fingerprints, handwriting, hand geometry, iris, vein, voice and retinal scan. Biometric technique is now becoming the foundation of a wide array of highly secure identification and personal verification. As the level of security breach and transaction scam increases, the need for well secure identification and personal verification technologies is becoming apparent. Recent world events had lead to an increase interest in security that will impel biometrics into majority use. Areas of future use contain Internet transactions, workstation and network access, telephone transactions and in travel and tourism. There have different types of biometrics: Some are old or others are latest technology. The most recognized biometric technologies are fingerprinting, retinal scanning, hand geometry, signature verification, voice recognition, iris scanning and facial recognition. A biometric system can be either an 'identification' system or a 'verification' (authentication) system, which are defined below.

3.1.Identification (1 : n)

One-to-Many: Biometrics can be used to determine a person's identity even without his awareness or approval. Such as scanning a crowd with the help of a camera and using face recognition technology, one can verify matches that are already store in database.

3.2 Verification (1:1)

One-to-One: Biometrics can also be used to verify a person's identity. Such as one can allow physical access to a secure area in a building by using finger scans or can grant access to a bank account at an ATM by using retina scan.

3.3 Characteristics

3.3.1.Universal

Every person must possess the characteristic. The trait must be one that is universal and seldom lost to accident or disease.

3.3.2.Invariance of properties
They should be constant over a long time. The trait should not be focus to considerable differences based on age either episodic or chronic disease.

3.3.3.Measurability
This should be suitable for capture without waiting time and must be easy to gather the attribute data passively.

3.3.4.Singularity
Each expression of the element must be distinctive to the person. The characteristics should have adequate distinctive properties to distinguish one person from other. Height, weight, hair and eye color are all elements that are unique assuming a mostly accurate measure, but do not offer enough points of separation to be useful for more than categorizing.

3.3.5.Acceptance
The capturing should be possible in a manner acceptable to a large fraction of the residents. Excluded are particularly persistent technologies, such technologies which is require a part of the human body to be taken or which (apparently) impair the human body.

3.3.6.Reducibility
The captured data should be able of being reduced to a file which is easy to handle.

3.3.7.Reliability and tamper-resistance
The attribute should be impractical to mask or modify. Process should make sure high reliability and reproducibility.

3.3.8.Privacy
This process should not break the privacy of the individual.

3.3.9.Comparable
They should be able to reduce the trait to a state that makes it is digitally comparable from others. It has less probabilistic for similarity and more dependable on the identification.

3.3.10.Inimitable
The trait must be irreproducible by other way. The less reproducible the trait, the more likely it will be reliable [8].

3.4.Process
Face recognition records the spatial geometry of unique features of the face. Main focuses on key features of the face. Face recognition technique is used to identify terrorists, criminals, and other types of persons for law enforcement purposes. This is a non intrusive, cheap technology. In face recognition 2d recognition is affected by change in lighting, the person's hair, age, and if the people wear glasses, low resolution images. It requires camera as equipment for user identification; thus, it is doubtful to become popular until most pcs include cameras as standard equipment. United States used same technologies to prevent people from obtaining fake identification cards and driver's licenses. Face recognition has always been a very challenging task for the researches. On the one hand, its applications may be very useful for personal verification and recognition. On the other hand, it has always been very difficult to implement due to all different situation that a human face can be found. Facial recognition is a form of computer vision that uses faces to attempt to identify a person or verify a person's claimed identity. Facial recognition is including five steps to complete their process.

Step1: ACQUIRING THE IMAGE OF AN INDIVIDUALS FACE; 2 WAYS TO ACQUIRE IMAGE: 1) Digitally scan an existing photograph; 2) Acquire a live picture of a subject.

Step2: LOCATE IMAGE OF FACE: software is used to locate the faces in the image that has been obtained.

Step3: ANALYSIS OF FACIAL IMAGE: software measures face according to is peaks and valleys; focuses on the inner area of the face identified as the "golden triangle", valleys are used to create a face print with their nodal points.

Step4: COMPARISON: the face print created by the software is compared to all face prints the system has stored in its database.

Step5: MATCH OR NO MATCH: software decides whether or not any comparisons from step 4 are close enough to declare a possible match [9].

3.5.Functions of Face Recognition

3.5.1.Face detection
Face detection and indication of any facial zones that are opposite in various guidelines in complex scene.

3.5.2.Facial Pose Estimation
Estimation of the angle to which a face is twisted

3.5.3.Facial part detection
The identification of the positions of face parts for example the centre of eyes, tip of nose, and corners of the jaws.

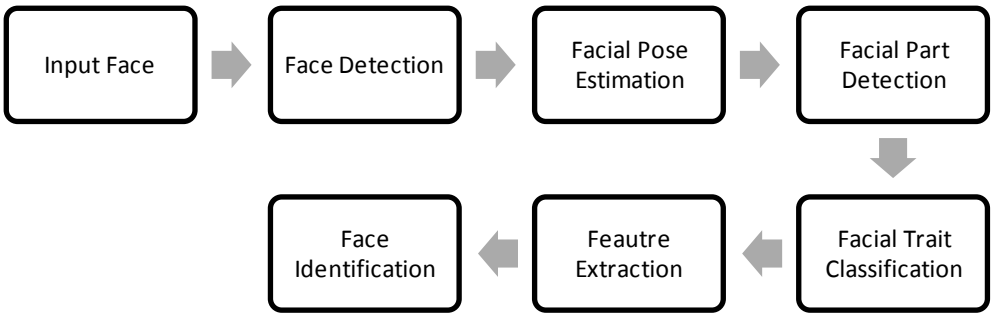

Figure 2. Block diagram of a Face Recognizer

3.5.4.Facial trait classification
The classification of faces by color, gender, civilization, age, appearance and other character.

3.5.5.Face identification
The identification of persons by comparisons with registered people [10].

3.6.Statistical Face Recognition
That faces recognition that is most commonly used in commercial applications. The first step is to define a facial pattern of a specific size. Human vision can judge whether or not a face is present even in a low-resolution image made up of 16x16 pixels. This ability does not rely on color, and human eyes will find faces even in a monochrome image, computer process facial patterns using image of about the same size.

3.6.1.Detection of face to be scanned
The system scans the image from top left to bottom right until it finds this pattern.

3.6.2.Facial pattern classification
Facial patterns are not easy to define. They vary from person to person, and they also change according to the angle of the face and differences in lighting conditions or facial expressions. To overcome this, it is necessary to formulate functions that allow discrimination between facial and non-facial images by applying statistical methods to large numbers of facial and non-facial images. It is possible to achieve powerful pattern classification performance despite the simplicity of the operation involved. [11]

Table 1. Comparison between different types of digital recognition

Characteristics	Fingerprints	Hand Geometry	Retina	Iris	Face	Signature	Voice
Easy of Use	high	high	Low	Medium	Medium	High	High
Error Incidence	Dryness, dirt, age	Hand injury, age	Glasses	Lighting	Lighting, age, glasses, hair	Changing signature	Noise, colds
Accuracy	High	High	Very high	Very high	High	High	High
User Acceptance	Medium	Medium	Medium	Medium	Medium	High	high
Long Term Stability	High	Medium	high	high	Medium	Medium	Medium

IV. CONCLUSION

Biometrics is a rapidly evolving technology that is being widely used in forensics, security; prevent unauthorized access in bank or ATMs, in cellular phones, smart cards, PCs, in workplaces, and computer networks. There are numerous forms of biometrics now being built into technology platforms. It has been implemented in public for short time. There are lots of applications and solutions in biometrics technology used in security systems, which can improve our lives such as: improved security, it is reduced con and password administrator costs, easy to use and make life more secure and comfortable.

But it is not possible to definitely state if a biometric technique are successful run, it is essential to locate factors that's help to reduce affect system performance. The international biometric group Strike System Strikes are: in Fingerprint Dry/oily finger, in Voice recognition Cold or illness that affects voice, in Facial recognition Lighting conditions, in Iris-scan too much movement of head or eye, in Hand geometry Bandages, and in Signature-scan Different signing positions. Face recognition technology are more reliable, non-intrusive, inexpensive and extremely accurate. Currently Face recognition technology is the most challenging recognition technologies.

REFERENCES

[1] http://www.tldp.org/HOWTO/Speech-Recognition-HOWTO/introduction.html

[2] H.Sakoe and S.Chiba, "Dynamic Programming Algorithm O optimization for Spoken Word Recognition,- IEEE TransAcoust, SpeechSignalProcess.ASSP-26,43(1978)

[3] http://en.wikipedia.org/wiki/Handwriting_recognition

[4] Bhatia et al., International Journal of Advanced Research in Computer Science and Software Engineering 3(5), May - 2013, pp. 93-99

[5] Bonsor, K. "How Facial Recognition Systems Work". Retrieved 2008-06-02.

[6] De Vel, O.; Aeberhard, S., "Line-based face recognition under varying pose", Pattern Analysis and Machine Intelligence, IEEE Transactions on Volume: 21 Issue: 10, Oct. 1999, Page(s): 1081 -1088.

