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Application of Artificial Intelligence in Sound Pattern Recognition

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ABSTRACT: The pattern is that entity, which is not clearly defined, like human fingerprints, handwriting, voice and etc. Pattern recognition is mechanism to observe the environment and differentiate the owner and make sound and perfect decisions using machines and computers. The goal of pattern recognition is to make decision making process easier and less complicated. These types of system uses template matching, syntactical methods, statistical methods and neural networks. The paper reviews, pattern recognition system-phases, speech technology, application and modules, for human voice, statistical method.

Keywords: pattern, quality, uniqueness, methods, modules, phases, recognition, artificial intelligence.

I. INTRODUCTION

We humans developing our innovatory skills day by day, so that along with us, machines can also understand its surrounding environment and can take action accordingly. E.g.; there are types of sensors made by humans which can sense each and every motion of us. Every person have its own quality and its uniqueness. That's why it is easy for humans to identify others only by their uniqueness, like by their handwriting, voice texture and etc. But the difficulty comes when someone try to mimic the qualities of other, at that time humans also fail to identify the true one. But, here is the plus point for machine. If machine get strongly trained by the particular person's quality during its training period than its very hard for humans to betray the machine by mimicking, because even if the mimic artist copy perfectly, but there is some mixing of his or her own texture in that, and that's the loop hole for the machine, because at the training time machine analyse each and every small movement and frequency of true owner and store the data in its database, and by using that data and artificial intelligence machine identify the true owner. So it's become very easy for the system to recognise the true owner.

Understanding the texture of the human voice and act accordingly is a part of artificial intelligence. Humans have natural senses, that's why they understand the texture of sounds and understand how he or she is feeling and whose this voice is.

Humans are naturally intelligent and they can easily identify the texture. Most of the kids can understand the texture when they are of 3 and 4 years only. They understand whether the person is angry, sad or happy and who's this voice may be, by his her voice tone. Study of pattern recognition is a part of artificial intelligence, that how a machine can easily recognize the sound pattern spoken by the human and under which environment, by his or her voice texture, and make decision accordingly. But until now, we humans are lacking in designing such a perfect voice recognition system. The best voice pattern matching is can done by the humans only.

II. PATTERN

The pattern is that entity or templates which is uncertain or not clearly define, like humans fingerprints, handwriting or voice signals.Recognition, description, grouping and classification of pattern are the fields that are covered under artificial intelligence or we can say that that important aspect or discipline of artificial intelligence.

There are systems exist which are meant for pattern recognition of human voice, document classification, fingerprints classification and etc. Sensing, feature extraction, selection, decision making, system performance evolution, are the modules of sound pattern recognition system.

Because of increasing level of access use of internet, today there is huge amount of digitized document over the internet like text, video, voice mail and etc., and for efficient archiving and retrieving of data, pattern recognition is the new application domain[1].

III. SPEECH TECHNOLOGY

This technology is known for extracting some text transcript or some meaningful form from the input

speech. Analyses of speech or voice pattern is the transformation of human voice into digital form so that it is suitable for machine to understand it and analyse it. This process is to e reverse at the time when we need to play the speech or recorded voice pattern. Therefore, voice encoding and decoding process is also known as digital speech coding and encoding[2].
There comes the variation in the nature of the speech and voice signal due to local alteration of scale of voice tone, sound intonation from device from which you are recording your voice and etc.

IV. WHY PATTERN RECOGNITON REQUIRED

1. Security purpose, so that it can differentiate between two people and identify the true owner.
2. Sensed the data and commands and process it.
3. Identify the mood of the owner by his or her voice tone and act according to the situation.

V. PHASES OF PATTERN RECOGNITON SYSTEM

1. Train the system, by speaking few words or text to it, so that system can analyse the voice texture, way of pronunciation and tone of the true owner, and store that data about the owner's voice.
2. Measure the bandwidth, resolution, sensitivity, latency and etc., for sensing the data[3].
3. Remove the noise from the background and make voice pattern clear to understand for the further processing.
4. Map the texture of the voice and pattern with the saved pattern and texture and identify the person using more factors, of artificial intelligence.
5. Take decision by the combination of the mapping and its artificial intelligence.

VI. DIFFICULTIES IN DESIGING PATTERN RECOGNITION SYSTEM

- How it sense the environment
- Phonetics/phonology: - extracting the data or pattern and Selection of true owner by the voice texture and tone[4].
- Conversion of voice signal into digital signal, so that system can interpret it.
- Representing the pattern.
- Performance.

VII. APPLICATION OF SOUND PATTERN RECOGNITION SYSTEM

- GPS control navigation system.
- Serrien in iphones
- hi-tech security measure
- interactive robots who live among human beings
- voice search in internet
- voice commands in various system

VIII. APPROCHES FOR PARTTEN RECOGNITION SYSTEM

These are the following approaches for designing the system:

- Template matching
- Syntactic methods
- Statistical method
- Neural networks[5]

IX. STATISTICAL METHOD

This method survey the whole process of investigation from problem formulation, data collection to assessment of result and interpretation[6].
As shown in the diagram, during classification of any pattern system take all the information from the data which is store in the system during the training period. Here, in training period firstly system process the pattern spoken by the client or the owner and try to understand the pattern, next it extract the feature of the pattern like voice texture, voice tone, pronunciations, frequency and etc. After extracting all these feature from the pattern, system store or learn all things about the owner or the client and save it permanently. Now when someone try to access the sound pattern, at that time, system pre-process the pattern enter by the client by taking the data from the system which is save by the system during the processing phase of training period. Next it analyse the feature of the entered sound pattern and check it from those features which are extract by the system during extraction phase of training period.

After checking or mapping all the feature of entered sound pattern by the saved or original sound pattern, finally system reach to its conclusion whether to allow the client to access that sound pattern or decline it. Therefore, all the process of investigation of sound pattern through its determination and classification to result and conclusion is covered by the statistical method.

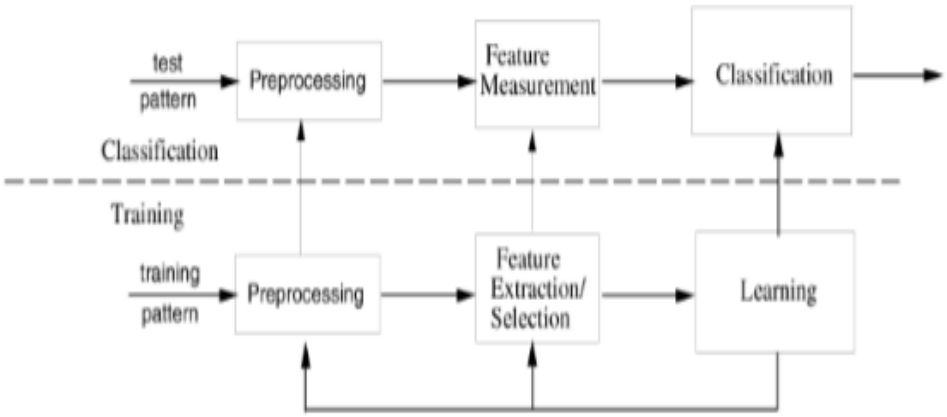

Fig. 1 Model for Statistical Pattern Recognition

X. CONCLUSION

Artificial intelligence play very important role in this voice pattern recognition system, in each and every phase. By using the techniques and fields of artificial intelligence system identify the owner and commands given by the owner. There are many speaker-dependent systems which activate with the human voice only, for e.g. navigation system in car, which work with the human voice, voice dialling and etc. Voice recognition system can proof the good security measure for those who wants that no one can access their data without their permission or without their presence. Or if in future, this feature implemented in robots than for one extent robots can also become that much intelligent like humans to understand the emotions and originality of humans.

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