

VOICEPRINT AND VOICE RECOGNITION

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Voiceprint stands out among other human recognition/verification technologies as one of the most precise. Pre-commercial and commercial off-the-shelf voice-recognition methods find their way into both civil and military applications. The future of voiceprint application range is truly amazing.

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Among other human-recognition methodologies, voiceprint stands out as the unique one, surpassing fingerprints or retina / iris-based identification. The latter verifies just one parameter, no matter how technically unique, whereas voiceprint checks at least half a dozen characteristics pertaining to an individual to counteract forgery of any kind. Biometrical verification of a person's voice is therefore considered one of the most needed security technologies for both military and civil purposes.

Intensive research of voice biometrics to the purpose of intercepting voice messages and tracing alien activities started as early as during the Second World War, in particular in the US [3].

Currently, voiceprints (spectrograms) are extensively used by private detectives and other experts outside academic and scholarly communities. Voiceprints have also found their way as a speaker identification method into some courts, including the military ones, in a number of European countries and in US and Canada.

Studying voiceprints is typically done in specialized laboratories by using functional magnetic resonance imaging (fMRI). The principal drawbacks of this technology include its overly sophistication and high cost. One of the cheaper alternatives is the so-called "ear-witness" lineup (or "voice parade"). This is the auditory equivalent of what the police call an "eyewitness lineup", and use extensively.

Authenticity judgments of listeners with limited training in speech recognition are usually viewed as rather unreliable, so professional phoneticians are typically engaged for purposes of conducting auditory analysis. For example, accent authenticity verification must be based on rather fine phonetic details, so a

well-trained expert with sophisticated accent / dialect exposure must be called for. At the same time, when too many distinctive features of a language are detected, the accent or rather lack of it may be judged as assumed, phony, and ultimately non-authentic.

Apart from laboratory and auditory methods of speaker identification / verification, all stakeholders in this area employ the amalgam of criminal acoustics techniques and cutting-edge developments in phonetics and phonology.

Speaker identification / verification via voiceprint study is now a well-established area of applied research where phonetic sciences and engineering go hand-in-hand.

In both civil and military applications, speaker identification/ verification through voiceprints serves the primary purpose of ensuring safety and security. To this purpose, the cost of technology is often of lesser importance than the focal objective of secure and reliable operation. Once the military-initiated research, developments and achievements permeate among the founding-father areas of responsibility, they naturally spill-over into numerous commercial-off-the-shelf applications.

Major military-purpose areas of speaker recognition/ verification through voiceprint comprise, but not exhaust, the following: (i) command and control; (ii) communications; (iii) computer software and access to information; (iii) (counter) intelligence/ reconnaissance; (iv) training; and (v) multinational forces. [2].

Civil applications of voice/ speaker recognition technologies include, for example: (i) (re)playing simple information; (ii) calls management and / or filtering; (iii) automated voice / speaker recognition for verification purposes, (iv) directed dialogue / calls management to offset peak traffic [1].

In future, potential extensive use awaits the following speech-recognition techniques:

- a) automated message cross-language interpretation;
- b) transformation of human messages into “speaker-independent” format;
- c) automated generation of multilingual voice-managed glossaries;
- d) augmented speech signal quality irrespective of noise / interference / jamming;
- e) voice signal secure transmission with immediate decoding / deciphering at both ends of communication channel;
- f) computer-assisted FL training.

Literature

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