Forensic Tape Analysis, Inc.

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TASK DESCRIPTION
VOICEPRINT IDENTIFICATION

Voiceprint identification can be defined as a combination of both aural (listening) and spectrographic (instrumental) comparison of one or more known voices with an unknown voice for the purpose of identification or elimination. From 1967 until the present, more than 7,000 voice identification cases have been processed by certified voiceprint examiners.

Voice identification is part of a larger forensic role known as acoustic analyses, which involves tape filtering and enhancement, tape authentication, gunshot acoustics, reconstruction of conversations, and the analysis of any other questioned acoustic events.

THEORY

The fundamental theory for voice identification rests on the premise that every voice is individually characteristic enough to distinguish it through voiceprint analysis. The first factor in determining voice uniqueness lies in the sizes of the vocal cavities, such as the throat, nasal and oral cavities, and the shape, length and tension of the individual's vocal cords located in the larynx. The likelihood that two people would have all their vocal cavities the same size and configuration and coupled identically appears very remote.

RELIABILITY STUDIES

Several studies have been published evidencing the ability to reliably identify voices under certain conditions, and a Federal Bureau of Investigation survey of its own performance in the examination of 2,000 forensic cases revealed an error rate of 0.31 percent for false identifications, and 0.53 percent for false elimination's. (See Koenig, B.E., 1986, Spectrographic Voice Identification: "A Forensic Survey", Journal of the Acoustical Society of America, 79:2088-2092).

PROCEDURAL GUIDELINES:

To facilitate the visual comparisons of voices, a sound spectrograph is used to analyze the complex speech waveform into a pictorial display on what is referred to as a spectrogram. The spectrogram displays the speech signal with time along the horizontal axis, frequency on the vertical axis, and relative amplitude indicated by the degree of gray shading on the display. The

spectrograms serve as a permanent record of the words spoken and facilitate the visual comparison of similar words spoken between and unknown and known speakers' voices.

If a suspect refuses to cooperate with the investigator, a court order may be acquired compelling the suspect to produce voice recordings for the purpose of comparison. Courts have repeatedly held that requiring the accused to submit voice exemplars for the purpose of comparison for identification or elimination does not violate the suspect's Fifth Amendment rights. The investigator is wise to request that the court order specify, in detail, that the suspect give a sample of his or her voice, repeating the phrases of the questioned call in a natural conversational voice (or in a similar disguise, if that is the case) and that such samples shall be given at least three times and to the reasonable satisfaction of the investigator. Voice speech samples obtained should contain exactly the same words and phrases as those in the questioned sample because only like speech sounds are used for comparisons. Because the voice, like handwriting, is dynamic and variant, several samples of the verbatim spoken phrases are desired for analysis. The evidence should be shipped in a secure container that will prevent the evidence from damage. It is important to provide the examiner with information regarding the recording method used, the number of calls involved and any other information that may assist the examiner in the examination of the evidence.

Visual comparison of spectrograms involves the examination of spectrograph features of like sounds in terms of time, frequency and amplitude parameters. Special aural comparison tapes are prepared facilitating comparison of psycholinguistic features via short-term memory. Aural cues compared include resonance quality, pitch, temporal factors, inflection, dialect, articulation, syllable grouping, breath pattern, disguise, pathologies and other peculiar speech characteristics. Several state appellate and supreme courts have admitted the evidence, as have four of five federal apppellate courts. The United States Supreme Court has refused to review and decide the three cases brought before it. While the admission of aural-spectrographic voice evidence continues to be decided in various courts, the method continues to be a very important tool in the forensic arsenal, and in the adjudication of criminal and civil cases.