B24 Audio Authentication: A Comparative Analysis of Same-Room Recordings vs. Speakerphone Recordings

Jordan R. Graves, BS, 300 E 17th Ave, Apt 1022, Denver, CO 80203; Carl R. Kriigel, MA, 568 Kings Walk, Douglasville, GA 30134; and Matthew E. Graves, MFS, Geoffry Smith, BS, and Garold Warner, BS, U.S. Army Criminal Investigation Laboratory, 4930 N 31st St, Forest Park, GA 30297*

After attending this presentation, attendees will understand a methodology for examining recorded voices, with and without telephone transmission effects, to determine if conversations were recorded under conditions in which they were allegedly created.

This presentation will impact the forensic community by demonstrating a process to determine the recording conditions of an audio signal or dialogue. It will also demonstrate some ways to manipulate one set of recordings to attain similar properties of another. Analyzed material will include audio signals and speech recorded from the same room and between telephonic devices, via analog and digital audio recorders.

This research was inspired by an actual case that pertained to a conversation recorded on a microcassette. The recording was allegedly made by the victim using the recorder held to the earpiece of a cellular phone during a conversation during which he was threatened. Investigators reviewed the microcassette tape and questioned the authenticity of the recording as it sounded rehearsed. The recording was submitted for analysis to determine if the recording was produced as alleged, or if both parties were actually in the same room and possibly reading from a script.

This research will also explore techniques used to alter the characteristics of a same-room conversation to appear consistent with a two-location telephonic conversation. The ability to differentiate between recorded conversations occurring in the same room and those transmitted between telephonic devices can be an essential element of an audio authentication examination. Determinations concerning the authenticity of questioned recordings have the potential to change the dynamic of an entire case or investigation. Since a purely aural designation of tonal quality can be a subjective assessment and may vary from examiner to examiner, it is significant to point out the statistical, objective approach to measurement and characterization of the recordings used for this presentation. This approach provides a more reliable and statistical evaluation process is desired.

For this research project, several test recordings were made over different types of cellular and land-based phones, using a variety of recorders. To account for and quantify the properties of chosen recorded signals, these test recordings were analyzed using forensic audio tools, signal processors, and forensic phonetic software. The recordings were characterized by their reported correlation coefficients and mean quadratic difference values, as well as the average frequencies and standard deviations of each voice formant in each recording scenario. The comparison methods allowed for an established baseline to identify the differences between same-room and speaker phone recordings, which in turn provided a clear goal for the next element of the project.

Utilizing similar audio tools and techniques, researchers attempted to duplicate the qualities of a speaker phone recording with a manipulated same-room recording. After manipulation, the newly generated recordings were compared against same-room and speaker phone recordings of the same voice, using the same means as outlined above. A final determination was then made in regard to the effectiveness of the manipulations, and whether they rendered the forged recordings more or less similar to either scenario. This presentation will highlight the preparation, execution, and results of this study.

*The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

Audio Comparison, Audio Voice Analysis, Audio Authentication

 ** Presenting Author*