W12   Forensic Digital Multimedia: Enhancement and Authentication

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After attending this presentation, attendees will understand the important components to digital audio and image/video enhancement and to digital audio and image/video authentication.

This presentation will impact the forensic science community by providing a short training opportunity on the concepts of multimedia enhancement and authentication in: (1) digital audio enhancement; (2) digital image and video enhancement; (3) digital audio authentication; and, (4) digital image and video authentication.

Media authentication has become more important than ever before. Often a crucial element discovered during investigations, digital media has become a commonly contested form of evidence. Even the trustworthiness of press photography has become questionable due to manipulation. With the proliferation of digital media manipulation tools, media manipulation is a dangerous reality in the modern digital society.

Digital media authentication is a growing field of research that seeks to determine the validity of digital multimedia by investigating known signatures within a file's data combined with signal analysis of coding and compression effects on audio or image data. This workshop will discuss the media authentication process providing the user with methods of authenticating both image and audio. It will also demonstrate the incorporation of multiple tools and techniques into unified frameworks appropriate in forensic examinations where reducing examiner bias and error is crucial.

The goal of this workshop is to provide an overall view of conducting comprehensive digital multimedia examinations which rely on the results of multiple analyses to enhance recordings or to formulate an ultimate finding or opinion. During the discussion of digital multimedia enhancement, common image and audio filters which can be useful in processing recordings to increase intelligibility or visual details will be discussed and presented within their respective order of operations. This order is based on the effects of sequential processing that have been researched and optimized into an order which provides optimal results.

Multimedia authentication analysis frameworks, focusing on different aspects of image/audio creation to determine both source and authenticity will be presented. Global analysis investigates the validity of multimedia as whole while local analysis determines temporal or pixel level manipulation. Demonstration of how both container and content analysis can be used to determine authenticity of recordings as well as the purported source. Container analysis exploits characteristics of the multimedia file format which can be used to establish media provenance. Content analysis will cover both global and local analysis.

Multimedia Authentication, Multimedia Enhancement, Digital Evidence