



Forensic Tape Analysis, Inc.

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TASK DESCRIPTION

VIDEOTAPE ENHANCEMENT / AUTHENTICATION

There are many situations where a surveillance camera or the work of an amateur videographer has recorded important information. Occasionally because of deteriorating lighting, malfunctioning equipment or poor technique, the recorded images are less than we need in order to be useful as evidence. This is when Video Enhancement through image processing can solve the problem.

Video Enhancement is a term that describes a number of different processes used to correct for poor lighting or technique as well as some types of camera or recording equipment failure. Never, in our application of Video Enhancement, is the original recording damaged or altered in any way.

In most circumstances we will identify the significant degraded area and then capture the best possible reproduction of that area into the computer for enhancement purposes. Now begins the application of various techniques to improve the captured image of the captured image. Some of these techniques are quite complex, some are as simple as contrast and brightness adjustments.

When we start any enhancement task, it is absolutely imperative that we start with the best possible image. This means the original recording. We have all seen the photocopy of a photocopy of a photocopy... that is barely readable. It is readable at all because we are using the most sophisticated image processing system known (our eyes, visual cortex and brain) and there are a limited number of valid shapes to interpret (upper and lower case letters and numbers). When we are dealing with an image, we do not have the advantage of interpreting only "a limited number of valid shapes". We become much more sensitive to the degradation in the image caused by even a first generation copy.

A first generation copy can put us so far behind the quality of the original that we can waste a great deal of processing time just to get back to the same level of clarity as the original. In addition, each copy loses information and adds noise to the image. This lost information is data that we can never have available to us for processing and in cases of marginal images can easily make the difference in identification or elimination of a suspect in a processed image.

Incidentally, it is important to realize that the original recording will be degraded by continuous replay. Note the difference between your favorite brand new video and the same one rented from your local video store. Replay of an important section of video tape as few as 5 to 10 times can cause obvious, permanent and unrecoverable loss of image quality.

Authentication of any type of recording is a verification that it is a “Trustworthy” representation, in time, sequence and content, of the event recorded. Even a simple press of the “pause button” can be significant if it is determined that a period of time long enough for the scene to be altered, in meaning or content, has elapsed.

Video Tape Authentication requires the examination of the original tape and recorder that made that tape. We have extended the technique of using magnetic development, documented in the Watergate examination, from audio to video recording. The magnetic marks left by the recorder and frequently not part of the visual image itself are examined to determine:

If the recording is the original or a copy

Which buttons were depressed in the process of making that recording and where they are relative to the video images being presented

If part of the original recording was masked by recording over it at a later time

If the recorder presented is actually the one used to make the tape being evaluated

Which of a limited number of recorders was used to make a video recording

The answers to many other case specific questions

If the original recorder is not available, we still may be able to determine if more than one recorder was used to make the video tape, but the ability to specify that a particular recorder was involved is lost.

While authentication of a copy is not possible, if this is the best evidence or simply all that is available, some of the information about the making of the original recording can survive the copying process. This may be enough information to allow us to suggest that certain recording events probably occurred.