

DATE: November 15, 2022

CASE: Dauphin County Court of Common Pleas #2017-CV-06699-DV, #1336 DR 17

TO: Robert Bauchwitz
23 Harlech Drive
Wilmington, DE 19807

FROM: Nick Barreiro, BAC, AVFA, DIVRT
Chief Forensic Analyst
Principle Forensics

SUBJECT: Forensic Image Authentication

Introduction

My name is Nick Barreiro and I am a certified Audio Video Forensic Analyst and the founder of Principle Forensics. I am also an FBI-trained member of the Digital Imaging and Video Recovery Team. Prior to becoming a full-time Forensic Analyst, I spent 15 years as a law enforcement officer in California. I worked for the West Sacramento Police Department as a Patrol Officer, Field Training Officer, Detective, and Sergeant. While working as a Detective in the Investigations Unit, I handled all media forensics including collecting, enhancing, and analyzing video footage from surveillance cameras, cell phones, traffic cameras, body-worn cameras, and dash cameras.

I have received advanced training from the Federal Bureau of Investigation, the Robert Presley Institute of Criminal Investigation, the California Department of Justice, the Central California Intelligence Center, the Department of Homeland Security, Resolution Video, and the University of Colorado Denver. I hold a bachelor's degree in Communications from the University of California at Davis.

My experience from both the public and private sector has given me the opportunity to examine hundreds of recording devices, and enhance and analyze thousands of recordings and images, from simple slip-and-fall cases and minor traffic accidents to complex investigations such as homicides and officer-involved shootings. I have testified hundreds of times in criminal cases, civil cases, arbitrations, and depositions.

Background

On October 19, 2022, Principle Forensics was contacted by Robert Bauchwitz regarding forensic image authentication. Mr. Bauchwitz requested forensic analysis of 8 photographic prints to determine if the photographs were authentic original images. On October 28, 2022, Principle Forensics received the prints via UPS next day air.

Evidence

See Appendix A, Figure 1 – Figure 8 for scanned copies of the images that were analyzed.

Analysis

Critical Examination

Critical examination is a detailed, repeated visual review of the evidence. This is always the first step in any forensic analysis. In this case, the physical photographs, and the paper they were printed on were critically viewed at various levels of magnification.

Date Stamp

Images 1 – 6 appeared to have been captured by a digital camera while images 7 and 8 appeared to have been originally captured on film. Images 7 and 8 contained an overlaid yellow/orange date stamp in the lower right corner of the photographs. Point-and-shoot film cameras commonly added this type of date stamp to the film when the image was captured. The date indicated on image 7 and image 8 was “11 8’02”, however this date may or may not have been accurate as it would have been dependent on the internal clock of the camera capturing the images. The presence of the date stamps in image 7 and image 8 suggest that these photographs were originally captured on film. See Appendix A, Figure 9.

Paper

There were multiple indicators that the photographic prints in question were not processed by a professional photo lab. The images were printed on what appeared to be standard 8.5” x 11” 20lb copy paper. There were no observable watermarks or manufacturer’s branding printed on either side of the paper. See Appendix A, Figure 10.

Printing

There was an unprinted white border, between 1/8” and 3/8”, around each of the photographs. This type of margin is not commonly found in professionally processed photographic prints, but is usually required when printing with a printer or copier designed for home or office use. The printed surface had a sheen indicative of a powdered toner, like those used in color copy machines. See Appendix A, Figure 11.

Clipping

Clipping is the result of capturing or processing an image that contains intensity levels that fall outside the minimum or maximum intensity which can be represented. The clipped area of the image will typically appear as a uniform area of the minimum or maximum brightness, losing any image detail in that area.

All of the analyzed images in this case suffer from clipping. Images 1 – 6 contained minimum intensity clipping in the dark areas of the images. Images 7 and 8 contained both minimum intensity clipping in the dark areas, and maximum intensity clipping in the bright areas. The clipping may have been introduced when the images were captured, processed, printed, or copied. See Appendix A, Figure 12.

Cropping

The standard aspect ratio for 35mm film cameras is 3:2. The most common aspect ratio in digital photography is 4:3. To fit the evidentiary images onto a sheet of paper with an 11:8.5 ratio, the original images likely would have been cropped. See Appendix A, Figure 13.

Cropping an image in order to print full-page photographs, like the analyzed images, requires removing the portion of the photograph that extends beyond the bounds of the printable area of the paper. Removing a portion of the image is a destructive process and the lost detail cannot be recovered without the authentic original image.

Artifacts

There were matching artifacts in the same location on each image. Approximately 3 1/4" from the left edge of the paper were very fine red and green vertical lines in all of the analyzed images. See Appendix A, Figure 14.

Since image 7 and image 8 appeared to have been taken with a different camera than the other photographs, and these lines were consistent in each photograph, these artifacts were likely introduced sometime after the images were captured. The artifacts could have been created when the images were processed, printed, or copied (post-processing).

Anomalies

All of the images in question contained two white circles near the right edge of the paper. See Appendix A, Figure 15.

The white circles were approximately 1/4" in diameter and 2 3/4" apart, the same specifications as a 2-Hole Punch like the one pictured in Appendix A, Figure 16. These circles appeared to be the result of holes being punched into previous prints of these images.

Similarly, each image appeared to have two small defects, approximately 1/2" apart, in the upper right corner of the image. These defects appeared to be the result of previous prints being stapled at this location. See Appendix A, Figure 17.

The presence of these anomalies minimally suggests that the images in question are color copies of earlier prints that had been hole-punched and stapled -- far from authentic original images.

Conclusion

Based on the forensic analysis of the imagery in this case, I find the following to a high degree of forensic certainty:

1. The analyzed photographs are not consistent with authentic original images and should not be relied upon as an accurate record of the subject pictured.
 - a. The photographs were printed on copy paper using powdered toner, resulting in a loss of detail.
 - i. Digital photographs printed onto copy paper will never retain the original detail of the authentic digital image.
 - ii. Film photographs printed onto copy paper will never retain the original detail of the authentic film image.
 - b. Details in portions of the images have been lost due to clipping.
 - i. All of the analyzed photographs contained some level of clipping, resulting in image loss.
 - c. The photographs appeared to have been cropped to fit the page, resulting in image loss.
 - i. The aspect ratio of the images is not a ratio commonly found in digital or film photography.
 - d. Digital artifacts were introduced into each of the analyzed images due to post-processing.
 - i. The matching artifacts were introduced sometime after the images were captured.
 - e. The provided images were copies of previously hole-punched and stapled prints.
 - i. The damage from the hole punch and staples was clearly visible in each of the prints.
2. Whether the images were originally captured digitally or on film, copies of cropped, printed, hole-punched, and stapled photographs could never be considered authentic original evidence.
 - a. Inauthentic images introduce the possibility of tampering and therefore should not be used as evidence.

Further details regarding how the images were manipulated could be discovered if the authentic original digital files and/or film negatives were available for examination.

I reserve the right to amend this report if additional evidence becomes available.

I hereby certify that this report is a complete and accurate statement of all my actions and opinions, and the basis and reasons for them, to which I will testify under oath.



Nick Barreiro, BAC, AVFA, DIVRT
Chief Forensic Analyst

