

THE SEARCH FOR TRUTH: ANDROID PHONES AND SCREEN CAPTURED VS
CAMERA CREATED IMAGES

by

ERIKA THURMAN

B.S., Mass Media, Southeast Missouri State University, 2009

A thesis submitted to the
Faculty of the College of Arts & Media of the
University of Colorado in partial fulfillment
of the requirements for the degree of
Master of Science
Media Forensics Program

2023

This thesis for the Master of Science degree by

Erika Thurman has been

approved for the

Media Forensics Program

by

Catalin Grigoras, Chair

Greg Wales

Jeff Smith

Date: December 16, 2023

Thurman, Erika (M.S., Media Forensics Program)

The Search for Truth: Android Phones and Screen Captured vs Camera Created Images Thesis

directed by Associate Professor Catalin Grigoras

ABSTRACT

This thesis will examine the different information found from Android native camera created images vs screen captured images to detect indications of alteration for the purpose of digital image analysis and authentication.

The form and content of this abstract are approved. I recommend its publication.

Approved: Catalin Grigoras

DEDICATION

I dedicate this thesis to all of those who have supported this educational journey. This has been an eye-opening, challenging, and truly rewarding experience as well as a launch pad into the forensics field.

ACKNOWLEDGEMENTS

I would like to acknowledge my NCMF professors and staff, especially my committee members for their insight, instruction, and guidance throughout this program as well as the thesis process. Also, thank you to Leah for your much appreciated assistance. I couldn't have done it without you all.

TABLE OF CONTENTS

CHAPTER

I.	INTRODUCTION	1
	Previous Research	1
II.	MATERIALS	4
	Data	4
III.	METHODOLOGY	6
	Methods	6
IV.	RESULTS	8
	Results	16
V.	CONCLUSIONS.....	17
	Future Research	18
	REFERENCES	19
	APPENDIX	20

LIST OF TABLES

TABLE

1. Hand Sanitizer Bottles.....	8
2. Ceiling Fan	10
3. Trash Can	13

LIST OF ABBREVIATIONS

SWGDE - Scientific Working Group on Digital Evidence

FIAS - Forensic Image Analysis System

DSLR - Digital Single Lens Reflex

ASTM - American Society for Testing and Materials International

CHAPTER I

INTRODUCTION

Every day, people are utilizing their mobile devices to capture the world around them. Whether for photographic, news, or even cataloging purposes, smartphones are essential parts of our day to day lives. Smartphone cameras in some cases are taking the place of traditional Digital Single Lens Reflex (DSLR) cameras due to ease or convenience. Our phones are also become recording implements for the world we encounter. The images captured on a smartphone, iOS or Android, have been used in law enforcement cases and judicial proceedings as evidence. Yet, forensic examiners are confronted with the challenge of verifying authenticity when it comes to smartphone images. Android image authentication in relation to screenshots vs phone installed camera images and what alteration clues can be deduced from these types of images is an under investigated focus. The topic of my research is image analysis in regards to Android native camera images vs screen capture images and the detection of alteration artifacts.

Previous Research

The study of mobile device forensics is an exercise in learning in an ever-changing field. One aspect of mobile device forensics that is beginning to get more attention and thereby more critique, is digital imaging and the ability to separate manipulated from original images. Liu et al. (2013) showed how, due to the role digital images play in investigations and public trust, being able to identify not only altered images from unaltered images is crucial, but also pinpointing the source of the image. This fit very well with the topic because due to mobile phone cameras being a convenient and capable alternative to traditional cameras, most digital images are created,

edited, and shared via these devices. The need to greater scrutinize the authenticity of such images is fast becoming essential for the forensic community.

As previously mentioned, digital images are being used in legal and law enforcement cases as evidence, prompting the necessity of ensuring that forensic experts can identify integrity issues with images. To achieve that consistently, guidelines and standards are required to be adhered to for the entire forensic community. In the American Society for Testing and Materials International (ASTM) Standard Guide for Forensic Digital Image Processing, the framework for conducting digital image processing investigations is explained succinctly along with how obstacles and outside factors may play a role in the process. Directives on such matters as image enhancement, restoration, and compression standards along with standardized operating procedures are all clearly detailed and outlined to prevent confusion for examiners. (2022).

As research was being conducted on Android image authentication, it was realized that it was unknown what, if any parameters or best practices, were established for the community to adhere to when conducting necessary examinations. The Scientific Working Group on Digital Evidence's (SWGDE) Best Practices for Maintaining the Integrity of Imagery was an immediate source of clarification on how to address this issue. In examining digital images credibility, the article was very explicit in defining such terms as authentication and provenance, but also acknowledging challenges forensic experts may face when seeking to maintain image integrity in the field and investigations. Expectations of proper documentation, watermarking, and methods for evaluating accuracy were provided (2017).

As a continued assessment of the research already conducted on smartphone camera and screen captured images, there was difficulty finding published work pertaining to the exact subject perspective. Next, the subject was widened to include just digital images and see what

similarities and correlations were encountered. Popescu et al. (2005) came to notice due to the analysis of how statistical information can be a more effective technique in digital image authentication than previously thought, especially in the absence of watermarks, signatures, or other tamper protection methods. This article pointed out authentication implements that can be used on most smartphones, specifically Android devices.

CHAPTER II

MATERIALS

The study would employ 03 Android phone brands and 1 model per brand (depending on available devices). Anticipated devices to be used in the study would be:

- OnePlus 7
- Samsung Galaxy A11
- Google Pixel 7 Pro

This would allow a comparison between different leading Android brand devices, the similarities, and differences in what is offered in image generated information. This will also allow a comparison of devices based on installed photo elements. Another advantage of the amount devices and amount manufacturers is the ability to critique the changes in the Android smartphone landscape in regard to settings and cameras.

The research would utilize Google Mail or Gmail to export the images from the devices. The programs Hash Checker as well as Microsoft PowerShell would be used for hash verifying means. The program Forensic Image Analysis System (FIAS) is available via the University of Colorado Denver MSMF Remote Desktop.

Data

The focus of this research is to identify authentication indicators for Android installed camera derived images as opposed to screenshot images from Android devices. The research would utilize Android smartphones from 2 different manufacturers. First, on each device, compare the preinstalled camera/image settings along with what alterations are available.

Camera settings such as: Ultra Shot HDR, scene detection/smart scene recognition, location, etc. Image identifying information such as: serial number, Android version, build number, and camera type will be recorded for each device by manufacturer and model/series. Create SHA256 image hashes utilizing the Hash Checker application available for download via the Google Play Store on each device for each image created.

Next, with each device, capture images of the same subject with the same standard settings (no flash, no timer, wide-angle lens) and save the image as well as record the generated image information. Then, with each device, generate screenshot images of the same subject while recording what, if any, alteration options are available and record the image information created for each device. After accumulating the data for camera created images and screen captured images, compare while focusing on definitive delineations between the two types of created images.

CHAPTER III

METHODOLOGY

The experiment would start with collecting all the various smartphones. Once the devices are gathered, take a picture with each phone utilizing the preinstalled camera application of the same subject to compare photo information. The critical data to collect include image identification, image resolution, file size, if the maker and model of the device is identified, and the image histogram. Next, screenshots need to be created from the camera created image on each device. The process to create a screenshot on most Android devices is done in one of two ways, either pressing the power/lock screen button and the volume down button simultaneously or press and hold the power/lock screen button for a few seconds, then tap screenshot. Once the screen captures are created on each device, compare the screenshot image with the camera created image for variances and record the findings.

Methods

When considering which email services to use, Google Mail or Gmail was selected due to uniformity across devices and brand manufacturers. Next, with each separate device, select the screenshot of the camera image taken in the previous segment of the experiment and export it via email with Google. Once the exporting process has been completed, access the image information, compare the screenshot image with the downloaded exported image for variances and record the findings. Beyond critiquing just the images themselves for alteration, the research would also collect information on image identification, image resolution, file size, hashes, and the image histogram (if possible). Lastly, compare the available image information via the device installed gallery application (if possible) and Google Photos. A table would be generated for

each image subject, showing image name, whether camera or screenshot created, where information was gleaned and available information.

CHAPTER IV

RESULTS

The experiment began with the Samsung Galaxy A11 smartphone. One image taken and analyzed was of hand sanitizer bottles.

Table 1. Hand Sanitizer Bottles


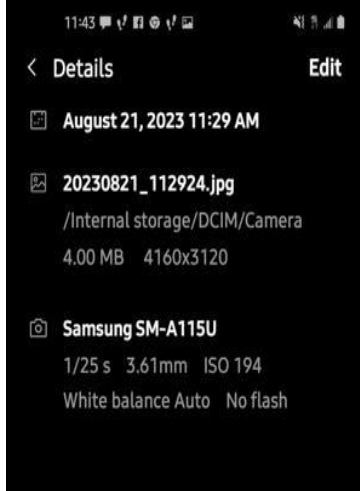

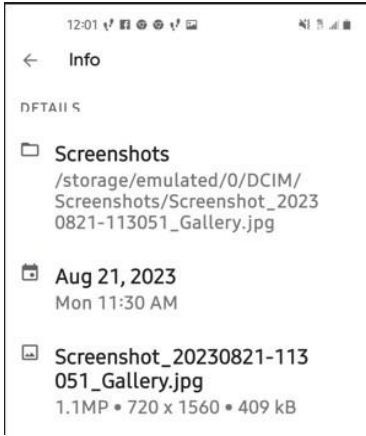
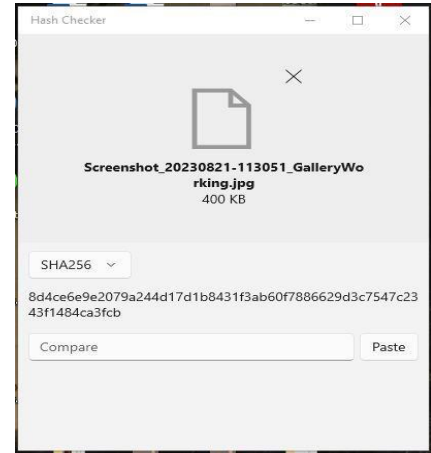
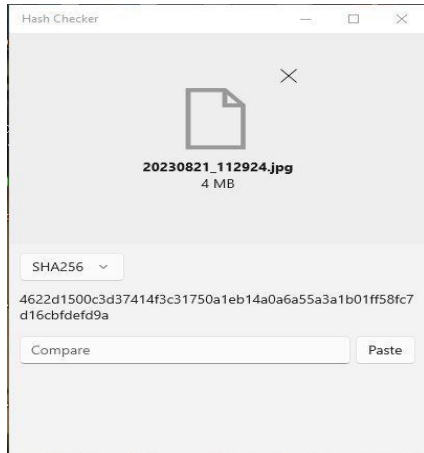
Image Name	Camera /Screenshot Image	Location (Gallery/Google Photos)	Information
20230821_112924 	Camera	Gallery	
Screenshot_20230821-113051_Gallery_Download 	Screenshot	Photos	

Table 1. Continued



```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BottlesCamera.jpg

Algorithm      Hash
-----
SHA256         4622D1500C3D37414F3C31750A1EB14A0A6A55A3A1B01FF58FC7D16CBFDEFD9A
Path
-----
F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BottlesScreenshot.jpg

Algorithm      Hash
-----
SHA256         8D4CE6E9E2079A244D17D1B8431F3AB60F7886629D3C7547C2343F1484CA3FCB
Path
-----
F:\Thesis Materi...
```

```
ExifTool Version Number      : 12.61
File Name                    : BottlesCamera.jpg
Directory                   : .
File Size                    : 4.2 MB
File Modification Date/Time   : 2023:10:23 17:08:43-06:00
File Access Date/Time        : 2023:10:24 16:00:47-06:00
File Creation Date/Time      : 2023:10:24 15:55:46-06:00
File Permissions             : -rw-rw-rw-
File Type                    : JPEG
File Type Extension          : jpg
MIME Type                    : image/jpeg
Exif Byte Order              : Big-endian (Motorola, MM)
Camera Model Name            : SM-A115U
Orientation                  : Rotate 90 CW
Modify Date                   : 2023:08:21 11:29:24
Focal Length                  : 3.6 mm
Exposure Time                 : 1/25
Flash                        : No Flash
ISO                           : 194
White Balance                 : Auto
Aperture Value                : 1.9
Make                         : samsung
JFIF Version                  : 1.01
Resolution Unit               : None
X Resolution                  : 1
Y Resolution                  : 1
Image Width                   : 4160
Image Height                  : 3120
Encoding Process              : Baseline DCT, Huffman coding
Bits Per Sample               : 8
Color Components              : 3
Y Cb Cr Sub Sampling         : YCbCr4:2:0 (2 2)
Aperture                      : 1.9
Image Size                    : 4160x3120
Megapixels                   : 13.0
Shutter Speed                 : 1/25
Focal Length                  : 3.6 mm
Light Value                   : 5.5
```

```
ExifTool Version Number      : 12.61
File Name                    : BottlesScreenshot.jpg
Directory                   : .
File Size                    : 409 kB
File Modification Date/Time   : 2023:10:23 17:08:44-06:00
File Access Date/Time        : 2023:10:24 16:30:11-06:00
File Creation Date/Time      : 2023:10:24 16:29:57-06:00
File Permissions             : -rw-rw-rw-
File Type                    : JPEG
File Type Extension          : jpg
MIME Type                    : image/jpeg
JFIF Version                  : 1.01
Resolution Unit               : None
X Resolution                  : 1
Y Resolution                  : 1
Image Width                   : 720
Image Height                  : 1560
Encoding Process              : Baseline DCT, Huffman coding
Bits Per Sample               : 8
Color Components              : 3
Y Cb Cr Sub Sampling         : YCbCr4:2:0 (2 2)
Image Size                    : 720x1560
Megapixels                   : 1.1
```

Next, we analyzed the images from the OnePlus 7 Pro. One such image was of a ceiling fan.

Table 2. Ceiling Fan




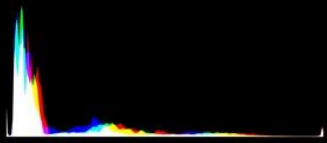
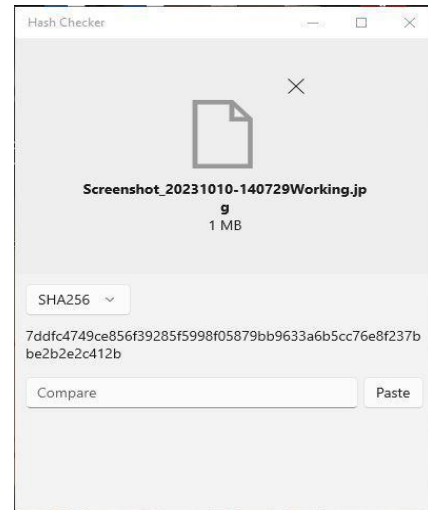
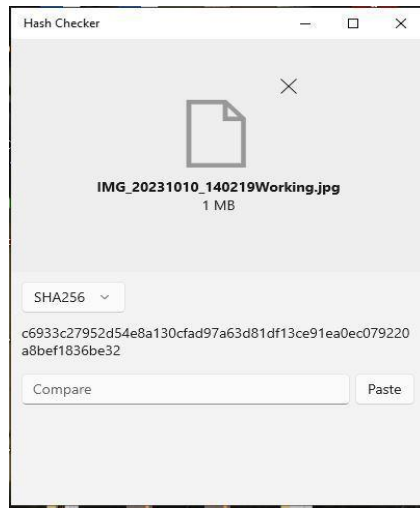
Image Name	Camera /Screenshot Image	Location (Gallery/Google Photos)	Information
IMG_20231010_140219 	Camera	Gallery	<div> <div>< Information</div> <div>PHOTO INFORMATION</div> <div> File name: IMG_20231010_140219 Time: Oct 10, 2023 14:02:20 Resolution: 1824x4000 File size: 115 MB Maker: OnePlus Model: GM1915 Flash: No flash Focal Length: 4.76 mm White balance: Auto Aperture: f/1.6 Exposure time: 1/100 ISO: 160 </div> <div>IMAGE HISTOGRAM</div> <div>  </div> <div>OTHER</div> <div> Path: /storage/emulated/0/DCIM/Camera/IMG_20231010_140219.jpg </div> </div>
Screenshot_20231010-140729 	Screenshot	Gallery	<div> <div>PHOTO INFORMATION</div> <div> File name: Screenshot_20231010-140729 Time: Oct 10, 2023 14:07:33 Resolution: 1440x3120 File size: 103 MB </div> <div>IMAGE HISTOGRAM</div> <div>  </div> <div>OTHER</div> <div> Path: /storage/emulated/0/Pictures/Screenshots/Screenshot_20231010-140729.jpg </div> </div>

Table 2. Continued



```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\CeilingFanCamera.jpg

Algorithm      Hash
-----
SHA256         C6933C27952D54E8A130CFAD97A63D81DF13CE91EA0EC079220A8BEF1836BE32
Path
-----
F:\Thesis Materi...
```

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\CeilingFanScreenshot.jpg

Algorithm      Hash
-----
SHA256         7DDFC4749CE856F39285F5998F05879BB9633A6B5CC76E8F237BBE2B2E2C412B
Path
-----
F:\Thesis Materi...
```

File Name	: CeilingFanCamera.jpg	File Name	: CeilingFanScreenshot.jpg
Directory	: .	Directory	: .
File Size	: 1202 kB	File Size	: 1081 kB
File Modification Date/Time	: 2023:10:23 17:06:49-06:00	File Modification Date/Time	: 2023:10:23 17:06:51-06:00
File Access Date/Time	: 2023:10:25 18:56:36-06:00	File Access Date/Time	: 2023:10:25 19:41:49-06:00
File Creation Date/Time	: 2023:10:25 18:56:12-06:00	File Creation Date/Time	: 2023:10:25 19:41:24-06:00
File Permissions	: -rw-rw-rw-	File Permissions	: -rw-rw-rw-
File Type	: JPEG	File Type	: JPEG
File Type Extension	: .jpg	File Type Extension	: .jpg
MIME Type	: image/jpeg	MIME Type	: image/jpeg
Exif Byte Order	: Big-endian (Motorola, MM)	JFIF Version	: 1.01
Y Resolution	: 72	Resolution Unit	: None
X Resolution	: 72	X Resolution	: 1
Camera Model Name	: GM1915	Y Resolution	: 1
Make	: OnePlus	Profile CMV Type	:
Y Cb Cr Positioning	: Centered	Profile Version	: 2.1.0
Exif Version	: 0220	Profile Class	: Display Device Profile
Aperture Value	: 1.6	Color Space Data	: RGB
Scene Type	: Directly photographed	Profile Connection Space	: XYZ
Exposure Compensation	: 0	Profile Date Time	: 0000:00:00 00:00:00
Exposure Program	: Program AE	Profile File Signature	: acsp
Color Space	: sRGB	Primary Platform	: Unknown ()
Max Aperture Value	: 1.6	CMV Flags	: Not Embedded, Independent
Exif Image Height	: 1824	Device Manufacturer	:
Brightness Value	: 2.5	Device Model	:
Date/Time Original	: 2023:10:10 14:02:20	Device Attributes	: Reflective, Glossy, Positive, Color
Flashpix Version	: 0100	Rendering Intent	: Media-Relative Colorimetric
Sub Sec Time Original	: 422741	Connection Space Illuminant	: 0.9642 1 0.82491
White Balance	: Auto	Profile Creator	:
Interoperability Index	: R98 - DCF basic file (sRGB)	Profile ID	: 0
Exposure Mode	: Auto	Profile Description	: sRGB
Exposure Time	: 1/100	Red Matrix Column	: 0.43607 0.22249 0.01392
Flash	: Off, Did not fire	Green Matrix Column	: 0.38515 0.71687 0.09708
Sub Sec Time	: 422741	Blue Matrix Column	: 0.14307 0.06061 0.7141
F Number	: 1.6	Red Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Exif Image Width	: 4000	Green Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
ISO	: 160	Blue Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Components Configuration	: Y, Cb, Cr, -	Media White Point	: 0.9642 1 0.82491
Focal Length In 35mm Format	: 27 mm	Profile Copyright	: Google Inc. 2016
Sub Sec Time Digitized	: 422741	Image Width	: 1440
Create Date	: 2023:10:10 14:02:20	Image Height	: 3120
Shutter Speed Value	: 1/100	Encoding Process	: Baseline DCT, Huffman coding
Metering Mode	: Multi-segment	Bits Per Sample	: 8
Focal Length	: 4.8 mm	Color Components	: 3
Scene Capture Type	: Standard	Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Light Source	: D65	Image Size	: 1440x3120
Sensing Method	: Not defined	Megapixels	: 4.5
Orientation	: Rotate 90 CW		

Table 2. Continued

Resolution Unit	: inches
Modify Date	: 2023:10:10 14:02:20
XMP Toolkit	: Adobe XMP Core 5.1.0-jc003
Capture Mode	: Photo
Lens Facing	: Back
Scene Detect Result Ids	: [0, 0, 0]
Scene Detect Result Confidences	: [0.0, 0.0, 0.0]
Scene	: AutoHDR
Is HDR Active	: True
Is Night Mode Active	: False
Is Bokeh Active	: False
Image Width	: 4000
Image Height	: 1824
Encoding Process	: Baseline DCT, Huffman coding
Bits Per Sample	: 8
Color Components	: 3
Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Aperture	: 1.6
Image Size	: 4000x1824
Megapixels	: 7.3
Scale Factor To 35 mm Equivalent	: 5.7
Shutter Speed	: 1/100
Create Date	: 2023:10:10 14:02:20.422741
Date/Time Original	: 2023:10:10 14:02:20.422741
Modify Date	: 2023:10:10 14:02:20.422741
Circle Of Confusion	: 0.005 mm
Field Of View	: 67.4 deg
Focal Length	: 4.8 mm (35 mm equivalent: 27.0 mm)
Hypertocal Distance	: 2.59 m
Light Value	: 7.4

Lastly, analyzed the images from the Google Pixel 7 Pro, which does not have an installed Camera Gallery, instead all images are directly saved on Google Photos. One such image was of a trash can.

Table 3. Trash Can


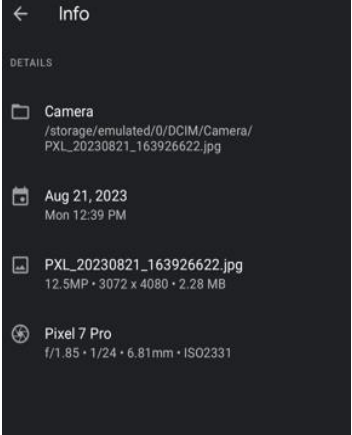

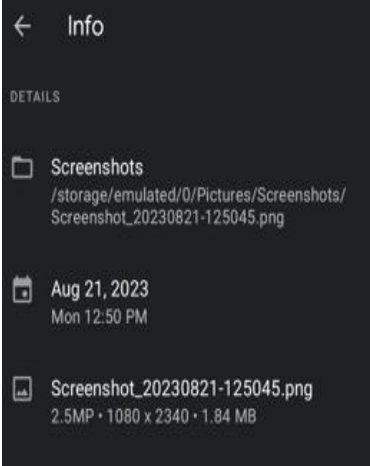
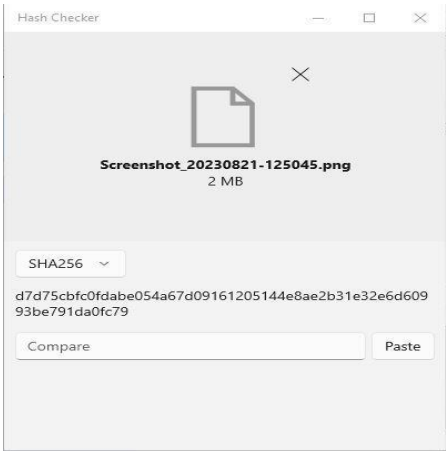
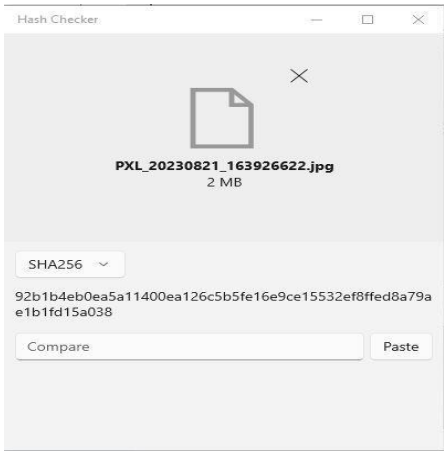
Image Name	Camera /Screenshot Image	Location (Gallery/Google Photos)	Information
PXL_20230821_163926622 	Camera	Google Photos	
Screenshot_20230821-125045 	Screenshot	Google Photos	

Table 3. Continued



```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\TrashCanCamera.jpg

Algorithm      Hash
-----
SHA256         92B1B4EB0EA5A11400EA126C5B5FE16E9CE15532EF8FFED8A79AE1B1FD15A038
Path
-----
F:\...

PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\TrashCanScreenshot.png

Algorithm      Hash
-----
SHA256         D7D75CBFC0FDABE054A67D09161205144E8AE2B31E32E6D60993BE791DA0FC79
Path
-----
F:\...
```

```
FIAS Report
-----
Date & Time: 29-Oct-2023, 18:9:44
-----Evidence-----
Evidence file: TrashCanScreenshot.png
SHA256: d7d75cbfc0fdabe054a67d09161205144e8ae2b31e32e6d60993be791da0fc79
-----Forensic Working Copy-----
Working copy: TrashCanScreenshot.png
SHA256: d7d75cbfc0fdabe054a67d09161205144e8ae2b31e32e6d60993be791da0fc79
-----
Evidence and Working copy have same SHA256.
-----
References:
[1] NIST Policy on Hash Functions
August 5, 2015
https://csrc.nist.gov/Projects/Hash-Functions/NIST-Policy-on-Hash-Functions|
-----Structure Analysis-----
Date & Time: 29-Oct-2023, 18:9:48
Offset: 73 -> Android
Offset: 137 -> Android

-----Compression Analysis-----
Date & Time: 29-Oct-2023, 18:9:49
File: CLA-512.txt
SHA256: 38f23c713950e4687d1720a21206553850476a5b79148cf9bd3e1e935ee124dc
Date & Time: 29-Oct-2023, 18:9:49
File: CLA-512-cep.txt
SHA256: deca9ef5c09d4bfafce5f0cd5069975300c740d5fe5778839d207c81df749f3a
Date & Time: 29-Oct-2023, 18:9:51
File: CLA-512.png
SHA256: cbf791262fd3eff6e76e8824c00a790b2c7abf62a8a62a4b4c27ef17466418f6
-----Color Filter Array Analysis-----
Date & Time: 29-Oct-2023, 18:9:52
File: CFA.png
SHA256: 58de81c2953ff055c23795b4cf38810e80ed74820e7f0eb06243c8c0e7ce5719
Date & Time: 29-Oct-2023, 18:9:52
File: CFA.txt
SHA256: fd2514c82b5435e168b7c4e4f8c64780ccdeb102a808bef98026f8fff4d3d771
-----JPG DCT Map Analysis-----
Date & Time: 29-Oct-2023, 18:10:50
File: DCT-Map-DC.png
SHA256: 15c9c75e652ba49bd9ae0d9ba3bbfadbdd3c8c803f55b0b42befb2596d01f1c2
```

Table 3. Continued

File Name	: TrashCanCamera.jpg		
Directory	:		
File Size	: 2.3 MB		
File Modification Date/Time	: 2023:10:23 17:03:52-06:00		
File Access Date/Time	: 2023:10:29 17:50:12-06:00		
File Creation Date/Time	: 2023:10:29 17:49:58-06:00		
File Permissions	: -rw-rw-rw-		
File Type	: JPEG		
File Type Extension	: jpg		
MIME Type	: image/jpeg	Image Width	: 3072
Exif Byte Order	: Little-endian (Intel, II)	Image Height	: 4080
Make	: Google	Encoding Process	: Baseline DCT, Huffman coding
Camera Model Name	: Pixel 7 Pro	Bits Per Sample	: 8
Orientation	: Horizontal (normal)	Color Components	: 3
X Resolution	: 72	Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Y Resolution	: 72	HDRP Maker Note	: (Binary data 42638 bytes, use -b option to extract)
Resolution Unit	: inches	Shot Log Data	: (Binary data 555 bytes, use -b option to extract)
Software	: HDR+ 1.0.540104767zd	Aperture	: 1.9
Modify Date	: 2023:08:21 12:39:26	Image Size	: 3072x4080
Y Cb Cr Positioning	: Centered	Megapixels	: 12.5
Exposure Time	: 1/24	Scale Factor To 35 mm Equivalent	: 3.5
F Number	: 1.9	Shutter Speed	: 1/24
Exposure Program	: Program AE	Create Date	: 2023:08:21 12:39:26.622-04:00
ISO	: 2331	Date/Time Original	: 2023:08:21 12:39:26.622-04:00
Exif Version	: 0232	Modify Date	: 2023:08:21 12:39:26.622-04:00
Date/Time Original	: 2023:08:21 12:39:26	Thumbnail Image	: (Binary data 20664 bytes, use -b option to extract)
Create Date	: 2023:08:21 12:39:26	Circle Of Confusion	: 0.009 mm
Offset Time	: -04:00	Depth Of Field	: 0.07 m (0.28 - 0.35 m)
Offset Time Original	: -04:00	Field Of View	: 73.7 deg
Offset Time Digitized	: -04:00	Focal Length	: 6.8 mm (35 mm equivalent: 24.0 mm)
Components Configuration	: Y, Cb, Cr, -	Hyperfocal Distance	: 2.94 m
Shutter Speed Value	: 1/24	Light Value	: 1.8
Aperture Value	: 1.9	Lens ID	: Pixel 7 Pro back camera 6.81mm f/1.85
Brightness Value	: -3.19		
Exposure Compensation	: 0		
Max Aperture Value	: 1.9		
Subject Distance	: 0.311 m		
Metering Mode	: Center-weighted average		
Flash	: Off, Did not fire		
Focal Length	: 6.8 mm		
Sub Sec Time	: 622		
Sub Sec Time Original	: 622		
Sub Sec Time Digitized	: 622		
Flashpix Version	: 0100		
Color Space	: sRGB		
Exif Image Width	: 3072		
Exif Image Height	: 4080		
Lens Make	: Google		
Lens Model	: Pixel 7 Pro back camera 6.81mm f/1.85		
Composite Image	: Composite Image Captured While Shooting		
GPS Img Direction Ref	: Magnetic North		
GPS Img Direction	: 60		
Compression	: JPEG (old-style)		

Results

After compiling, critiquing, and comparing all the information as well as images, a few things became very apparent. One, the way an image is created drives how it is labeled and where it is stored in Android phone devices. So, regardless of where the consumer may want to store the image, it will automatically characterize itself as a camera image if created via the installed camera or as a screenshot if created as such. Also, the difference in supplied information for camera created vs screenshot is eye-opening. Along with the variety in provided details about the images varying based on the manner of creation, the variety in Android devices in conjunction with the diversity in installed camera systems identify a true difference maker in regard to the ease for image analysis. When considering the three different manufacturers, timeframe of creation, and other factors, the information to be gleaned from each device is based largely on the type and age of said device. Lastly, with the abilities of Android devices to successfully have information forensically extracted, even if an image was tampered with or allocated to a destination not naturally expected, the extraction would provide definitive clues for diagnosing the truth.

CHAPTER V

CONCLUSIONS

When this research was begun on this topic, it was immediately apparent that a research problem pertaining to the lack of established data on Android smartphones and image authentication existed. The researcher especially was curious about how the method by which an image is captured affects the information that is created and can be examined. Also, the inability to find a great deal of research on what happens to an image when it's been sent via different means was present. While there is a good amount of attention being paid to image analysis and authentication overall, only a small measure of research has been paid to mobile devices, especially smartphones and even less on Android specifically. This is important and necessary because with so many different Android devices, and settings, we as forensic examiners need to be more aware and adept at recognizing telltale signs of image manipulation. For instance, when someone is missing and images are shared with the intention of spreading awareness and locating them, we must be sure that the image being presented is accurate to the person and not one that's been altered indiscriminately to ensure maximum success. Another example is when Android images are used as evidence in criminal or civil cases. If forensic examiners are not able to confidently and expertly separate unaltered images from altered images as well as explain whether they were screenshots or camera images, then the credibility of not just that specific examiner but the entire multimedia forensic community will be called into question.

Future Research

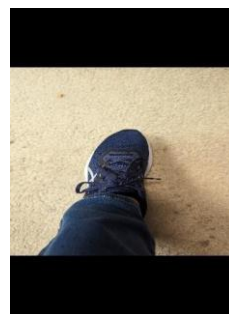
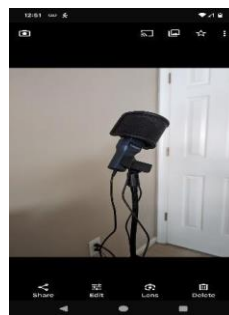
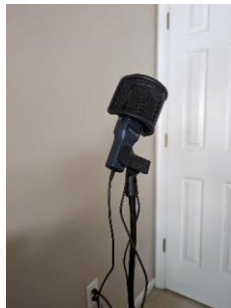
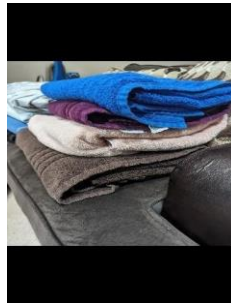
An area of future research is really digging into the different Android manufacturers and their systems for alteration clues that may be found in each device that is offered via that manufacturer. Such brands to study would possibly be Samsung or Google, due to the reach and standing of the brands in the Android world. There are also other issues affecting Android image authentication that will continue to be brought to the forefront, especially in conjunction with social media. Additional possible future research would be to create a camera image and then create a screenshot of the camera image. Next, perform some type of modification or edit on the original camera-created image and then critique the three different images for signs of alterations.

REFERENCES

1. American Society for Testing and Materials (ASTM) International. (2019). Standard Guide for Forensic Digital Image Processing (E2825-19).
<https://astm.org/Standards/E2825.htm>
2. LIU, Q., COOPER, P. A., CHEN, L., CHO, H., CHEN, Z., QIAO, M, SU, Y., WEI, M, & SUNG, A. H. (2013). Detection of JPEG double compression and identification of smartphone image source and post-capture manipulation: Frontiers of applied intelligence. *Applied Intelligence (Dordrecht, Netherlands)*, 3(4), 705-526.
<https://doi.org/10.1007/s10489-013-0430-z>
3. Popescu, A. C., & Farid, H. (2005). Exposing digital forgeries by detecting traces of resampling. *IEEE Transactions on Signal Processing*, 53(2), 758-767.
<https://doi.org/10.1109/TSP.2004.839932>
4. Scientific Working Group on Digital Evidence. (2017). SWGDE Best Practices for Maintaining the Integrity of Imagery.
<https://drive.google.com/file/d/10wuCTEZJcMiqiS3Blp1iZgoW22BhlrwJ/view>

APPENDIX

*GOOGLE PIXEL 7 PRO ADDITIONAL IMAGES, HASH VERIFICATIONS, AND FIAS REPORTS



```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\FramedMaskCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	B03B0098D93288087341705C574A3B0940736F5C0382D6021BD395C13885B466	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\FramedMaskScreenshot.png
```

Algorithm	Hash	Path
-----	----	----
SHA256	235A9044B07FEF1A4D96CCA13A78C96A25BBFA38538E61C02A907435BD460B4A	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ShoeCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	B761D7A641D05B40F382C4C7B81EBE2F93888680BF7D23BF74F7286A1B4C6A24	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ShoeScreenshot.png
```

Algorithm	Hash	Path
-----	----	----
SHA256	DD975C12155A330C0AAD352E0924E485C557D95950E2372D7DEEA21DAA927FBB	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\PlugCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	DA9ED0961ACF967820600923B9E962B5703B02B0331162D6C5E0A44AD87ABDF4	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\PlugScreenshot.png
```

Algorithm	Hash	Path
-----	----	----
SHA256	9F31D660112024AFDB09AF0B68AB03776243C222BFAE284AACDC229186DE2B9F	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\MicCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	26A862F1918D1243E07E8E050D2CAA0D1B977DF539F596B023D21E3B782622DE	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\MicScreenshot.png
```

Algorithm	Hash	Path
-----	----	----
SHA256	B45D7B07D0BA8F29414EA36FD137F9F615D242FE0169A0FDC468C47950AA6ED1	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\RemoteCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	8EAF2689D836B73B746AA53827DB389011CC0C9542AFC72510B571ECF7D378A3	F:\...

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\RemoteScreenshot.png
```

Algorithm	Hash	Path
-----	----	----
SHA256	D25B6C42F39183D134F387B46C0275DF82AC84AADCCCE7F2391AC28D287EAC407	F:\...


```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ClothesStackCamera.jpg

Algorithm      Hash
-----
SHA256         EABCBCBC4308DE57CBCF8D2C1A3CE223F2C69CB08E6EBE2BE8E3041D8F452E33    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ClothesStackScreenshot.png

Algorithm      Hash
-----
SHA256         C18BECF40DCE904262E4FC65CFE38A21D8397D8BF25ECB0E3E0BCE494F5C57B7    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\CombatCamera.jpg

Algorithm      Hash
-----
SHA256         93178A0EF6156660D9A25C0494FB08B0E7C0B2D28B4AD9EE41A38C2B1D514F27    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\CombatScreenshot.png

Algorithm      Hash
-----
SHA256         9165E79A6F5D569E2EF079E522B51EFD414B74D4AA4501309A8B42D99200CA8F    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ToteCamera.jpg

Algorithm      Hash
-----
SHA256         685221FEF3C4F350B8F5602171F10EABB4F3EC46778E8F2C1DE6905825B6BA03    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\ToteScreenshot.png

Algorithm      Hash
-----
SHA256         5154B72A39313840871D763F0C1B790B9F8EA43C3D69D41498EB0EFB46405A32    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\Rhoya19Camera.jpg

Algorithm      Hash
-----
SHA256         C7723D9E37DC1BACBE6AFEBBD1F33A1DEBF52756BF0F77B956F433A61932F7A3    F:\...
```

```
PS F:\Thesis Material\Thesis Photos\GooglePixel7Pro\CameravsScreenshot> Get-FileHash .\Rhoya19Screenshot.png

Algorithm      Hash
-----
SHA256         C769A708EAC4F6B9FA545E6E4F0708AC2206AC76E57C69A88FDD42144A805AEE    F:\...
```

```

File Name       : FramedMaskCamera.jpg
Directory      : .
File Size       : 1991 kB
File Modification Date/Time : 2023:10:23 17:04:26-06:00
File Access Date/Time      : 2023:10:27 20:05:55-06:00
File Creation Date/Time    : 2023:10:27 20:05:51-06:00
File Permissions          : -rw-rw-rw-
File Type            : JPEG
File Type Extension     : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Little-endian (Intel, II)
Make                : Google
Camera Model Name     : Pixel 7 Pro
Orientation          : Horizontal (normal)
X Resolution         : 72
Y Resolution         : 72
Resolution Unit       : Inches
Software            : HDR+ 1.0.5401047672d
Modify Date         : 2023:10:15 13:59:55
Y Cb Cr Positioning  : Centered
Exposure Time        : 1/47
F Number            : 1.9
Exposure Program     : Program AE
ISO                 : 5221
Exif Version         : 0232
Date/Time Original   : 2023:10:15 13:59:55
Create Date         : 2023:10:15 13:59:55
Offset Time         : -04:00
Offset Time Original : -04:00
Offset Time Digitized : -04:00
Components Configuration : Y, Cb, Cr, -
Shutter Speed Value  : 1/47
Aperture Value       : 1.9
Brightness Value     : -3.37
Exposure Compensation : 0
Max Aperture Value   : 1.9
Subject Distance     : 0.153 m
Metering Mode        : Center-weighted average
Flash               : Off, Did not fire
Focal Length        : 6.8 mm
Sub Sec Time        : 737
Sub Sec Time Original : 737
Sub Sec Time Digitized : 737
Flashpix Version     : 0100
Color Space          : sRGB
Exif Image Width     : 3072
Exif Image Height    : 4000
Interoperability Index : R98 - DCF basic file (sRGB)
Interoperability Version : 0100
Sensing Method       : One-chip color area
Scene Type           : Directly photographed
Custom Rendered      : Custom
Exposure Mode        : Auto
White Balance        : Auto
Digital Zoom Ratio   : 0
Focal Length In 35mm Format : 24 mm
Scene Capture Type   : Standard
Contrast             : Normal
Saturation           : Normal
Sharpness           : Normal
Subject Distance Range : Macro
Lens Make           : Google
Lens Model          : Pixel 7 Pro back camera 6.81mm f/1.85

```

FIAS Report

Date & Time: 27-Oct-2023, 9:54:3

-----Evidence-----

Evidence file: CombatScreenshot.png

SHA256: 9165e79a6f5d569e2ef079e522b51efd414b74d4aa4501309a8b42d99200ca8f

-----Forensic Working Copy-----

Working copy: CombatScreenshot.png

SHA256: 9165e79a6f5d569e2ef079e522b51efd414b74d4aa4501309a8b42d99200ca8f

Evidence and Working copy have same SHA256.

-----Compression Analysis-----

Date & Time: 27-Oct-2023, 9:54:10

File: CLA-512.txt

SHA256: 1328551e50996f66bcf608fad0df11957b95a8f91a76a6e89a9e4bb1cc4378c9

Date & Time: 27-Oct-2023, 9:54:10

File: CLA-512-cep.txt

SHA256: 92194fde5bf7fd692f4f9398828ea05512344698fd87c4aa1f8476dde5e0b1b3

Date & Time: 27-Oct-2023, 9:54:12

File: CLA-512.png

SHA256: a33f32691425017e2438b4cb734ef364ee64162704fadd62bbc9171a66244f7f

FIAS Report

Date & Time: 29-Oct-2023, 8:5:4

Evidence

Evidence file: PlugScreenshot.png

SHA256: 9f31d660112024afdb09af0b68ab03776243c222bfae284aacdc229186de2b9f

Forensic Working Copy

Working copy: PlugScreenshot.png

SHA256: 9f31d660112024afdb09af0b68ab03776243c222bfae284aacdc229186de2b9f

Evidence and Working copy have same SHA256.

```
File Name          : PlugCamera.jpg
Directory          :
File Size          : 3.8 MB
File Modification Date/Time : 2023:10:23 17:04:44-06:00
File Access Date/Time   : 2023:10:29 07:41:32-06:00
File Creation Date/Time  : 2023:10:29 07:41:26-06:00
File Permissions      : -rw-rw-rw-
File Type          : JPEG
File Type Extension   : .jpg
MIME Type           : image/jpeg
Exif Byte Order       : Little-endian (Intel, II)
Make                : Google
Camera Model Name     : Pixel 7 Pro
Orientation          : Horizontal (normal)
X Resolution         : 72
Y Resolution         : 72
Resolution Unit       : Inches
Software             : HDR+ 1.0.540104767zd
Modify Date          : 2023:10:15 14:05:00
Y Cb Cr Positioning   : Centered
Exposure Time         : 1/25
F Number             : 1.9
Exposure Program      : Program AE
ISO                  : 110
Exif Version          : 0212
Date/Time Original    : 2023:10:15 14:05:00
Create Date           : 2023:10:15 14:05:00
Offset Time           : -04:00
Offset Time Original  : -04:00
Offset Time Digitized : -04:00
Components Configuration : Y, Cb, Cr, -
Shutter Speed Value    : 1/25
Aperture Value         : 1.9
Brightness Value       : 1.27
Exposure Compensation : 0
Max Aperture Value     : 1.9
Subject Distance       : 0.529 m
Metering Mode          : Center-weighted average
Flash                 : Off, Did not fire
Focal Length           : 6.8 mm
Sub Sec Time           : 797
Sub Sec Time Original  : 797
Sub Sec Time Digitized : 797
Flashpix Version        : 0100
Color Space            : sRGB
Exif Image Width       : 3072
Exif Image Height      : 4080
Interoperability Index : R98 - DCF basic file (sRGB)
Interoperability Version : 0100
Sensing Method         : One-chip color area
Scene Type             : Directly photographed
Custom Rendered        : Custom
Exposure Mode          : Auto
White Balance          : Auto
Digital Zoom Ratio      : 2.91
Focal Length In 35mm Format : 48 mm
Scene Capture Type      : Standard
Contrast               : Normal
Saturation              : Normal
Sharpness              : Normal
Subject Distance Range : Macro
Lens Make              : Google
Lens Model             : Pixel 7 Pro back camera 6.81mm f/1.85
Camera Lens            : Google Pixel 7 Pro back camera 6.81mm f/1.85
```

Compression Analysis

Date & Time: 29-Oct-2023, 8:5:12

File: CLA-512.txt

SHA256: e47cd87de3734627587f5ed1b3a322570bc65461ec73730f94280d1d7bd6bd50

Date & Time: 29-Oct-2023, 8:5:13

File: CLA-512-cep.txt

SHA256: c62687c0a7c45f1bcffe8fa7cb9bd62204b7691d2e0ca4900da56cea7f8ce705

Date & Time: 29-Oct-2023, 8:5:15

File: CLA-512.png

SHA256: cf998497352acb8c3ad94c9d64cbbd95ac0a56120be590f4cb45f23309ee2800

FIAS Report

Date & Time: 29-Oct-2023, 16:22:54

Evidence

Evidence file: ShoeScreenshot.png

SHA256: dd975c12155a330c0aad352e0924e485c557d95950e2372d7deea21daa927fbb

Forensic Working Copy

Working copy: ShoeScreenshot.png

SHA256: dd975c12155a330c0aad352e0924e485c557d95950e2372d7deea21daa927fbb

Evidence and Working copy have same SHA256.

Compression Analysis

Date & Time: 29-Oct-2023, 16:22:57

File: CLA-512.txt

SHA256: fe2a89dd352a177307d6aff5c054cbde0c16de45e07ed821690924a6a5bd7762

Date & Time: 29-Oct-2023, 16:22:57

File: CLA-512-cep.txt

SHA256: 9549352f37837a14cda42fc59e3bbcfca5c558c1c884bdf4234d7b829bf09a09

Date & Time: 29-Oct-2023, 16:22:59

File: CLA-512.png

SHA256: d407156124307a037ef99ab6f708ecfe8ef54fb32805b124b8520be1eeef6764

File Name	: ShoeCamera.jpg
Directory	: .
File Size	: 2.7 MB
File Modification Date/Time	: 2023:10:23 17:05:26-06:00
File Access Date/Time	: 2023:10:29 15:59:18-06:00
File Creation Date/Time	: 2023:10:29 15:59:14-06:00
File Permissions	: -rw-rw-rw-
File Type	: JPEG
File Type Extension	: jpg
MIME Type	: image/jpeg
Exif Byte Order	: little-endian (Intel, II)
Make	: Google
Camera Model Name	: Pixel 7 Pro
Orientation	: Horizontal (normal)
X Resolution	: 72
Y Resolution	: 72
Resolution Unit	: inches
Software	: HDR+ 1.0.540104767zd
Modify Date	: 2023:10:15 14:02:25
Y Cb Cr Positioning	: Centered
Exposure Time	: 1/24
F Number	: 1.9
Exposure Program	: Program AE
ISO	: 211
Exif Version	: 0232
Date/Time Original	: 2023:10:15 14:02:25
Create Date	: 2023:10:15 14:02:25
Offset Time	: -04:00
Offset Time Original	: -04:00
Offset Time Digitized	: -04:00
Components Configuration	: Y, Cb, Cr, -
Shutter Speed Value	: 1/24
Aperture Value	: 1.9
Brightness Value	: 0.27
Exposure Compensation	: 0
Max Aperture Value	: 1.9
Subject Distance	: 0.353 m
Metering Mode	: Center-weighted average
Flash	: Off, Did not fire
Focal Length	: 6.8 mm
Sub Sec Time	: 175
Sub Sec Time Original	: 175
Sub Sec Time Digitized	: 175
Flashpix Version	: 0100
Color Space	: sRGB
Exif Image Width	: 3072
Exif Image Height	: 4080
Interoperability Index	: R98 - DCF basic file (sRGB)
Interoperability Version	: 0100
Sensing Method	: One-chip color area
Scene Type	: Directly photographed
Custom Rendered	: Custom
Exposure Mode	: Auto
White Balance	: Auto
Digital Zoom Ratio	: 0
Focal Length In 35mm Format	: 24 mm
Scene Capture Type	: Standard
Contrast	: Normal
Saturation	: Normal
Sharpness	: Normal
Subject Distance Range	: Macro
Lens Make	: Google
Lens Model	: Pixel 7 Pro back camera 6.81mm f/1.85

FIAS Report

Date & Time: 29-Oct-2023, 14:44:4

-----Evidence-----

Evidence file: RemoteScreenshot.png

SHA256: d25b6c42f39183d134f387b46c0275df82ac84aadce7f2391ac28d287eac407

-----Forensic Working Copy-----

Working copy: RemoteScreenshot.png

SHA256: d25b6c42f39183d134f387b46c0275df82ac84aadce7f2391ac28d287eac407

Evidence and Working copy have same SHA256.

-----Compression Analysis-----

Date & Time: 29-Oct-2023, 14:44:12

File: CLA-512.txt

SHA256: a6fa8c9fb9d577c0b14d8a0b25d3d04e0b9e44e971f593885569787fbecc97bd

Date & Time: 29-Oct-2023, 14:44:12

File: CLA-512-cep.txt

SHA256: c48b452a4373b9827b1f9ceeb441c853d6763317cccd429741e13edfa51cc7f7

Date & Time: 29-Oct-2023, 14:44:14

File: CLA-512.png

SHA256: 7c3b2001238cebc98be9f8921c99620abdc7e72d4ad09878244976ae52beeca4

```
File Name      : RemoteCamera.jpg
Directory      : 
File Size      : 2.2 MB
File Modification Date/Time : 2023:10:23 17:04:55-06:00
File Access Date/Time      : 2023:10:29 09:35:17-06:00
File Creation Date/Time    : 2023:10:29 09:35:05-06:00
File Permissions          : -rw-rw-rw-
File Type               : JPEG
File Type Extension      : jpg
MIME Type              : image/jpeg
Exif Byte Order         : Little-endian (Intel, II)
Make                   : Google
Camera Model Name       : Pixel 7 Pro
Orientation            : Horizontal (normal)
X Resolution            : 72
Y Resolution            : 72
Resolution Unit         : Inches
Software                : HDR+ 1.0.540104767zd
Modify Date             : 2023:10:15 14:03:30
Y Cb Cr Positioning     : Centered
Exposure Time           : 1/65
F Number                : 1.9
Exposure Program        : Program AE
ISO                     : 1200
Exif Version            : 0232
Date/Time Original      : 2023:10:15 14:03:30
Create Date             : 2023:10:15 14:03:30
Offset Time             : -04:00
Offset Time Original    : -04:00
Offset Time Digitized   : -04:00
Components Configuration : Y, Cb, Cr, -
Shutter Speed Value     : 1/64
Aperture Value          : 1.9
Brightness Value        : -0.8
Exposure Compensation   : 0
Max Aperture Value      : 1.9
Subject Distance        : 0.248 m
Metering Mode           : Center-weighted average
Flash                   : Off, Did not fire
Focal Length            : 6.8 mm
Sub Sec Time            : 562
Sub Sec Time Original   : 562
Sub Sec Time Digitized  : 562
Flashpix Version        : 0100
Color Space             : sRGB
Exif Image Width        : 3072
Exif Image Height       : 4080
Interoperability Index  : R98 - DCF basic file (sRGB)
Interoperability Version : 0100
Sensing Method          : One-chip color area
Scene Type              : Directly photographed
Custom Rendered         : Custom
Exposure Mode           : Auto
White Balance           : Auto
Digital Zoom Ratio      : 0
Focal Length In 35mm Format : 24 mm
Scene Capture Type      : Standard
Contrast                : Normal
Saturation              : Normal
Sharpness              : Normal
Subject Distance Range  : Macro
Lens Make               : Google
Lens Model              : Pixel 7 Pro back camera 6.81mm f/1.85
```

```

FIAS Report
-----
Date & Time: 29-Oct-2023, 15:16:45
-----Evidence-----
Evidence file: Rhoyal9Screenshot.png
SHA256: c769a708eac4f6b9fa545e6e4f0708ac2206ac76e57c69a88fdd42144a805aee
-----Forensic Working Copy-----
Working copy: Rhoyal9Screenshot.png
SHA256: c769a708eac4f6b9fa545e6e4f0708ac2206ac76e57c69a88fdd42144a805aee
-----
Evidence and Working copy have same SHA256.
-----Compression Analysis-----
Date & Time: 29-Oct-2023, 15:17:26
File: CLA-512.txt
SHA256: 5fd6af3da950d8e150892d00617333458912a4168d9a48e4ee5fa216296a45c2
Date & Time: 29-Oct-2023, 15:17:26
File: CLA-512-cep.txt
SHA256: 60828a84f211296cbb2a30775337ae57f22bac4e356bc1d82101d8653e1470b6
Date & Time: 29-Oct-2023, 15:17:28
File: CLA-512.png
SHA256: 49e08dbe8b5dfcfa08b6151ddd433d38cdab2f6cb3f864696c24865325e6a4e9

```

```

File Name           : Rhoyal9Camera.jpg
Directory           : .
File Size            : 6.1 MB
File Modification Date/Time : 2023:10:23 17:05:14-06:00
File Access Date/Time   : 2023:10:29 14:54:33-06:00
File Creation Date/Time  : 2023:10:29 14:54:30-06:00
File Permissions       : -rw-rw-rw-
File Type            : JPEG
File Type Extension    : jpg
MIME Type             : image/jpeg
Exif Byte Order        : Little-endian (Intel, II)
Make                  : Google
Camera Model Name      : Pixel 7 Pro
Orientation           : Horizontal (normal)
X Resolution           : 72
Y Resolution           : 72
Resolution Unit        : inches
Software              : HDR+ 1.0.540104767zd
Modify Date           : 2023:10:15 14:00:49
Y Cb Cr Positioning    : Centered
Exposure Time          : 1/47
F Number              : 1.9
Exposure Program       : Program AE
ISO                   : 144
Exif Version           : 0212
Date/Time Original     : 2023:10:15 14:00:49
Create Date           : 2023:10:15 14:00:49
Offset Time            : -04:00
Offset Time Original   : -04:00
Offset Time Digitized  : -04:00
Components Configuration : Y, Cb, Cr, -
Shutter Speed Value     : 1/47
Aperture Value          : 1.9
Brightness Value        : 1.81
Exposure Compensation   : 0
Max Aperture Value      : 1.9
Subject Distance        : 0.227 m
Metering Mode           : Center-weighted average
Flash                  : Off, Did not fire
Focal Length            : 6.8 mm
Sub Sec Time           : 914
Sub Sec Time Original   : 914
Sub Sec Time Digitized  : 914
Flashpix Version        : 0100
Color Space             : sRGB
Exif Image Width        : 1072
Exif Image Height       : 4080
Interoperability Index  : R98 - DCF basic file (sRGB)
Interoperability Version : 0100
Sensing Method          : One-chip color area
Scene Type              : Directly photographed
Custom Rendered         : Custom
Exposure Mode           : Auto
White Balance           : Auto
Digital Zoom Ratio       : 0
Focal Length In 35mm Format : 24 mm
Scene Capture Type      : Standard
Contrast                : Normal
Saturation              : Normal
Sharpness               : Normal
Subject Distance Range  : Macro
Lens Make               : Google
Lens Model              : Pixel 7 Pro back camera 6.81mm f/1.85

```

FIAS Report

Date & Time: 29-Oct-2023, 17:44:22

-----Evidence-----

Evidence file: ToteScreenshot.png

SHA256: 5154b72a39313840871d763f0c1b790b9f8ea43c3d69d41498eb0efb46405a32

-----Forensic Working Copy-----

Working copy: ToteScreenshot.png

SHA256: 5154b72a39313840871d763f0c1b790b9f8ea43c3d69d41498eb0efb46405a32

Evidence and Working copy have same SHA256.

-----Compression Analysis-----

Date & Time: 29-Oct-2023, 17:44:44

File: CLA-512.txt

SHA256: 3758e69dc899b1151f5b9dc02d05d62ea5f1b8586854a9a73885c79106a4224d

Date & Time: 29-Oct-2023, 17:44:44

File: CLA-512-cep.txt

SHA256: bfbe0126782179f6dd87da38edac41f20263dbe78c07aa70687e1d933f3cbc6b

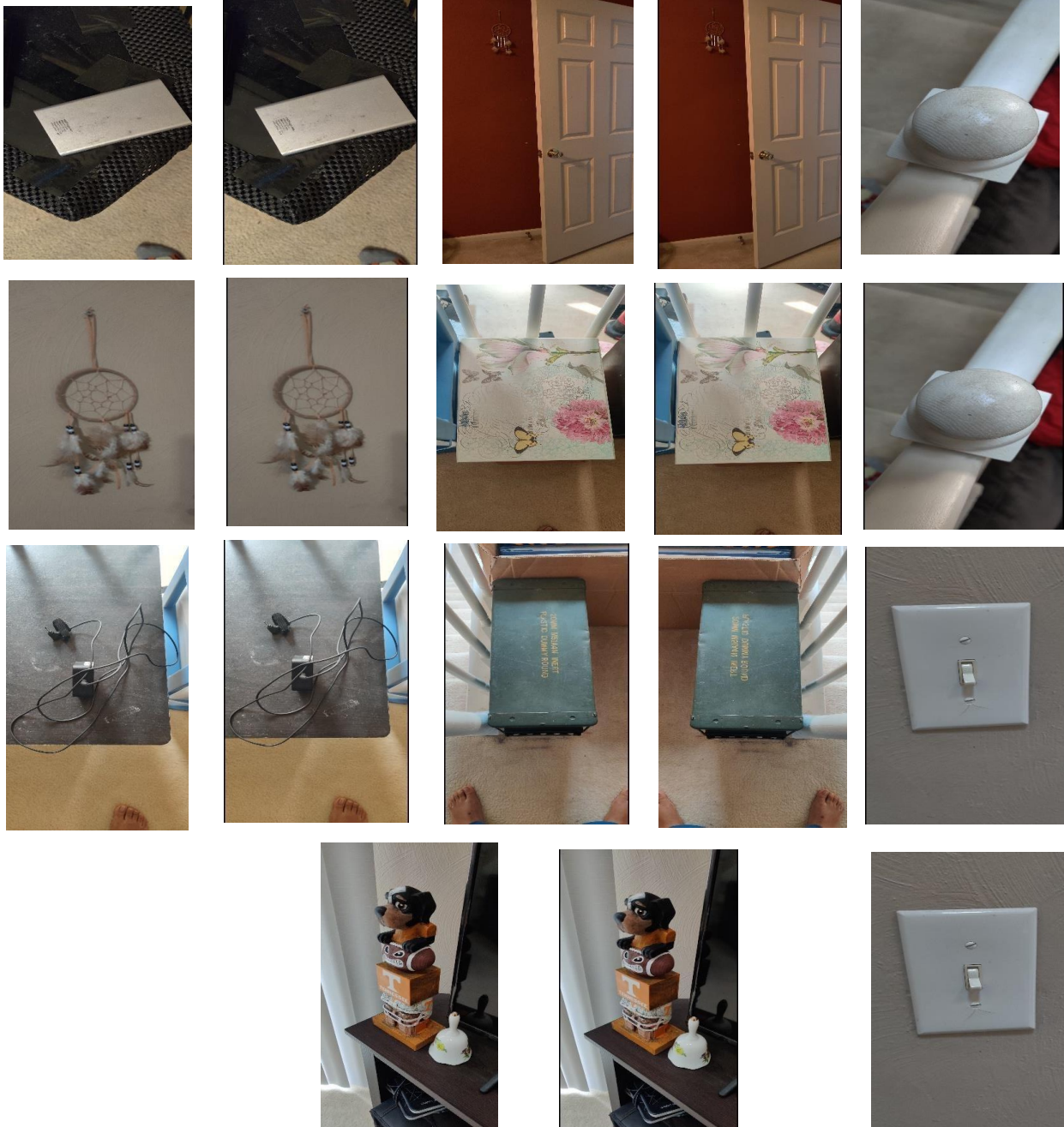
Date & Time: 29-Oct-2023, 17:44:46

File: CLA-512.png

SHA256: 44f45e21d331ee23a53c97e91bee9083e667eda38bf9a7564ba86297e272991d

File Name	: ToteCamera.jpg
Directory	: .
File Size	: 2.3 MB
File Modification Date/Time	: 2023:10:23 17:03:44-06:00
File Access Date/Time	: 2023:10:29 16:59:14-06:00
File Creation Date/Time	: 2023:10:29 16:58:54-06:00
File Permissions	: -rw-rw-rw-
File Type	: JPEG
File Type Extension	: .jpg
MIME Type	: image/jpeg
Exif Byte Order	: Little-endian (Intel, II)
Make	: Google
Camera Model Name	: Pixel 7 Pro
Orientation	: Horizontal (normal)
X Resolution	: 72
Y Resolution	: 72
Resolution Unit	: Inches
Software	: HDR+ 1.0.540104767zd
Modify Date	: 2023:08:21 12:39:12
Y Cb Cr Positioning	: Centered
Exposure Time	: 1/40
F Number	: 1.9
Exposure Program	: Program AE
ISO	: 1700
Exif Version	: 0232
Date/Time Original	: 2023:08:21 12:39:12
Create Date	: 2023:08:21 12:39:12
Offset Time	: -04:00
Offset Time Original	: -04:00
Offset Time Digitized	: -04:00
Components Configuration	: Y, Cb, Cr, -
Shutter Speed Value	: 1/40
Aperture Value	: 1.9
Brightness Value	: -2
Exposure Compensation	: 0
Max Aperture Value	: 1.9
Subject Distance	: 0.386 m
Metering Mode	: Center-weighted average
Flash	: Off, Did not fire
Focal Length	: 6.8 mm
Sub Sec Time	: 909
Sub Sec Time Original	: 909
Sub Sec Time Digitized	: 909
Flashpix Version	: 0100
Color Space	: sRGB
Exif Image Width	: 3072
Exif Image Height	: 4080
Interoperability Index	: R98 - DCF basic file (sRGB)
Interoperability Version	: 0100
Sensing Method	: One-chip color area
Scene Type	: Directly photographed
Custom Rendered	: Custom
Exposure Mode	: Auto
White Balance	: Auto
Digital Zoom Ratio	: 0
Focal Length In 35mm Format	: 24 mm
Scene Capture Type	: Standard
Contrast	: Normal
Saturation	: Normal
Sharpness	: Normal
Subject Distance Range	: Macro
Lens Make	: Google
Lens Model	: Pixel 7 Pro back camera 6.8mm f/1.85

*ONEPLUS 7 PRO ADDITIONAL IMAGES, HASH VERIFICATIONS, AND FIAS REPORTS



File Name	: BatteryCamera.jpg	File Name	: BatteryScreenshot.jpg
Directory	:	Directory	:
File Size	: 3.1 MB	File Size	: 2.3 MB
File Modification Date/Time	: 2023:10:23 17:06:40-06:00	File Modification Date/Time	: 2023:10:23 17:06:46-06:00
File Access Date/Time	: 2023:10:24 15:10:22-06:00	File Access Date/Time	: 2023:10:24 15:14:34-06:00
File Creation Date/Time	: 2023:10:24 15:09:43-06:00	File Creation Date/Time	: 2023:10:24 15:14:26-06:00
File Permissions	: -rw-rw-rw-	File Permissions	: -rw-rw-rw-
File Type	: JPEG	File Type	: JPEG
File Type Extension	: .jpg	File Type Extension	: .jpg
MIME Type	: image/jpeg	MIME Type	: image/jpeg
Exif Byte Order	: Big-endian (Motorola, MM)	JFIF Version	: 1.01
Y Resolution	: 72	Resolution Unit	: None
X Resolution	: 72	X Resolution	: 1
Camera Model Name	: GM1915	Y Resolution	: 1
Make	: OnePlus	Profile CMV Type	:
Y Cb Cr Positioning	: Centered	Profile Version	: 2.1.0
Exif Version	: 0220	Profile Class	: Display Device Profile
Aperture Value	: 1.6	Color Space Data	: RGB
Scene Type	: Directly photographed	Profile Connection Space	: XYZ
Exposure Compensation	: 0	Profile Date Time	: 0000:00:00 00:00:00
Exposure Program	: Program AE	Profile File Signature	: acsp
Color Space	: sRGB	Primary Platform	: Unknown ()
Max Aperture Value	: 1.6	CMV Flags	: Not Embedded, Independent
Exif Image Height	: 1824	Device Manufacturer	:
Brightness Value	: -4.04	Device Model	:
Date/Time Original	: 2023:10:10 14:01:56	Device Attributes	: Reflective, Glossy, Positive, Color
Flashpix Version	: 0100	Rendering Intent	: Media-Relative Colorimetric
Sub Sec Time Original	: 708471	Connection Space Illuminant	: 0.9642 1 0.82491
White Balance	: Auto	Profile Creator	:
Interoperability Index	: R98 - DCF basic file (sRGB)	Profile ID	: 0
Exposure Mode	: Auto	Profile Description	: sRGB
Exposure Time	: 1/17	Red Matrix Column	: 0.43607 0.22249 0.01392
Flash	: Off, Did not fire	Green Matrix Column	: 0.38515 0.71687 0.09708
Sub Sec Time	: 708471	Blue Matrix Column	: 0.14307 0.06061 0.7141
F Number	: 1.6	Red Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Exif Image Width	: 4000	Green Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
ISO	: 2500	Blue Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Components Configuration	: Y, Cb, Cr, -	Media White Point	: 0.9642 1 0.82491
Focal Length In 35mm Format	: 27 mm	Profile Copyright	: Google Inc. 2016
Sub Sec Time Digitized	: 708471	Image Width	: 1440
Create Date	: 2023:10:10 14:01:56	Image Height	: 3120
Shutter Speed Value	: 1/17	Encoding Process	: Baseline DCT, Huffman coding
Metering Mode	: Spot	Bits Per Sample	: 8
Focal Length	: 4.8 mm	Color Components	: 3
Scene Capture Type	: Standard	Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Light Source	: D65	Image Size	: 1440x3120
Sensing Method	: Not defined	Megapixels	: 4.5
Orientation	: Rotate 90 CW		
Resolution Unit	: inches		
Modify Date	: 2023:10:10 14:01:56		
XMP Toolkit	: Adobe XMP Core 5.1.0-jc003		
Capture Mode	: Photo		
Lens Facing	: Back		
Scene Detect Result Ids	: [0, 0, 0]		
Scene Detect Result Confidences	: [0.0, 0.0, 0.0]		
Scene	: AutoHDR		
Is HDR Active	: False		
Is Night Mode Active	: False		
Is Bokeh Active	: False		
Image Width	: 4000		
Image Height	: 1824		
Encoding Process	: Baseline DCT, Huffman coding		
Bits Per Sample	: 8		

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\BatteryCamera.jpg

Algorithm      Hash                                     Path
-----
SHA256         27F544E1B9848FB33ACBAAAAA71692CB7AAFEF0D26948AC1F4470CB1B6D2E94D  F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\BatteryScreenshot.jpg

Algorithm      Hash                                     Path
-----
SHA256         93AB4044E77AEB25034B27DE45422E916E35A964F0A0B2AAC54DF0C47AEAD7B  F:\Thesis Materi...
```

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\DoorCamera.jpg

Algorithm      Hash                                     Path
-----
SHA256         FAC87838D71F3DC305937B5D935C937DB6EF4D10E061195926DA9C94ABB6ED7B  F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\DoorScreenshot.jpg

Algorithm      Hash                                     Path
-----
SHA256         3C0507A12C4890C0C3F735CDF34D90E1C430AB9B20F9B2F11E8B6776FA0FD35B  F:\Thesis Materi...
```



```

File Name      : DreamcatherCamera.jpg
Directory     : .
File Size     : 1718 kB
File Modification Date/Time : 2023:10:23 17:07:04-06:00
File Access Date/Time      : 2023:10:27 19:15:36-06:00
File Creation Date/Time    : 2023:10:27 19:15:33-06:00
File Permissions          : -rw-rw-rw-
File Type               : JPEG
File Type Extension     : jpg
MIME Type              : image/jpeg
Exif Byte Order         : Big-endian (Motorola, MM)
Y Resolution            : 72
X Resolution            : 72
Camera Model Name       : GM1915
Make                   : OnePlus
Y Cb Cr Positioning     : Centered
Exif Version            : 0220
Aperture Value          : 1.6
Scene Type              : Directly photographed
Exposure Compensation   : 0
Exposure Program        : Program AE
Color Space             : sRGB
Max Aperture Value      : 1.6
Exif Image Height       : 1824
Brightness Value        : -3.1
Date/Time Original      : 2023:10:10 14:01:49
Flashpix Version        : 0100
Sub Sec Time Original   : 922149
White Balance           : Auto
Interoperability Index  : R98 - DCF basic file (sRGB)
Exposure Mode           : Auto
Exposure Time           : 1/20
Flash                   : Off, Did not fire
Sub Sec Time           : 922149
F Number                : 1.6
Exif Image Width        : 4000
ISO                     : 1600
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized  : 922149
Create Date             : 2023:10:10 14:01:49
Shutter Speed Value     : 1/20
Metering Mode           : Center-weighted average
Focal Length            : 4.8 mm
Scene Capture Type      : Standard
Light Source            : D65
Sensing Method          : Not defined
Orientation             : Rotate 90 CW
Resolution Unit         : inches
Modify Date             : 2023:10:10 14:01:49
XMP Toolkit             : Adobe XMP Core 5.1.0-jc003
Capture Mode            : Photo
Lens Facing             : Back
Scene Detect Result Ids  : [0, 0, 0]
Scene Detect Result Confidences : [0.0, 0.0, 0.0]
Scene                   : AutoHDR
Is HDR Active           : False
Is Night Mode Active    : False
Is Bokeh Active         : False
Image Width             : 4000
Image Height            : 1824
Encoding Process        : Baseline DCT, Huffman coding
Bits Per Sample         : 8

```

```

File Name      : DreamcatherScreenshot.jpg
Directory     : .
File Size     : 1898 kB
File Modification Date/Time : 2023:10:23 17:07:10-06:00
File Access Date/Time      : 2023:10:27 19:22:47-06:00
File Creation Date/Time    : 2023:10:27 19:22:44-06:00
File Permissions          : -rw-rw-rw-
File Type               : JPEG
File Type Extension     : jpg
MIME Type              : image/jpeg
JFIF Version            : 1.01
Resolution Unit         : None
X Resolution            : 1
Y Resolution            : 1
Profile CMM Type        : 
Profile Version         : 2.1.0
Profile Class           : Display Device Profile
Color Space Data        : RGB
Profile Connection Space : XYZ
Profile Date Time       : 0000:00:00 00:00:00
Profile File Signature   : acsp
Primary Platform        : Unknown ()
CMM Flags               : Not Embedded, Independent
Device Manufacturer     : 
Device Model            : 
Device Attributes       : Reflective, Glossy, Positive, Color
Rendering Intent         : Media-Relative Colorimetric
Connection Space Illuminant : 0.9642 1 0.82491
Profile Creator         : 
Profile ID              : 0
Profile Description     : sRGB
Red Matrix Column       : 0.43607 0.22249 0.01392
Green Matrix Column     : 0.38515 0.71687 0.09708
Blue Matrix Column      : 0.14307 0.06061 0.7141
Red Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Green Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Blue Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Media White Point       : 0.9642 1 0.82491
Profile Copyright       : Google Inc. 2016
Image Width             : 1440
Image Height            : 3120
Encoding Process        : Baseline DCT, Huffman coding
Bits Per Sample         : 8
Color Components        : 3
Y Cb Cr Sub Sampling    : YCbCr4:2:0 (2 2)
Image Size              : 1440x3120
Megapixels              : 4.5

```

```

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\DreamcatherCamera.jpg
Algorithm      Hash
-----
SHA256         AF788DF5BD86DB280EFA4FC09B53300AB8C125600F9027CE9AFF46F2C572127C    F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\DreamcatherScreenshot.jpg
Algorithm      Hash
-----
SHA256         5B2706786AA47B7BB0AC87B3A2C030246643E271D096C1523392D2CFA5691FEF    F:\Thesis Materi...

```

```

File Name      : FlowerBoxScreenshot.jpg
Directory     : .
File Size     : 2.4 MB
File Modification Date/Time : 2023:10:23 17:07:21-06:00
File Access Date/Time : 2023:10:27 19:48:34-06:00
File Creation Date/Time : 2023:10:27 19:48:29-06:00
File Permissions : -rw-rw-rw-
File Type     : JPEG
File Type Extension : jpg
MIME Type    : image/jpeg
JFIF Version : 1.01
Resolution Unit : None
X Resolution  : 1
Y Resolution  : 1
Profile CMM Type :
Profile Version : 2.1.0
Profile Class  : Display Device Profile
Color Space Data : RGB
Profile Connection Space : XYZ
Profile Date Time : 0000:00:00 00:00:00
Profile File Signature : acsp
Primary Platform : Unknown ()
CMM Flags      : Not Embedded, Independent
Device Manufacturer :
Device Model    :
Device Attributes : Reflective, Glossy, Positive, Color
Rendering Intent : Media-Relative Colorimetric
Connection Space Illuminant : 0.9642 1 0.82491
Profile Creator :
Profile ID     : 0
Profile Description : sRGB
Red Matrix Column : 0.43607 0.22249 0.01392
Green Matrix Column : 0.38515 0.71687 0.09708
Blue Matrix Column : 0.14307 0.06061 0.7141
Red Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Green Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Blue Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Media White Point : 0.9642 1 0.82491
Profile Copyright : Google Inc. 2016
Image Width    : 1440
Image Height   : 3120
Encoding Process : Baseline DCT, Huffman coding
Bits Per Sample : 8
Color Components : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size     : 1440x3120
Megapixels    : 4.5

```



```

File Name          : FlowerBoxCamera.jpg
Directory          : .
File Size          : 2.1 MB
File Modification Date/Time : 2023:10:23 17:07:14-06:00
File Access Date/Time   : 2023:10:27 19:35:57-06:00
File Creation Date/Time  : 2023:10:27 19:35:44-06:00
File Permissions     : -rw-rw-rw-
File Type          : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order      : Big-endian (Motorola, MM)
Y Resolution        : 72
X Resolution        : 72
Camera Model Name    : GM1915
Make                : OnePlus
Y Cb Cr Positioning  : Centered
Exif Version         : 0220
Aperture Value       : 1.6
Scene Type           : Directly photographed
Exposure Compensation : 0
Exposure Program     : Program AE
Color Space          : sRGB
Max Aperture Value   : 1.6
Exif Image Height    : 1824
Brightness Value     : -0.84
Date/Time Original   : 2023:08:21 12:12:11
Flashpix Version     : 0100
Sub Sec Time Original : 565617
White Balance        : Auto
Interoperability Index : R98 - DCF basic file (sRGB)
Exposure Mode        : Auto
Exposure Time        : 1/50
Flash               : Off, Did not fire
Sub Sec Time        : 565617
F Number            : 1.6
Exif Image Width     : 4000
ISO                 : 320
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized : 565617
Create Date         : 2023:08:21 12:12:11
Shutter Speed Value  : 1/50
Metering Mode        : Center-weighted average
Focal Length        : 4.8 mm
Scene Capture Type    : Standard
Light Source         : D65
Sensing Method       : Not defined
Orientation          : Rotate 90 CW
Resolution Unit       : inches
Modify Date         : 2023:08:21 12:12:11
XMP Toolkit          : Adobe XMP Core 5.1.0-jc003
Capture Mode         : Photo
Lens Facing          : Back
Scene Detect Result Ids : [0, 0, 0]
Scene Detect Result Confidences : [0.0, 0.0, 0.0]
Scene               : AutoHDR
Is HDR Active        : False
Is Night Mode Active : False
Is Bokeh Active      : False
Image Width         : 4000
Image Height        : 1824
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample     : 8

```

File Name	: DoorCamera.jpg	File Name	: DoorScreenshot.jpg
Directory	: .	Directory	: .
File Size	: 1857 kB	File Size	: 1999 kB
File Modification Date/Time	: 2023:10:23 17:06:56-06:00	File Modification Date/Time	: 2023:10:23 17:07:00-06:00
File Access Date/Time	: 2023:10:27 10:07:23-06:00	File Access Date/Time	: 2023:10:27 19:00:53-06:00
File Creation Date/Time	: 2023:10:27 10:07:14-06:00	File Creation Date/Time	: 2023:10:27 19:00:45-06:00
File Permissions	: -rw-rw-rw-	File Permissions	: -rw-rw-rw-
File Type	: JPEG	File Type	: JPEG
File Type Extension	: .jpg	File Type Extension	: .jpg
MIME Type	: image/jpeg	MIME Type	: image/jpeg
Exif Byte Order	: Big-endian (Motorola, MM)	JFIF Version	: 1.01
Y Resolution	: 72	Resolution Unit	: None
X Resolution	: 72	X Resolution	: 1
Camera Model Name	: GM1915	Y Resolution	: 1
Make	: OnePlus	Profile CMM Type	:
Y Cb Cr Positioning	: Centered	Profile Version	: 2.1.0
Exif Version	: 0220	Profile Class	: Display Device Profile
Aperture Value	: 1.6	Color Space Data	: RGB
Scene Type	: Directly photographed	Profile Connection Space	: XYZ
Exposure Compensation	: 0	Profile Date Time	: 0000:00:00 00:00:00
Exposure Program	: Program AE	Profile File Signature	: acsp
Color Space	: sRGB	Primary Platform	: Unknown ()
Max Aperture Value	: 1.6	CMM Flags	: Not Embedded, Independent
Exif Image Height	: 1824	Device Manufacturer	:
Brightness Value	: -2.75	Device Model	:
Date/Time Original	: 2023:10:10 14:02:00	Device Attributes	: Reflective, Glossy, Positive, Color
Flashpix Version	: 0100	Rendering Intent	: Media-Relative Colorimetric
Sub Sec Time Original	: 944148	Connection Space Illuminant	: 0.9642 1 0.82491
White Balance	: Auto	Profile Creator	:
Interoperability Index	: R98 - DCF basic file (sRGB)	Profile ID	: 0
Exposure Mode	: Auto	Profile Description	: sRGB
Exposure Time	: 1/20	Red Matrix Column	: 0.43607 0.22249 0.01392
Flash	: Off, Did not fire	Green Matrix Column	: 0.38515 0.71687 0.09708
Sub Sec Time	: 944148	Blue Matrix Column	: 0.14307 0.06061 0.7141
F Number	: 1.6	Red Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Exif Image Width	: 4000	Green Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
ISO	: 1250	Blue Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Components Configuration	: Y, Cb, Cr, -	Media White Point	: 0.9642 1 0.82491
Focal Length In 35mm Format	: 27 mm	Profile Copyright	: Google Inc. 2016
Sub Sec Time Digitized	: 944148	Image Width	: 1440
Create Date	: 2023:10:10 14:02:00	Image Height	: 3120
Shutter Speed Value	: 1/20	Encoding Process	: Baseline DCT, Huffman coding
Metering Mode	: Center-weighted average	Bits Per Sample	: 8
Focal Length	: 4.8 mm	Color Components	: 3
Scene Capture Type	: Standard	Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Light Source	: D65	Image Size	: 1440x3120
Sensing Method	: Not defined	Megapixels	: 4.5
Orientation	: Rotate 90 CW		
Resolution Unit	: Inches		
Modify Date	: 2023:10:10 14:02:00		
XMP Toolkit	: Adobe XMP Core 5.1.0-jc003		
Capture Mode	: Photo		
Lens Facing	: Back		
Scene Detect Result Ids	: [61, 0, 0]		
Scene Detect Result Confidences	: [0.91231614, 0.0, 0.0]		
Scene	: AutoHDR		
Is HDR Active	: False		
Is Night Mode Active	: False		
Is Bokeh Active	: False		
Image Width	: 4000		
Image Height	: 1824		
Encoding Process	: Baseline DCT, Huffman coding		
Bits Per Sample	: 8		

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\FlowerBoxCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	626338990191E01D450E8E7FF4C8775FEE1D2A1C68F283A5868FFE6991A4F6E4	F:\Thesis Materi...

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\FlowerBoxScreenshot.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	3AB5CEBE796F7D0061E11E5E95D690611B327F2602F198CBA662F12191C657E1	F:\Thesis Materi...

```

File Name           : KnobCamera.jpg
Directory           : .
File Size           : 1658 kB
File Modification Date/Time : 2023:10:23 17:07:24-06:00
File Access Date/Time   : 2023:10:27 20:45:46-06:00
File Creation Date/Time  : 2023:10:27 20:45:41-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Y Resolution         : 72
X Resolution         : 72
Camera Model Name     : GM1915
Make                : OnePlus
Y Cb Cr Positioning   : Centered
Exif Version         : 0220
Aperture Value        : 1.6
Scene Type           : Directly photographed
Exposure Compensation : 0
Exposure Program      : Program AE
Color Space          : sRGB
Max Aperture Value    : 1.6
Exif Image Height     : 1824
Brightness Value      : -0.52
Date/Time Original    : 2023:10:10 14:03:22
Flashpix Version      : 0100
Sub Sec Time Original : 225559
White Balance         : Auto
Interoperability Index : R98 - DCF basic file (sRGB)
Exposure Mode         : Auto
Exposure Time         : 1/50
Flash                : Off, Did not fire
Sub Sec Time         : 225559
F Number             : 1.6
Exif Image Width      : 4000
ISO                  : 640
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized : 225559
Create Date          : 2023:10:10 14:03:22
Shutter Speed Value   : 1/50
Metering Mode         : Spot
Focal Length         : 4.8 mm
Scene Capture Type    : Standard
Light Source          : D65
Sensing Method        : Not defined
Orientation           : Rotate 90 CW
Resolution Unit       : inches
Modify Date           : 2023:10:10 14:03:22
XMP Toolkit           : Adobe XMP Core 5.1.0-jc003
Capture Mode          : Photo
Lens Facing           : Back
Scene Detect Result Ids : [0, 0, 0]
Scene Detect Result Confidences : [0.0, 0.0, 0.0]
Scene                 : AutoHDR
Is HDR Active         : False
Is Night Mode Active  : False
Is Bokeh Active       : False
Image Width           : 4000
Image Height          : 1824
Encoding Process       : Baseline DCT, Huffman coding
Bits Per Sample       : 8

```

```

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\KnobCamera.jpg

Algorithm      Hash                                     Path
-----
SHA256         179C131DD11E00D903732B77BC73D40D4D21D946E73E596D1D67853D9924F36E  F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\KnobScreenshot.jpg

Algorithm      Hash                                     Path
-----
SHA256         2DC400F46854F244508A612CAC1D2D86A34F0999A10D8FCB85A78549ABB8B0DE  F:\Thesis Materi...

```



```

File Name      : KnobScreenshot.jpg
Directory      : .
File Size      : 1883 kB
File Modification Date/Time : 2023:10:23 17:07:28-06:00
File Access Date/Time      : 2023:10:28 06:46:55-06:00
File Creation Date/Time    : 2023:10:28 06:46:50-06:00
File Permissions           : -rw-rw-rw-
File Type                : JPEG
File Type Extension       : jpg
MIME Type                : image/jpeg
JFIF Version              : 1.01
Resolution Unit           : None
X Resolution              : 1
Y Resolution              : 1
Profile CMM Type          :
Profile Version           : 2.1.0
Profile Class              : Display Device Profile
Color Space Data          : RGB
Profile Connection Space   : XYZ
Profile Date Time          : 0000:00:00 00:00:00
Profile File Signature     : acsp
Primary Platform          : Unknown ()
CMM Flags                 : Not Embedded, Independent
Device Manufacturer       :
Device Model              :
Device Attributes         : Reflective, Glossy, Positive, Color
Rendering Intent          : Media-Relative Colorimetric
Connection Space Illuminant : 0.9642 1 0.82491
Profile Creator           :
Profile ID                : 0
Profile Description        : sRGB
Red Matrix Column         : 0.43607 0.22249 0.01392
Green Matrix Column       : 0.38515 0.71687 0.09708
Blue Matrix Column        : 0.14307 0.06061 0.7141
Red Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Green Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Blue Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Media White Point         : 0.9642 1 0.82491
Profile Copyright         : Google Inc. 2016
Image Width              : 1440
Image Height             : 3120
Encoding Process          : Baseline DCT, Huffman coding
Bits Per Sample           : 8
Color Components          : 3
Y Cb Cr Sub Sampling      : YCbCr4:2:0 (2 2)
Image Size               : 1440x3120
Megapixels               : 4.5

```

File Name	: LightSwitchCamera.jpg	File Name	: LightSwitchScreenshot.jpg
Directory	: .	Directory	: .
File Size	: 1698 kB	File Size	: 1858 kB
File Modification Date/Time	: 2023:10:23 17:07:31-06:00	File Modification Date/Time	: 2023:10:23 17:07:35-06:00
File Access Date/Time	: 2023:10:29 05:18:52-06:00	File Access Date/Time	: 2023:10:29 05:26:38-06:00
File Creation Date/Time	: 2023:10:29 05:18:45-06:00	File Creation Date/Time	: 2023:10:29 05:26:35-06:00
File Permissions	: -rw-rw-rw-	File Permissions	: -rw-rw-rw-
File Type	: JPEG	File Type	: JPEG
File Type Extension	: .jpg	File Type Extension	: .jpg
MIME Type	: image/jpeg	MIME Type	: image/jpeg
Exif Byte Order	: Big-endian (Motorola, MM)	JFIF Version	: 1.01
Y Resolution	: 72	Resolution Unit	: None
X Resolution	: 72	X Resolution	: 1
Camera Model Name	: GM1915	Y Resolution	: 1
Make	: OnePlus	Profile CMV Type	:
Y Cb Cr Positioning	: Centered	Profile Version	: 2.1.0
Exif Version	: 0220	Profile Class	: Display Device Profile
Aperture Value	: 1.6	Color Space Data	: RGB
Scene Type	: Directly photographed	Profile Connection Space	: XYZ
Exposure Compensation	: 0	Profile Date Time	: 0000:00:00 00:00:00
Exposure Program	: Program AE	Profile File Signature	: acsp
Color Space	: sRGB	Primary Platform	: Unknown ()
Max Aperture Value	: 1.6	CMV Flags	: Not Embedded, Independent
Exif Image Height	: 1824	Device Manufacturer	:
Brightness Value	: -1.72	Device Model	:
Date/Time Original	: 2023:10:10 14:03:39	Device Attributes	: Reflective, Glossy, Positive, Color
Flashpix Version	: 0100	Rendering Intent	: Media-Relative Colorimetric
Sub Sec Time Original	: 091212	Connection Space Illuminant	: 0.9642 1 0.82491
White Balance	: Auto	Profile Creator	:
Interoperability Index	: R98 - DCF basic file (sRGB)	Profile ID	: 0
Exposure Mode	: Auto	Profile Description	: sRGB
Exposure Time	: 1/33	Red Matrix Column	: 0.43607 0.22249 0.01392
Flash	: Off, Did not fire	Green Matrix Column	: 0.38515 0.71687 0.09708
Sub Sec Time	: 091212	Blue Matrix Column	: 0.14307 0.06061 0.7141
F Number	: 1.6	Red Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Exif Image Width	: 4000	Green Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
ISO	: 1000	Blue Tone Reproduction Curve	: (Binary data 40 bytes, use -b option to extract)
Components Configuration	: Y, Cb, Cr, -	Media White Point	: 0.9642 1 0.82491
Focal Length In 35mm Format	: 27 mm	Profile Copyright	: Google Inc. 2016
Sub Sec Time Digitized	: 091212	Image Width	: 1440
Create Date	: 2023:10:10 14:03:39	Image Height	: 3120
Shutter Speed Value	: 1/33	Encoding Process	: Baseline DCT, Huffman coding
Metering Mode	: Spot	Bits Per Sample	: 8
Focal Length	: 4.8 mm	Color Components	: 3
Scene Capture Type	: Standard	Y Cb Cr Sub Sampling	: YCbCr4:2:0 (2 2)
Light Source	: D65	Image Size	: 1440x3120
Sensing Method	: Not defined	Megapixels	: 4.5
Orientation	: Rotate 90 CW		
Resolution Unit	: Inches		
Modify Date	: 2023:10:10 14:03:39		
XMP Toolkit	: Adobe XMP Core 5.1.0-jc003		
Capture Mode	: Photo		
Lens Facing	: Back		
Scene Detect Result Ids	: [0, 0, 0]		
Scene Detect Result Confidences	: [0.0, 0.0, 0.0]		
Scene	: AutoHDR		
Is HDR Active	: False		
Is Night Mode Active	: False		
Is Bokeh Active	: False		
Image Width	: 4000		
Image Height	: 1824		
Encoding Process	: Baseline DCT, Huffman coding		
Bits Per Sample	: 8		

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\Camera\Screenshots> Get-FileHash .\LightSwitchCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	4F1A10F8C2B5B379C590E844F73F10803F23FABA7D4A45E366B7A7C9D8057944	F:\Thesis Materi...

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\Camera\Screenshots> Get-FileHash .\LightSwitchScreenshot.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	6C7CA11185E8C48CC8FA04927CA2E015B2F99C89BAE31593868CE0AF83F89809	F:\Thesis Materi...

```

File Name           : RoundCaseCamera.jpg
Directory           : .
File Size           : 2.2 MB
File Modification Date/Time : 2023:10:23 17:07:40-06:00
File Access Date/Time   : 2023:10:29 15:23:11-06:00
File Creation Date/Time  : 2023:10:29 15:23:11-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Y Resolution         : 72
X Resolution         : 72
Camera Model Name     : GM1915
Make                : OnePlus
Y Cb Cr Positioning   : Centered
Exif Version         : 0220
Aperture Value       : 1.6
Scene Type           : Directly photographed
Exposure Compensation : 0
Exposure Program      : Program AE
Color Space          : sRGB
Max Aperture Value    : 1.6
Exif Image Height     : 1824
Brightness Value      : -1.16
Date/Time Original    : 2023:08:21 12:11:43
Flashpix Version      : 0100
Sub Sec Time Original : 285821
White Balance         : Auto
Interoperability Index : R98 - DCF basic file (sRGB)
Exposure Mode         : Auto
Exposure Time         : 1/50
Flash                : Off, Did not fire
Sub Sec Time         : 285821
F Number              : 1.6
Exif Image Width      : 4000
ISO                   : 400
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized : 285821
Create Date           : 2023:08:21 12:11:43
Shutter Speed Value    : 1/50
Metering Mode          : Center-weighted average
Focal Length           : 4.8 mm
Scene Capture Type     : Standard
Light Source           : D65
Sensing Method         : Not defined
Orientation            : Rotate 90 CW
Resolution Unit        : inches
Modify Date            : 2023:08:21 12:11:43
XMP Toolkit            : Adobe XMP Core 5.1.0-jc003
Capture Mode           : Photo
Lens Facing            : Back
Scene Detect Result Ids : [61, 0, 0]
Scene Detect Result Confidences : [0.82978994, 0.0, 0.0]
Scene                  : AutoHDR
Is HDR Active          : False
Is Night Mode Active   : False
Is Bokeh Active        : False
Image Width            : 4000
Image Height           : 1824
Encoding Process       : Baseline DCT, Huffman coding
Bits Per Sample        : 8

```

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\RoundCaseCamera.jpg
```

Algorithm	Hash	Path
SHA256	7A2F919DC7385F3300FC0070259AC278ED34959539ACA941352E97E8B64BA803	F:\Thesis Materi...

```
PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\RoundCaseScreenshot.jpg
```

Algorithm	Hash	Path
SHA256	6DB98E804E955228662331669140F91498A1056F1016EF52076DF8DD3CB3B80	F:\Thesis Materi...


```

File Name           : TableCordsCamera.jpg
Directory           : .
File Size           : 2.2 MB
File Modification Date/Time : 2023:10:23 17:07:49-06:00
File Access Date/Time   : 2023:10:29 16:28:50-06:00
File Creation Date/Time  : 2023:10:29 16:28:47-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : .jpg
MIME Type            : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Y Resolution          : 72
X Resolution          : 72
Camera Model Name     : GM1915
Make                 : OnePlus
Y Cb Cr Positioning   : Centered
Exif Version          : 0220
Aperture Value        : 1.6
Scene Type            : Directly photographed
Exposure Compensation : 0
Exposure Program      : Program AE
Color Space           : sRGB
Max Aperture Value    : 1.6
Exif Image Height     : 1824
Brightness Value      : -2.08
Date/Time Original    : 2023:08:21 12:11:54
Flashpix Version      : 0100
Sub Sec Time Original : 491261
White Balance         : Auto
Interoperability Index : R98 - DCF basic file (sRGB)
Exposure Mode         : Auto
Exposure Time         : 1/33
Flash                : Off, Did not fire
Sub Sec Time         : 491261
F Number              : 1.6
Exif Image Width      : 4000
ISO                   : 500
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized : 491261
Create Date           : 2023:08:21 12:11:54
Shutter Speed Value    : 1/33
Metering Mode          : Center-weighted average
Focal Length           : 4.8 mm
Scene Capture Type     : Standard
Light Source           : D65
Sensing Method         : Not defined
Orientation            : Rotate 90 CW
Resolution Unit        : inches
Modify Date            : 2023:08:21 12:11:54
XMP Toolkit            : Adobe XMP Core 5.1.0-jc003
Capture Mode           : Photo
Lens Facing            : Back
Scene Detect Result Ids : [0, 0, 0]
Scene Detect Result Confidences : [0.0, 0.0, 0.0]
Scene                  : AutoHDR
Is HDR Active          : False
Is Night Mode Active   : False
Is Bokeh Active        : False
Image Width            : 4000
Image Height           : 1824
Encoding Process       : Baseline DCT, Huffman coding

```

```

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\TableCordsCamera.jpg
Algorithm      Hash                                     Path
-----
SHA256         DCB8DC9B075E9647A0517F3320B8DBB34893CAFFB02169D7026A176ADE7CE3A  F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\TableCordsScreenshot.jpg
Algorithm      Hash                                     Path
-----
SHA256         DAE6AF6D619FCF7A24986641BF339E7197FC10947AF328BB3C975E5196C1E2D7  F:\Thesis Materi...

```



```

File Name           : TableCordsScreenshot.jpg
Directory           : .
File Size           : 2.4 MB
File Modification Date/Time : 2023:10:23 17:07:54-06:00
File Access Date/Time   : 2023:10:29 16:46:55-06:00
File Creation Date/Time  : 2023:10:29 16:46:51-06:00
File Permissions      : -rw-rw-rw-
File Type            : JPEG
File Type Extension    : jpg
MIME Type            : image/jpeg
JFIF Version          : 1.01
Resolution Unit        : None
X Resolution          : 1
Y Resolution          : 1
Profile CMM Type       : 
Profile Version        : 2.1.0
Profile Class          : Display Device Profile
Color Space Data       : RGB
Profile Connection Space : XYZ
Profile Date Time       : 0000:00:00 00:00:00
Profile File Signature  : acsp
Primary Platform       : Unknown ()
CMM Flags              : Not Embedded, Independent
Device Manufacturer    : 
Device Model           : 
Device Attributes       : Reflective, Glossy, Positive, Color
Rendering Intent        : Media-Relative Colorimetric
Connection Space Illuminant : 0.9642 1 0.82491
Profile Creator         : 
Profile ID              : 0
Profile Description     : sRGB
Red Matrix Column       : 0.43607 0.22249 0.01392
Green Matrix Column     : 0.38515 0.71687 0.09708
Blue Matrix Column      : 0.14307 0.06061 0.7141
Red Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Green Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Blue Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Media White Point       : 0.9642 1 0.82491
Profile Copyright       : Google Inc. 2016
Image Width            : 1440
Image Height           : 3120
Encoding Process        : Baseline DCT, Huffman coding
Bits Per Sample         : 8
Color Components        : 3
Y Cb Cr Sub Sampling    : YCbCr4:2:0 (2 2)
Image Size              : 1440x3120
Megapixels              : 4.5

```

```

File Name           : TotemCamera.jpg
Directory           : .
File Size           : 1851 kB
File Modification Date/Time : 2023:10:23 17:08:00-06:00
File Access Date/Time   : 2023:10:29 17:18:46-06:00
File Creation Date/Time  : 2023:10:29 17:18:43-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Y Resolution         : 72
X Resolution         : 72
Camera Model Name     : GM1915
Make                : OnePlus
Y Cb Cr Positioning   : Centered
Exif Version         : 0220
Aperture Value        : 1.6
Scene Type           : Directly photographed
Exposure Compensation : 0
Exposure Program      : Program AE
Color Space           : sRGB
Max Aperture Value    : 1.6
Exif Image Height     : 1824
Brightness Value      : -1.75
Date/Time Original    : 2023:10:10 14:03:53
Flashpix Version      : 0100
Sub Sec Time Original : 405434
White Balance         : Auto
Interoperability Index : R98 - DCF basic file (sRGB)
Exposure Mode         : Auto
Exposure Time         : 1/33
Flash                : Off, Did not fire
Sub Sec Time         : 405434
F Number              : 1.6
Exif Image Width      : 4000
ISO                   : 400
Components Configuration : Y, Cb, Cr, -
Focal Length In 35mm Format : 27 mm
Sub Sec Time Digitized : 405434
Create Date           : 2023:10:10 14:03:53
Shutter Speed Value    : 1/33
Metering Mode         : Spot
Focal Length          : 4.8 mm
Scene Capture Type     : Standard
Light Source           : D65
Sensing Method         : Not defined
Orientation            : Rotate 90 CW
Resolution Unit        : inches
Modify Date            : 2023:10:10 14:03:53
XMP Toolkit            : Adobe XMP Core 5.1.0-jc003
Capture Mode           : Photo
Lens Facing            : Back
Scene Detect Result Ids : [61, 0, 0]
Scene Detect Result Confidences : [0.9125388, 0.0, 0.0]
Scene                  : AutoHDR
Is HDR Active          : False
Is Night Mode Active   : False
Is Bokeh Active        : False
Image Width            : 4000
Image Height           : 1824
Encoding Process       : Baseline DCT, Huffman coding
Bits Per Sample        : 8

```

```

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\TotemCamera.jpg
Algorithm      Hash                                     Path
-----
SHA256         B849631E2AA77A8BC7BC3F03B144099D852F5CC5DA98F8A91F8B4714BC26D8B6 F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\OnePlus7Pro\CameravsScreenshot> Get-FileHash .\TotemScreenshot.jpg
Algorithm      Hash                                     Path
-----
SHA256         0BAFD1074B47C70D3B5E4D05614B892FAD92480C0C57AA23E9C4890A68F9A4AD F:\Thesis Materi...

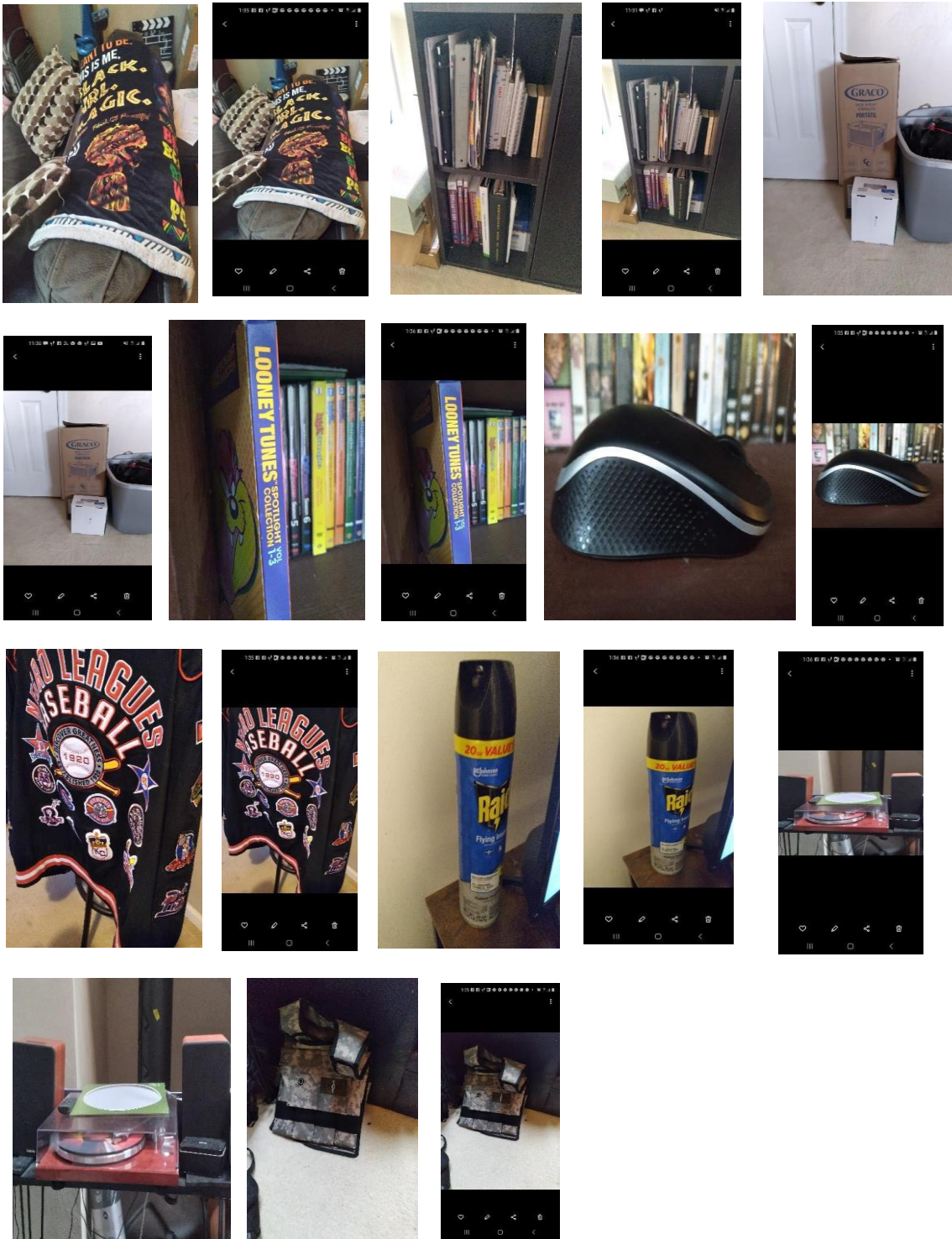
```

```

File Name           : TotemScreenshot.jpg
Directory           : .
File Size           : 2.2 MB
File Modification Date/Time : 2023:10:23 17:06:32-06:00
File Access Date/Time   : 2023:10:29 17:39:38-06:00
File Creation Date/Time  : 2023:10:29 17:39:05-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
JFIF Version         : 1.01
Resolution Unit       : None
X Resolution         : 1
Y Resolution         : 1
Profile CMM Type      :
Profile Version       : 2.1.0
Profile Class         : Display Device Profile
Color Space Data      : RGB
Profile Connection Space : XYZ
Profile Date Time     : 0000:00:00 00:00:00
Profile File Signature : acsp
Primary Platform      : Unknown ()
CMM Flags             : Not Embedded, Independent
Device Manufacturer   :
Device Model          :
Device Attributes     : Reflective, Glossy, Positive, Color
Rendering Intent      : Media-Relative Colorimetric
Connection Space Illuminant : 0.9642 1 0.82491
Profile Creator       :
Profile ID            : 0
Profile Description    : sRGB
Red Matrix Column     : 0.43607 0.22249 0.01392
Green Matrix Column   : 0.38515 0.71687 0.09708
Blue Matrix Column    : 0.14307 0.06061 0.7141
Red Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Green Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Blue Tone Reproduction Curve : (Binary data 40 bytes, use -b option to extract)
Media White Point     : 0.9642 1 0.82491
Profile Copyright     : Google Inc. 2016
Image Width           : 1440
Image Height          : 3120
Encoding Process       : Baseline DCT, Huffman coding
Bits Per Sample       : 8
Color Components      : 3
Y Cb Cr Sub Sampling  : YCbCr4:2:0 (2 2)
Image Size            : 1440x3120
Megapixels            : 4.5

```

*SAMSUNG GALAXY A11 ADDITIONAL IMAGES, HASH VERIFICATIONS, AND FIAS REPORTS




```

File Name           : BlackGirlMagicCamera.jpg
Directory           : .
File Size           : 4.2 MB
File Modification Date/Time : 2023:10:23 17:08:25-06:00
File Access Date/Time   : 2023:10:24 15:20:47-06:00
File Creation Date/Time  : 2023:10:24 15:20:05-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type            : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Rotate 90 CW
Modify Date          : 2023:10:10 08:04:50
Focal Length         : 3.6 mm
Exposure Time        : 1/13
Flash                : No Flash
ISO                  : 3017
White Balance         : Auto
Aperture Value       : 1.9
Make                 : samsung
JFIF Version         : 1.01
Resolution Unit       : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process      : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components      : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture             : 1.9
Image Size           : 4160x3120
Megapixels           : 13.0
Shutter Speed        : 1/13
Focal Length         : 3.6 mm
Light Value          : 0.6

File Name           : BlackGirlMagicScreenshot.jpg
Directory           : .
File Size           : 576 kB
File Modification Date/Time : 2023:10:23 17:08:26-06:00
File Access Date/Time   : 2023:10:24 15:33:28-06:00
File Creation Date/Time  : 2023:10:24 15:32:43-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type            : image/jpeg
JFIF Version         : 1.01
Resolution Unit       : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process      : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components      : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels           : 1.1

```

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BlackGirlMagicCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	0DE92368E00B85AE198C971D0D5F1384F0750E833D4A0E5AE5411BA96F091C3B	F:\Thesis Materi...

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BlackGirlMagicScreenshot.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	2235BB5C42FABA66339B5F84DB5684AF7A2054918DE7EF32858B75FEA49E0E18	F:\Thesis Materi...

```

File Name           : BookcaseCamera.jpg
Directory           : .
File Size           : 4.2 MB
File Modification Date/Time : 2023:10:23 17:08:34-06:00
File Access Date/Time   : 2023:10:24 15:40:02-06:00
File Creation Date/Time : 2023:10:24 15:37:52-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order      : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Rotate 90 CW
Modify Date          : 2023:08:21 11:30:11
Focal Length         : 3.6 mm
Exposure Time        : 1/14
Flash                : No Flash
ISO                  : 2334
White Balance        : Auto
Aperture Value       : 1.9
Make                 : samsung
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process      : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components      : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture             : 1.9
Image Size           : 4160x3120
Megapixels           : 13.0
Shutter Speed        : 1/14
Focal Length         : 3.6 mm
Light Value          : 1.1

```

```

File Name           : BookcaseScreenshot.jpg
Directory           : .
File Size           : 520 kB
File Modification Date/Time : 2023:10:23 17:08:35-06:00
File Access Date/Time   : 2023:10:24 15:50:52-06:00
File Creation Date/Time : 2023:10:24 15:49:43-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process      : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components      : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels           : 1.1

```

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BookcaseCamera.jpg

Algorithm      Hash
-----
SHA256         9B9C7AE71054DD58AF4AF8951CF942793B913A526264D19728EE7C2CD4C5C333      Path
-----
F:\Thesis Materi...
```

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BookcaseScreenshot.jpg

Algorithm      Hash
-----
SHA256         BDE02F7466E7FCD2B6E4F1EADCDEA76893EAA1D007730A2239529219F9890620      Path
-----
F:\Thesis Materi...
```

```
File Name      : BoxesCamera.jpg
Directory     : .
File Size      : 2.1 MB
File Modification Date/Time : 2023:10:23 17:08:48-06:00
File Access Date/Time   : 2023:10:24 16:44:55-06:00
File Creation Date/Time : 2023:10:24 16:44:31-06:00
File Permissions : -rw-rw-rw-
File Type      : JPEG
File Type Extension : jpg
MIME Type      : image/jpeg
Exif Byte Order : Big-endian (Motorola, MM)
Camera Model Name : SM-A115U
Orientation     : Rotate 90 CW
Modify Date     : 2023:08:21 11:29:47
Focal Length    : 3.6 mm
Exposure Time   : 1/25
Flash           : No Flash
ISO             : 363
White Balance   : Auto
Aperture Value  : 1.9
Make            : samsung
JFIF Version    : 1.01
Resolution Unit : None
X Resolution    : 1
Y Resolution    : 1
Image Width     : 4160
Image Height    : 3120
Encoding Process : Baseline DCT, Huffman coding
Bits Per Sample : 8
Color Components : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture        : 1.9
Image Size      : 4160x3120
Megapixels      : 13.0
Shutter Speed   : 1/25
Focal Length    : 3.6 mm
Light Value     : 4.6
```



```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BoxesCamera.jpg

Algorithm      Hash
-----
SHA256         7B22F941F297286FC4BEDB1EF4563D330CA4C8BFD485C9145DA65A0504F3DC7
Path
-----
F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\BoxesScreenshot.jpg

Algorithm      Hash
-----
SHA256         9F283A901371505BC77E2F85693B5769385B2E52005FD4F60F2B653F1C12C57D
Path
-----
F:\Thesis Materi...
```

```

File Name           : LooneyTunesCamera.jpg
Directory           : .
File Size           : 8.4 MB
File Modification Date/Time : 2023:10:23 17:09:00-06:00
File Access Date/Time   : 2023:10:29 05:30:25-06:00
File Creation Date/Time  : 2023:10:29 05:30:19-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Rotate 90 CW
Modify Date          : 2023:10:15 13:28:37
Focal Length         : 3.6 mm
Exposure Time        : 1/15
Flash               : No Flash
ISO                 : 2382
White Balance        : Auto
Aperture Value       : 1.9
Make               : samsung
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture            : 1.9
Image Size           : 4160x3120
Megapixels          : 13.0
Shutter Speed        : 1/15
Focal Length         : 3.6 mm
Light Value          : 1.1

```

```

File Name           : LooneyTunesScreenshot.jpg
Directory           : .
File Size           : 485 kB
File Modification Date/Time : 2023:10:23 17:09:01-06:00
File Access Date/Time   : 2023:10:29 05:42:10-06:00
File Creation Date/Time  : 2023:10:29 05:42:08-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels          : 1.1

```

```

File Name           : MouseCamera.jpg
Directory           : .
File Size           : 4.2 MB
File Modification Date/Time : 2023:10:23 17:09:13-06:00
File Access Date/Time   : 2023:10:29 06:10:55-06:00
File Creation Date/Time  : 2023:10:29 06:10:47-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Horizontal (normal)
Modify Date          : 2023:10:10 08:04:28
Focal Length         : 3.6 mm
Exposure Time        : 1/11
Flash               : No Flash
ISO                 : 3318
White Balance        : Auto
Aperture Value       : 1.9
Make               : samsung
JFIF Version        : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture            : 1.9
Image Size           : 4160x3120
Megapixels          : 13.0
Shutter Speed       : 1/11
Focal Length        : 3.6 mm
Light Value          : 0.2

```

```

File Name           : MouseScreenshot.jpg
Directory           : .
File Size           : 279 kB
File Modification Date/Time : 2023:10:23 17:09:14-06:00
File Access Date/Time   : 2023:10:29 06:45:42-06:00
File Creation Date/Time  : 2023:10:29 06:45:37-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
JFIF Version        : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels          : 1.1

```

```

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\MouseCamera.jpg

Algorithm      Hash
-----
SHA256         D28CA0FEA80AC4026574AA6D653696AC5FB978D2D21AF4EE8656913E8FDD0F68
Path
-----
F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\MouseScreenshot.jpg

Algorithm      Hash
-----
SHA256         AA6BD536F91A699AFA1C36DE1F9D2E366394F79E4FBC7F9664B94A5022ED4202
Path
-----
F:\Thesis Materi...

```

```

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\LooneyTunesCamera.jpg

Algorithm      Hash
-----
SHA256         603551118B5523B042A86307004EE277924B40B55ED8CD1661DB3F27E273E084
Path
-----
F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\LooneyTunesScreenshot.jpg

Algorithm      Hash
-----
SHA256         85B62BE2F2D1642D9A7DA285301F0F595B7EC98B84D39F3CA64A7565DA3CDBBD
Path
-----
F:\Thesis Materi...

```

```

File Name           : NLBaseballCamera.jpg
Directory           : .
File Size           : 8.4 MB
File Modification Date/Time : 2023:10:23 17:09:27-06:00
File Access Date/Time   : 2023:10:29 06:51:14-06:00
File Creation Date/Time  : 2023:10:29 06:51:11-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension    : jpg
MIME Type            : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Rotate 90 CW
Modify Date          : 2023:10:10 08:05:16
Focal Length         : 3.6 mm
Exposure Time        : 1/15
Flash                : No Flash
ISO                  : 1715
White Balance        : Auto
Aperture Value       : 1.9
Make                 : samsung
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture             : 1.9
Image Size           : 4160x3120
Megapixels           : 13.0
Shutter Speed        : 1/15
Focal Length         : 3.6 mm
Light Value          : 1.6

File Name           : NLBaseballScreenshot.jpg
Directory           : .
File Size           : 593 kB
File Modification Date/Time : 2023:10:23 17:09:28-06:00
File Access Date/Time   : 2023:10:29 07:36:08-06:00
File Creation Date/Time  : 2023:10:29 07:36:01-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension    : jpg
MIME Type            : image/jpeg
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels           : 1.1

```



```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\NLBaseballCamera.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	1A8FD9A5D1C3C5450916F7851C3AACC52DBEA14A1F9266D15355A86019191705	F:\Thesis Materi...

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\NLBaseballScreenshot.jpg
```

Algorithm	Hash	Path
-----	----	----
SHA256	143073EB9A7E1FF012E698B2E553354E856C06D96F42E4836762CF456BB67BC4	F:\Thesis Materi...

```

File Name           : RaidCamera.jpg
Directory           : .
File Size           : 8.4 MB
File Modification Date/Time : 2023:10:23 17:09:45-06:00
File Access Date/Time   : 2023:10:29 08:12:01-06:00
File Creation Date/Time  : 2023:10:29 08:11:52-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
Exif Byte Order       : Big-endian (Motorola, MM)
Camera Model Name     : SM-A115U
Orientation          : Rotate 90 CW
Modify Date          : 2023:10:10 08:06:52
Focal Length         : 3.6 mm
Exposure Time        : 1/17
Flash                : No Flash
ISO                  : 1857
White Balance        : Auto
Aperture Value       : 1.9
Make                 : samsung
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 4160
Image Height         : 3120
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture             : 1.9
Image Size           : 4160x3120
Megapixels           : 13.0
Shutter Speed        : 1/17
Focal Length         : 3.6 mm
Light Value          : 1.7

```

```

File Name           : RaidScreenshot.jpg
Directory           : .
File Size           : 456 kB
File Modification Date/Time : 2023:10:23 17:09:46-06:00
File Access Date/Time   : 2023:10:29 08:37:24-06:00
File Creation Date/Time  : 2023:10:29 08:35:02-06:00
File Permissions      : -rw-rw-rw-
File Type           : JPEG
File Type Extension   : jpg
MIME Type           : image/jpeg
JFIF Version         : 1.01
Resolution Unit      : None
X Resolution         : 1
Y Resolution         : 1
Image Width          : 720
Image Height         : 1560
Encoding Process     : Baseline DCT, Huffman coding
Bits Per Sample      : 8
Color Components     : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Image Size           : 720x1560
Megapixels           : 1.1

```

```
PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\RaidCamera.jpg

Algorithm      Hash
-----
SHA256         545031764D7A69969FC3F132B29D58E7E83F8DB0A5F3055635483C0A06A6D56E
Path
-----
F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\RaidScreenshot.jpg

Algorithm      Hash
-----
SHA256         A7207FCF2C9E5C8D2B4BF57D05FC0138C77766E51A98609B48A3928AC961E215
Path
-----
F:\Thesis Materi...
```


File Name : RecordTableCamera.jpg
 Directory : .
 File Size : 4.2 MB
 File Modification Date/Time : 2023:10:23 17:09:52-06:00
 File Access Date/Time : 2023:10:29 08:41:13-06:00
 File Creation Date/Time : 2023:10:29 08:41:05-06:00
 File Permissions : -rw-rw-rw-
 File Type : JPEG
 File Type Extension : jpg
 MIME Type : image/jpeg
 Exif Byte Order : Big-endian (Motorola, MM)
 Camera Model Name : SM-A115U
 Orientation : Horizontal (normal)
 Modify Date : 2023:10:15 13:29:33
 Focal Length : 3.6 mm
 Exposure Time : 1/20
 Flash : No Flash
 ISO : 1275
 White Balance : Auto
 Aperture Value : 1.9
 Make : samsung
 JFIF Version : 1.01
 Resolution Unit : None
 X Resolution : 1
 Y Resolution : 1
 Image Width : 4160
 Image Height : 3120
 Encoding Process : Baseline DCT, Huffman coding
 Bits Per Sample : 8
 Color Components : 3
 Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
 Aperture : 1.9
 Image Size : 4160x3120
 Megapixels : 13.0
 Shutter Speed : 1/20
 Focal Length : 3.6 mm
 Light Value : 2.5

File Name : RecordTableScreenshot.jpg
 Directory : .
 File Size : 304 kB
 File Modification Date/Time : 2023:10:23 17:09:53-06:00
 File Access Date/Time : 2023:10:29 09:32:16-06:00
 File Creation Date/Time : 2023:10:29 09:32:09-06:00
 File Permissions : -rw-rw-rw-
 File Type : JPEG
 File Type Extension : jpg
 MIME Type : image/jpeg
 JFIF Version : 1.01
 Resolution Unit : None
 X Resolution : 1
 Y Resolution : 1
 Image Width : 720
 Image Height : 1560
 Encoding Process : Baseline DCT, Huffman coding
 Bits Per Sample : 8
 Color Components : 3
 Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
 Image Size : 720x1560
 Megapixels : 1.1

```

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\RecordTableCamera.jpg
Algorithm      Hash
-----
SHA256         9A92C4E26CA765B2162D6BA8CFA8D531EA071476002E52954F2FD594DEE2102F      F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\RecordTableScreenshot.jpg
Algorithm      Hash
-----
SHA256         5A606886ACFD85982F14A3E3ED046E704B2C862E1A3E8A950BDD18E66D0A74F7      F:\Thesis Materi...

```

```

File Name      : WeightVestCamera.jpg
Directory     : .
File Size      : 8.4 MB
File Modification Date/Time : 2023:10:23 17:10:06-06:00
File Access Date/Time   : 2023:10:29 18:15:24-06:00
File Creation Date/Time  : 2023:10:29 18:15:19-06:00
File Permissions : -rw-rw-rw-
File Type      : JPEG
File Type Extension : .jpg
MIME Type      : image/jpeg
Exif Byte Order : Big-endian (Motorola, MM)
Camera Model Name : SM-A115U
Orientation     : Rotate 90 CW
Modify Date     : 2023:10:10 08:03:51
Focal Length    : 3.6 mm
Exposure Time   : 1/20
Flash           : No Flash
ISO             : 1431
White Balance   : Auto
Aperture Value  : 1.9
Make            : samsung
JFIF Version    : 1.01
Resolution Unit : None
X Resolution    : 1
Y Resolution    : 1
Image Width     : 4160
Image Height    : 3120
Encoding Process : Baseline DCT, Huffman coding
Bits Per Sample : 8
Color Components : 3
Y Cb Cr Sub Sampling : YCbCr4:2:0 (2 2)
Aperture        : 1.9
Image Size      : 4160x3120
Megapixels      : 13.0
Shutter Speed   : 1/20
Focal Length    : 3.6 mm
Light Value     : 2.3

```

```

File Name           : WeightVestScreenshot.jpg
Directory           : .
File Size            : 458 kB
File Modification Date/Time : 2023:10:23 17:08:16-06:00
File Access Date/Time   : 2023:10:29 18:37:45-06:00
File Creation Date/Time  : 2023:10:29 18:37:37-06:00
File Permissions       : -rW-rW-rW-
File Type            : JPEG
File Type Extension    : jpg
MIME Type            : image/jpeg
JFIF Version          : 1.01
Resolution Unit        : None
X Resolution          : 1
Y Resolution          : 1
Image Width           : 720
Image Height          : 1560
Encoding Process       : Baseline DCT, Huffman coding
Bits Per Sample        : 8
Color Components       : 3
Y Cb Cr Sub Sampling   : YCbCr4:2:0 (2 2)
Image Size            : 720x1560
Megapixels            : 1.1

```

```

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\WeightVestCamera.jpg
Algorithm      Hash                                     Path
-----
SHA256         1057C61E91A3AD21EA04D76BEA32B2E95978D9244A64AC17C234DADC64481490 F:\Thesis Materi...

PS F:\Thesis Material\Thesis Photos\SamsungGalaxyA11\CameravsScreenshot> Get-FileHash .\WeightVestScreenshot.jpg
Algorithm      Hash                                     Path
-----
SHA256         5F5E00CAA8D900380BD4F954A09C5EDF09F4F17094881ADEA66D200B7F533A1A F:\Thesis Materi...

```