Unittest for `media`

August 16, 2025

Contents

1 Test Information

1.1 Test Candidate Information

The Module media is designed to help on all issues with media files, like tags (e.g. exif, id3) and transformations. For more Information read the documentation.

Library Information	
Name	media
State	Released
Supported Interpreters	python3
Version	187551be7c8e5ccdf7d3e15d55ebd849
Dependencies	

1.2 Unittest Information

Unittest Information	
Version	11788ce248ede284b3ac8b3d342da278
Testruns with	python 3.13.5 (final)

1.3 Test System Information

System Information	
Architecture	64bit
Distribution	Debian GNU/Linux 13 trixie
Hostname	erle
Kernel	6.15.1-surface-2 (#2 SMP PREEMPT_DYNAMIC Tue Jun 24 21:02:07 UTC 2025)
Machine	x86_64
Path	/home/dirk/work/unittest_collection/media
System	Linux
Username	dirk

2 Statistic

2.1 Test-Statistic for testrun with python 3.13.5 (final)

Number of tests	**7**
Number of successfull tests	**7**
Number of possibly failed tests	**0**
Number of failed tests	**0**
Executionlevel	Full Test (all defined tests)
Time consumption	3.574s

2.2 Coverage Statistic

Module- or Filename	Line-Coverage	Branch-Coverage
media	68.7%	54.9%
media.CDDB.py	19.5%	
media.__init__.py	100.0%	
media.common.py	84.1%	
media.convert.py	37.5%	
media.image.py	99.2%	
media.metadata.py	82.0%	

3 Tested Requirements

3.1 Metadata

3.1.1 Method to get Metadata

Description
A Method shall return the metadata for a given media filename.

Testresult
This test was passed with the state: **Success**. See also full trace in section A.1.1!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:25,742
Finished-Time:	2025-08-16 16:39:26,386
Time-Consumption	0.644s

Testsummary:

Success	Media data for unknown.txt is correct (Content None and Type is <class 'NoneType'>).
Success	Media data for audio.mp3 is correct (Content {'duration': 236.094694, 'bitrate': 290743, 'artist': 'Kaleo', 'title': 'No Good', 'album': 'A/B', 'track': 1, 'genre': 'Rock', 'year': 2016, 'size': 8580366, 'time': 1451606398, 'tm_is_subst': True} and Type is <class 'dict'>).
Success	Media data for audio_fail_conv.mp3 is correct (Content {'duration': 281.991837, 'bitrate': 228298, 'title': 'Video Games (Album Version Remastered)', 'artist': 'Lana Del Rey', 'album': 'Born To Die', 'genre': 'Pop', 'track': 4, 'year': 2012, 'size': 8047290, 'time': 1325375995, 'tm_is_subst': True} and Type is <class 'dict'>).
Success	Media data for audio_year_0.mp3 is correct (Content {'duration': 120.476735, 'bitrate': 240202, 'title': 'Was bringt der Dezember', 'artist': 'Rolf und seine Freunde', 'album': 'Wir warten auf Weihnachten', 'year': 0, 'track': 9, 'genre': 'Other', 'size': 3617354} and Type is <class 'dict'>).
Success	Media data for image_exif_gps.jpg is correct (Content {'time': 1560083621, 'exposure_program': 'Program Normal', 'exposure_time': 0.007633587786259542, 'flash': 'Off', 'aperture': 2.2, 'focal_length': 3.463, 'gps': {'lon': 11.574697, 'lat': 52.993599}, 'height': 3120, 'iso': 100, 'orientation': 6, 'width': 4160, 'size': 4524705, 'camera': 'motorola: motorola one'} and Type is <class 'dict'>).
Success	Media data for image_exif_no_gps.jpg is correct (Content {'time': 1515143529, 'exposure_program': 'Program Normal', 'exposure_time': 0.03, 'flash': 'Fired', 'aperture': 2.2, 'focal_length': 4.5, 'height': 3968, 'iso': 160, 'orientation': 0, 'width': 2976, 'size': 2837285, 'camera': 'HUAWEI: EVA-L09'} and Type is <class 'dict'>).
Success	Media data for image_non_exif.jpg is correct (Content {'size': 1139092, 'time': 1754841648, 'tm_is_subst': True} and Type is <class 'dict'>).
Success	Media data for image_extraction_failed.jpg is correct (Content {'time': 1226149915, 'exposure_program': 'Program Normal', 'exposure_time': 0.008, 'flash': 'Fill Fired', 'aperture': 7.1, 'focal_length': 170.0, 'height': 2592, 'iso': 400, 'orientation': 1, 'width': 3888, 'size': 1301272, 'camera': 'Canon: Canon EOS 40D'} and Type is <class 'dict'>).
Success	Media data for faulty_gps_data.jpg is correct (Content {'time': 1590940859, 'exposure_program': 'Program Normal', 'exposure_time': 0.01, 'flash': 'Off', 'aperture': 2.0, 'focal_length': 3.463, 'height': 3120, 'iso': 124, 'orientation': 6, 'width': 4160, 'size': 3500036, 'camera': 'motorola: motorola one'} and Type is <class 'dict'>).

Success	Media data for video.3gp is correct (Content {'width': 800, 'height': 480, 'ratio': 1.6666666666666667, 'duration': 3.964, 'bitrate': 2341765, 'time': 1414948303, 'size': 1160345} and Type is <class 'dict'>).
Success	Media data for video.mp4 is correct (Content {'width': 1920, 'height': 1080, 'ratio': 1.7777777777777777, 'duration': 12.453189, 'bitrate': 17883617, 'time': 1503125482, 'size': 27838508} and Type is <class 'dict'>).
Success	Media data for video_special_time.avi is correct (Content {'width': 320, 'height': 240, 'duration': 26.531264, 'bitrate': 840554, 'time': 1086778620, 'size': 2787622} and Type is <class 'dict'>).
Success	Media data for video_no_date.avi is correct (Content {'width': 640, 'height': 480, 'ratio': 1.3333333333333333, 'duration': 11.016, 'bitrate': 2153411, 'size': 2965248, 'time': 1754841648, 'tm_is_subst': True} and Type is <class 'dict'>).

3.2 Image

3.2.1 Load from File

Description

The class `image` shall have a method `load_from_file`, which creates a copy of an image to the instance. Load from file can handle a filename, but also pil images and media images. The method returns `True` on success and `False` on failures.

Testresult

This test was passed with the state: Success. See also full trace in section A.1.2!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:26,386
Finished-Time:	2025-08-16 16:39:26,677
Time-Consumption	0.291s

Testsummary:

Success	Type of image stored in instance, if no parameter is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).
Success	Type of image stored in instance, if a unsupported parameter is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).
Success	Type of image stored in instance, if an unknown file is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).
Success	Type of image stored in instance, if a image file is given is correct (Content <class 'PIL.Image.Image'> and Type is <class 'type'>).
Success	Type of image stored in instance, if a video file is given is correct (Content <class 'PIL.Image.Image'> and Type is <class 'type'>).

3.2.2 Save

Description

The class `image` shall have a method `save`, which stores the modified image to a given filename. The method returns

True on success and False on failures.

Testresult
This test was passed with the state: **Success**. See also full trace in section A.1.3!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:26,677
Finished-Time:	2025-08-16 16:39:26,867
Time-Consumption	0.191s

Testsummary:

Success	Returnvalue of failed save method is correct (Content False and Type is <class 'bool'>).
Success	Existance of saved file is correct (Content False and Type is <class 'bool'>).
Success	Returnvalue of successful save method is correct (Content True and Type is <class 'bool'>).
Success	Existance of saved file is correct (Content True and Type is <class 'bool'>).

3.2.3 Image data

Description
The class image shall have a method image_data, which returns the raw data of the modified image.

Testresult
This test was passed with the state: **Success**. See also full trace in section A.1.4!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:26,868
Finished-Time:	2025-08-16 16:39:26,999
Time-Consumption	0.131s

Testsummary:

Success	Filecompare for image_data.jpg is correct (Content True and Type is <class 'bool'>).

3.2.4 Resize

Description
The class image shall have a method resize, which resizes the image. The method returns True on success and False on failures.

Testresult
This test was passed with the state: **Success**. See also full trace in section A.1.5!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)

Start-Time:	2025-08-16 16:39:27,002
Finished-Time:	2025-08-16 16:39:27,093
Time-Consumption	0.091s

Testsummary:	
Success	Returnvalue of successful resize method is correct (Content True and Type is <class 'bool'>).
Success	Resulution of resized image is correct (Content 300 and Type is <class 'int'>).
Success	Returnvalue of failed resize method is correct (Content False and Type is <class 'bool'>).

3.2.5 Rotate

Description

The class `image` shall have a method `rotate_by_orientation`, which rotates the image by an exif orientation. If no parameter is given, the orientation will be taken out of the loaded image. The method returns `True` on success and `False` on failures.

Testresult

This test was passed with the state: Success. See also full trace in section A.1.6!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:27,093
Finished-Time:	2025-08-16 16:39:27,858
Time-Consumption	0.765s

Testsummary:	
Success	Returnvalue of rotate method without loading an image is correct (Content False and Type is <class 'bool'>).
Success	Returnvalue of rotate method with invalid orientation is correct (Content False and Type is <class 'bool'>).
Success	Returnvalue of rotate method with no orientation in method call and exif is correct (Content False and Type is <class 'bool'>).
Success	Filecompare for rotated_image_none.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for rotated_image_6.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for rotated_image_8.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for rotated_image_3.jpg is correct (Content True and Type is <class 'bool'>).

3.2.6 Join

Description

The class `image` shall have a method `join`, which joins an image to the loaded image. The method returns `True` on success and `False` on failures.

Testresult

This test was passed with the state: Success. See also full trace in section A.1.7!

Testrun:	python 3.13.5 (final)
Caller:	/home/dirk/work/unittest_collection/media/unittest/src/report/__init__.py (331)
Start-Time:	2025-08-16 16:39:27,860
Finished-Time:	2025-08-16 16:39:29,322
Time-Consumption	1.462s

Testsummary:

Success	Returnvalue of join method without loading an image is correct (Content False and Type is <class 'bool'>).
Success	Returnvalue of join method with invalid join position is correct (Content False and Type is <class 'bool'>).
Success	Returnvalue of join method with unknown join file is correct (Content False and Type is <class 'bool'>).
Success	Filecompare for joined_image_3.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for joined_image_4.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for joined_image_5.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for joined_image_1.jpg is correct (Content True and Type is <class 'bool'>).
Success	Filecompare for joined_image_2.jpg is correct (Content True and Type is <class 'bool'>).

A Trace for testrun with python 3.13.5 (final)

A.1 Tests with status Info (7)

A.1.1 REQ-0001

Testresult
This test was passed with the state: **Success**.

Success	Media data for unknown.txt is correct (Content None and Type is <class 'NoneType'>).

```
Filetype not known: /home/dirk/work/unittest_collection/media/unittest/input_data/unknown.txt
Media data identified: None
Result (Media data for unknown.txt): None (<class 'NoneType'>)
Expectation (Media data for unknown.txt): result = None (<class 'NoneType'>)
```

Success	Media data for audio.mp3 is correct (Content {'duration': 236.094694, 'bitrate': 290743, 'artist': 'Kaleo', 'title': 'No Good', 'album': 'A/B', 'track': 1, 'genre': 'Rock', 'year': 2016, 'size': 8580366, 'time': 1451606398, 'tm_is_subst': True} and Type is <class 'dict'>).

```
Media data identified: {'duration': 236.094694, 'bitrate': 290743, 'artist': 'Kaleo', 'title':
↪  'No Good', 'album': 'A/B', 'track': 1, 'genre': 'Rock', 'year': 2016, 'size': 8580366,
↪  'time': 1451606398, 'tm_is_subst': True}
Result (Media data for audio.mp3): { 'duration': 236.094694, 'bitrate': 290743, 'artist':
↪  'Kaleo', 'title': 'No Good', 'album': 'A/B', 'track': 1, 'genre': 'Rock', 'year': 2016,
↪  'size': 8580366, 'time': 1451606398, 'tm_is_subst': True } (<class 'dict'>)
Expectation (Media data for audio.mp3): result = { 'duration': 236.094694, 'bitrate': 290743,
↪  'artist': 'Kaleo', 'title': 'No Good', 'album': 'A/B', 'track': 1, 'genre': 'Rock',
↪  'year': 2016, 'time': 1451606398, 'tm_is_subst': True, 'size': 8580366 } (<class 'dict'>)
```

Success	Media data for audio_fail_conv.mp3 is correct (Content {'duration': 281.991837, 'bitrate': 228298, 'title': 'Video Games (Album Version Remastered)', 'artist': 'Lana Del Rey', 'album': 'Born To Die', 'genre': 'Pop', 'track': 4, 'year': 2012, 'size': 8047290, 'time': 1325375995, 'tm_is_subst': True} and Type is <class 'dict'>).

```
Media data identified: {'duration': 281.991837, 'bitrate': 228298, 'title': 'Video Games
↪  (Album Version Remastered)', 'artist': 'Lana Del Rey', 'album': 'Born To Die', 'genre':
↪  'Pop', 'track': 4, 'year': 2012, 'size': 8047290, 'time': 1325375995, 'tm_is_subst': True}
Result (Media data for audio_fail_conv.mp3): { 'duration': 281.991837, 'bitrate': 228298,
↪  'title': 'Video Games (Album Version Remastered)', 'artist': 'Lana Del Rey', 'album':
↪  'Born To Die', 'genre': 'Pop', 'track': 4, 'year': 2012, 'size': 8047290, 'time':
↪  1325375995, 'tm_is_subst': True } (<class 'dict'>)
Expectation (Media data for audio_fail_conv.mp3): result = { 'duration': 281.991837,
↪  'bitrate': 228298, 'artist': 'Lana Del Rey', 'title': 'Video Games (Album Version
↪  Remastered)', 'album': 'Born To Die', 'track': 4, 'genre': 'Pop', 'year': 2012, 'time':
↪  1325375995, 'tm_is_subst': True, 'size': 8047290 } (<class 'dict'>)
```

Success	Media data for audio_year_0.mp3 is correct (Content {'duration': 120.476735, 'bitrate': 240202, 'title': 'Was bringt der Dezember', 'artist': 'Rolf und seine Freunde', 'album': 'Wir warten auf Weihnachten', 'year': 0, 'track': 9, 'genre': 'Other', 'size': 3617354} and Type is <class 'dict'>).

```
Media data identified: {'duration': 120.476735, 'bitrate': 240202, 'title': 'Was bringt der
↪  Dezember', 'artist': 'Rolf und seine Freunde', 'album': 'Wir warten auf Weihnachten',
↪  'year': 0, 'track': 9, 'genre': 'Other', 'size': 3617354}
```

```
Result (Media data for audio_year_0.mp3): { 'duration': 120.476735, 'bitrate': 240202,
↪  'title': 'Was bringt der Dezember', 'artist': 'Rolf und seine Freunde', 'album': 'Wir
↪  warten auf Weihnachten', 'year': 0, 'track': 9, 'genre': 'Other', 'size': 3617354 }
↪  (<class 'dict'>)
```

```
Expectation (Media data for audio_year_0.mp3): result = { 'duration': 120.476735, 'bitrate':
↪  240202, 'artist': 'Rolf und seine Freunde', 'title': 'Was bringt der Dezember', 'album':
↪  'Wir warten auf Weihnachten', 'track': 9, 'genre': 'Other', 'year': 0, 'size': 3617354 }
↪  (<class 'dict'>)
```

Success	Media data for image_exif_gps.jpg is correct (Content {'time': 1560083621, 'exposure_program': 'Program Normal', 'exposure_time': 0.007633587786259542, 'flash': 'Off', 'aperture': 2.2, 'focal_length': 3.463, 'gps': {'lon': 11.574697, 'lat': 52.993599}, 'height': 3120, 'iso': 100, 'orientation': 6, 'width': 4160, 'size': 4524705, 'camera': 'motorola: motorola one'} and Type is <class 'dict'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
```

```
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
```

```
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
```

```
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
```

```
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
```

```
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
```

```
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
```

```
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
```

```
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
```

```
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
```

```
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
```

```
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
```

```
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
```

```
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪ b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪ b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪ b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪ b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪ x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪ b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪ value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪ b'2019:06:09\x00'
Converting time out of '2019:06:09 14:33:41'
Converting exposure_program out of 2
Converting exposure_time out of 0.007633587786259542
Converting flash out of 16
Converting aperture out of 2.2
Converting focal_length out of 3.463
Converting gps out of {0: b'\x02\x02\x00\x00', 1: 'N', 2: (52.0, 59.0, 36.9564), 3: 'E', 4:
↪ (11.0, 34.0, 28.9092), 5: b'\x01', 6: 49.61, 7: (12.0, 33.0, 39.0), 18: 'WGS-84', 27:
↪ 'ASCII\x00\x00\x00GPS', 29: '2019:06:09'}
Converting height out of 3120
Converting iso out of 100
Converting camera_vendor out of 'motorola'
Converting camera_model out of 'motorola one'
Converting orientation out of 6
Converting width out of 4160
Media data identified: {'time': 1560083621, 'exposure_program': 'Program Normal',
↪ 'exposure_time': 0.007633587786259542, 'flash': 'Off', 'aperture': 2.2, 'focal_length':
↪ 3.463, 'gps': {'lon': 11.574697, 'lat': 52.993599}, 'height': 3120, 'iso': 100,
↪ 'orientation': 6, 'width': 4160, 'size': 4524705, 'camera': 'motorola: motorola one'}
Result (Media data for image_exif_gps.jpg): { 'time': 1560083621, 'exposure_program': 'Program
↪ Normal', 'exposure_time': 0.007633587786259542, 'flash': 'Off', 'aperture': 2.2,
↪ 'focal_length': 3.463, 'gps': { 'lon': 11.574697, 'lat': 52.993599 }, 'height': 3120,
↪ 'iso': 100, 'orientation': 6, 'width': 4160, 'size': 4524705, 'camera': 'motorola:
↪ motorola one' } (<class 'dict'>)
Expectation (Media data for image_exif_gps.jpg): result = { 'time': 1560083621,
↪ 'exposure_program': 'Program Normal', 'exposure_time': 0.007633587786259542, 'flash':
↪ 'Off', 'aperture': 2.2, 'focal_length': 3.463, 'gps': { 'lon': 11.574697, 'lat': 52.993599
↪ }, 'height': 3120, 'iso': 100, 'orientation': 6, 'width': 4160, 'camera': 'motorola:
↪ motorola one', 'size': 4524705 } (<class 'dict'>)
```

Success	Media data for image_exif_no_gps.jpg is correct (Content {'time': 1515143529, 'exposure_program': 'Program Normal', 'exposure_time': 0.03, 'flash': 'Fired', 'aperture': 2.2, 'focal_length': 4.5, 'height': 3968, 'iso': 160, 'orientation': 0, 'width': 2976, 'size': 2837285, 'camera': 'HUAWEI: EVA-L09'} and Type is <class 'dict'>).

```
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
```

```
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
```

```
Converting time out of '2018:01:05 10:12:09'
Converting exposure_program out of 2
Converting exposure_time out of 0.03
Converting flash out of 1
Converting aperture out of 2.2
Converting focal_length out of 4.5
Converting height out of 3968
Converting iso out of 160
Converting camera_vendor out of 'HUAWEI'
Converting camera_model out of 'EVA-L09'
Converting orientation out of 0
Converting width out of 2976
Media data identified: {'time': 1515143529, 'exposure_program': 'Program Normal',
↪  'exposure_time': 0.03, 'flash': 'Fired', 'aperture': 2.2, 'focal_length': 4.5, 'height':
↪  3968, 'iso': 160, 'orientation': 0, 'width': 2976, 'size': 2837285, 'camera': 'HUAWEI:
↪  EVA-L09'}
Result (Media data for image_exif_no_gps.jpg): { 'time': 1515143529, 'exposure_program':
↪  'Program Normal', 'exposure_time': 0.03, 'flash': 'Fired', 'aperture': 2.2,
↪  'focal_length': 4.5, 'height': 3968, 'iso': 160, 'orientation': 0, 'width': 2976, 'size':
↪  2837285, 'camera': 'HUAWEI: EVA-L09' } (<class 'dict'>)
Expectation (Media data for image_exif_no_gps.jpg): result = { 'time': 1515143529,
↪  'exposure_program': 'Program Normal', 'exposure_time': 0.03, 'flash': 'Fired', 'aperture':
↪  2.2, 'focal_length': 4.5, 'height': 3968, 'iso': 160, 'orientation': 0, 'width': 2976,
↪  'camera': 'HUAWEI: EVA-L09', 'size': 2837285 } (<class 'dict'>)
```

Success	Media data for image_non_exif.jpg is correct (Content {'size': 1139092, 'time': 1754841648, 'tm_is_subst': True} and Type is <class 'dict'>).

```
/home/dirk/work/unittest_collection/media/unittest/input_data/image_non_exif.jpg does not have
↪  any exif information
Media data identified: {'size': 1139092, 'time': 1754841648, 'tm_is_subst': True}
Result (Media data for image_non_exif.jpg): { 'size': 1139092, 'time': 1754841648,
↪  'tm_is_subst': True } (<class 'dict'>)
Expectation (Media data for image_non_exif.jpg): result = { 'time': 1754841648, 'tm_is_subst':
↪  True, 'size': 1139092 } (<class 'dict'>)
```

Success	Media data for image_extraction_failed.jpg is correct (Content {'time': 1226149915, 'exposure_program': 'Program Normal', 'exposure_time': 0.008, 'flash': 'Fill Fired', 'aperture': 7.1, 'focal_length': 170.0, 'height': 2592, 'iso': 400, 'orientation': 1, 'width': 3888, 'size': 1301272, 'camera': 'Canon: Canon EOS 40D'} and Type is <class 'dict'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 170 - value: b'Canon\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 176 - value: b'Canon EOS
↪  40D\x00'
tag: Orientation (274) - type: short (3) - value: b'\x01\x00'
```

```
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 208 - value:
↪  b'H\x00\x00\x00\x01\x00\x00\x00'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 216 - value:
↪  b'H\x00\x00\x00\x01\x00\x00\x00'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x02\x00'
tag: DateTime (306) - type: string (2) Tag Location: 94 - Data Location: 224 - value:
↪  b'2008:11:08 14:11:55\x00'
tag: WhitePoint (318) - type: rational (5) Tag Location: 106 - Data Location: 244 - value:
↪  b'9\x01\x00\x00\xe8\x03\x00\x00I\x01\x00\x00\xe8\x03\x00\x00'
tag: PrimaryChromaticities (319) - type: rational (5) Tag Location: 118 - Data Location: 260 -
↪  value: <table: 48 bytes>
tag: YCbCrCoefficients (529) - type: rational (5) Tag Location: 130 - Data Location: 308 -
↪  value:
↪  b'+\x01\x00\x00\xe8\x03\x00\x00K\x02\x00\x00\xe8\x03\x00\x00r\x00\x00\x00\xe8\x03\x00\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x02\x00'
tag: ExifIFD (34665) - type: long (4) - value: b'L\x01\x00\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'n"\x00\x00'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 346 - Data Location: 722 - value:
↪  b'\x01\x00\x00\x00}\x00\x00\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 358 - Data Location: 730 - value:
↪  b'G\x00\x00\x00\n\x00\x00\x00'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x02\x00'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x90\x01'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0221'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 406 - Data Location: 738 -
↪  value: b'2008:11:08 14:11:55\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 418 - Data Location: 758 -
↪  value: b'2008:11:08 14:11:55\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 442 - Data Location:
↪  778 - value: b'\x00\x00\x07\x00\x00\x00\x01\x00'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 454 - Data Location: 786 -
↪  value: b'\x00\xa0\x05\x00\x00\x00\x01\x00'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 466 - Data Location:
↪  794 - value: b'\xfe\xff\xff\xff\x03\x00\x00\x00'
tag: MeteringMode (37383) - type: short (3) - value: b'\x05\x00'
tag: Flash (37385) - type: short (3) - value: b'\t\x00'
tag: FocalLength (37386) - type: rational (5) Tag Location: 502 - Data Location: 802 - value:
↪  b'\xaa\x00\x00\x00\x01\x00\x00\x00'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 514 - Data Location: 810 - value:
↪  <table: 7686 bytes>
tag: UserComment (37510) - type: undefined (7) Tag Location: 526 - Data Location: 8496 -
↪  value: <table: 264 bytes>
tag: SubSec (37520) - type: string (2) - value: b'01\x00'
```

```
tag: SubSecTimeOriginal (37521) - type: string (2) - value: b'01\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) - value: b'01\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\xff\xff'
tag: PixelXDimension (40962) - type: short (3) - value: b'0\x0f'
tag: PixelYDimension (40963) - type: short (3) - value: b' \n'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'8"\x00\x00'
tag: FocalPlaneXResolution (41486) - type: rational (5) Tag Location: 634 - Data Location:
↪  8790 - value: b'\x80S;\x00l\x03\x00\x00'
tag: FocalPlaneYResolution (41487) - type: rational (5) Tag Location: 646 - Data Location:
↪  8798 - value: b"\x00\x8d'\x00G\x02\x00\x00"
tag: FocalPlaneResolutionUnit (41488) - type: short (3) - value: b'\x02\x00'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x01\x00'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: Gamma (42240) - type: rational (5) Tag Location: 718 - Data Location: 8806 - value:
↪  b'\x16\x00\x00\x00\n\x00\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
Converting time out of '2008:11:08 14:11:55'
Converting exposure_program out of 2
Converting exposure_time out of 0.008
Converting flash out of 9
Converting aperture out of 7.1
Converting focal_length out of 170.0
Converting gps out of {0: b'\x02\x02\x00\x00'}
GPS data extraction failed for {0: b'\x02\x02\x00\x00'}
Converting height out of 2592
Converting iso out of 400
Converting camera_vendor out of 'Canon'
Converting camera_model out of 'Canon EOS 40D'
Converting orientation out of 1
Converting width out of 3888
Media data identified: {'time': 1226149915, 'exposure_program': 'Program Normal',
↪  'exposure_time': 0.008, 'flash': 'Fill Fired', 'aperture': 7.1, 'focal_length': 170.0,
↪  'height': 2592, 'iso': 400, 'orientation': 1, 'width': 3888, 'size': 1301272, 'camera':
↪  'Canon: Canon EOS 40D'}
Result (Media data for image_extraction_failed.jpg): { 'time': 1226149915, 'exposure_program':
↪  'Program Normal', 'exposure_time': 0.008, 'flash': 'Fill Fired', 'aperture': 7.1,
↪  'focal_length': 170.0, 'height': 2592, 'iso': 400, 'orientation': 1, 'width': 3888,
↪  'size': 1301272, 'camera': 'Canon: Canon EOS 40D' } (<class 'dict'>)
```

```
Expectation (Media data for image_extraction_failed.jpg): result = { 'time': 1226149915,
↪  'exposure_program': 'Program Normal', 'exposure_time': 0.008, 'flash': 'Fill Fired',
↪  'aperture': 7.1, 'focal_length': 170.0, 'height': 2592, 'iso': 400, 'orientation': 1,
↪  'width': 3888, 'camera': 'Canon: Canon EOS 40D', 'size': 1301272 } (<class 'dict'>)
```

Success	Media data for faulty_gps_data.jpg is correct (Content {'time': 1590940859, 'exposure_program': 'Program Normal', 'exposure_time': 0.01, 'flash': 'Off', 'aperture': 2.0, 'focal_length': 3.463, 'height': 3120, 'iso': 124, 'orientation': 6, 'width': 4160, 'size': 3500036, 'camera': 'motorola: motorola one'} and Type is <class 'dict'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  48 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 234 - value:
↪  b'2020:05:31 18:00:59\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x00\xfe'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04p'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 268 - Data Location: 632 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00d'
tag: FNumber (33437) - type: rational (5) Tag Location: 280 - Data Location: 640 - value:
↪  b'\x00\x00\x00\x14\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00|'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 328 - Data Location: 648 -
↪  value: b'2020:05:31 18:00:59\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 340 - Data Location: 668 -
↪  value: b'2020:05:31 18:00:59\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 364 - Data Location:
↪  688 - value: b'\x00\x00\x19\xf4\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 376 - Data Location: 696 -
↪  value: b'\x00\x03\r@\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 388 - Data Location:
↪  704 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
```

```
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 400 - Data Location:
↪ 712 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
```

```
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 412 - Data Location: 720 -
↪ value: b'\x00\x03\r@\x00\x01\x86\xa0'
```

```
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
```

```
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
```

```
tag: FocalLength (37386) - type: rational (5) Tag Location: 448 - Data Location: 728 - value:
↪ b'\x00\x00\r\x87\x00\x00\x03\xe8'
```

```
tag: MakerNote (37500) - type: undefined (7) Tag Location: 460 - Data Location: 736 - value:
↪ <table: 338 bytes>
```

```
tag: SubSec (37520) - type: string (2) Tag Location: 472 - Data Location: 1074 - value:
↪ b'764525\x00'
```

```
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 484 - Data Location: 1082 -
↪ value: b'764525\x00'
```

```
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 496 - Data Location: 1090 -
↪ value: b'764525\x00'
```

```
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
```

```
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
```

```
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
```

```
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
```

```
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04R'
```

```
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
```

```
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
```

```
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
```

```
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
```

```
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 616 - Data Location: 1098 -
↪ value: b'\x00\x00\x00d\x00\x00\x00d'
```

```
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
```

```
tag: GPSVersionID (0) - type: byte (1) - value: b'\x00\x00\x00\x00'
```

```
tag: GPSLatitudeRef (1) - type: string (2) - value: b'\x00\x00'
```

```
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1174 - Data Location: 1274 - value:
↪ b'\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x0⌟
↪ 0\x00\x00'
```

```
tag: GPSLongitudeRef (3) - type: string (2) - value: b'\x00\x00'
```

```
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1198 - Data Location: 1298 - value:
↪ b'\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x0⌟
↪ 0\x00\x00'
```

```
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x00'
```

```
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1222 - Data Location: 1322 - value:
↪ b'\x00\x00\x00\x00\x00\x00\x00\x00'
```

```
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1234 - Data Location: 1330 - value:
↪ b'\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x0⌟
↪ 0\x00\x00'
```

```
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1246 - Data Location: 1354 - value:
↪  b'\x00\x00\x00\x00\x00\x00\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1258 - Data Location: 1362 -
↪  value: b'\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1270 - Data Location: 1374 - value:
↪  b'\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00'
Converting time out of '2020:05:31 18:00:59'
Converting exposure_program out of 2
Converting exposure_time out of 0.01
Converting flash out of 16
Converting aperture out of 2.0
Converting focal_length out of 3.463
Converting gps out of {0: b'\x00\x00\x00\x00', 1: '\x00', 2: (nan, nan, nan), 3: '\x00', 4:
↪  (nan, nan, nan), 5: b'\x00', 6: nan, 7: (nan, nan, nan), 18: '\x00\x00\x00\x00\x00\x00',
↪  27: '\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00', 29:
↪  '\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00'}
Converting height out of 3120
Converting iso out of 124
Converting camera_vendor out of 'motorola'
Converting camera_model out of 'motorola one'
Converting orientation out of 6
Converting width out of 4160
Media data identified: {'time': 1590940859, 'exposure_program': 'Program Normal',
↪  'exposure_time': 0.01, 'flash': 'Off', 'aperture': 2.0, 'focal_length': 3.463, 'height':
↪  3120, 'iso': 124, 'orientation': 6, 'width': 4160, 'size': 3500036, 'camera': 'motorola:
↪  motorola one'}
Result (Media data for faulty_gps_data.jpg): { 'time': 1590940859, 'exposure_program':
↪  'Program Normal', 'exposure_time': 0.01, 'flash': 'Off', 'aperture': 2.0, 'focal_length':
↪  3.463, 'height': 3120, 'iso': 124, 'orientation': 6, 'width': 4160, 'size': 3500036,
↪  'camera': 'motorola: motorola one' } (<class 'dict'>)
Expectation (Media data for faulty_gps_data.jpg): result = { 'time': 1590940859,
↪  'exposure_program': 'Program Normal', 'exposure_time': 0.01, 'flash': 'Off', 'aperture':
↪  2.0, 'focal_length': 3.463, 'height': 3120, 'iso': 124, 'orientation': 6, 'width': 4160,
↪  'camera': 'motorola: motorola one', 'size': 3500036 } (<class 'dict'>)
```

Success	Media data for video.3gp is correct (Content {'width': 800, 'height': 480, 'ratio': 1.6666666666666667, 'duration': 3.964, 'bitrate': 2341765, 'time': 1414948303, 'size': 1160345} and Type is <class 'dict'>).

```
Media data identified: {'width': 800, 'height': 480, 'ratio': 1.6666666666666667, 'duration':
↪  3.964, 'bitrate': 2341765, 'time': 1414948303, 'size': 1160345}
Result (Media data for video.3gp): { 'width': 800, 'height': 480, 'ratio': 1.6666666666666667,
↪  'duration': 3.964, 'bitrate': 2341765, 'time': 1414948303, 'size': 1160345 } (<class
↪  'dict'>)
Expectation (Media data for video.3gp): result = { 'width': 800, 'height': 480, 'ratio':
↪  1.6666666666666667, 'duration': 3.964, 'bitrate': 2341765, 'time': 1414948303, 'size':
↪  1160345 } (<class 'dict'>)
```

Success	Media data for video.mp4 is correct (Content {'width': 1920, 'height': 1080, 'ratio': 1.7777777777777777, 'duration': 12.453189, 'bitrate': 17883617, 'time': 1503125482, 'size': 27838508} and Type is <class 'dict'>).

```
Media data identified: {'width': 1920, 'height': 1080, 'ratio': 1.7777777777777777,
↪  'duration': 12.453189, 'bitrate': 17883617, 'time': 1503125482, 'size': 27838508}
Result (Media data for video.mp4): { 'width': 1920, 'height': 1080, 'ratio':
↪  1.7777777777777777, 'duration': 12.453189, 'bitrate': 17883617, 'time': 1503125482,
↪  'size': 27838508 } (<class 'dict'>)
Expectation (Media data for video.mp4): result = { 'width': 1920, 'height': 1080, 'ratio':
↪  1.7777777777777777, 'duration': 12.453189, 'bitrate': 17883617, 'time': 1503125482,
↪  'size': 27838508 } (<class 'dict'>)
```

Success	Media data for video_special_time.avi is correct (Content {'width': 320, 'height': 240, 'duration': 26.531264, 'bitrate': 840554, 'time': 1086778620, 'size': 2787622} and Type is <class 'dict'>).

```
Can't convert 'N/A' (ratio) for ratio
Can't convert 'N/A' (duration) for duration
Media data identified: {'width': 320, 'height': 240, 'duration': 26.531264, 'bitrate': 840554,
↪  'time': 1086778620, 'size': 2787622}
Result (Media data for video_special_time.avi): { 'width': 320, 'height': 240, 'duration':
↪  26.531264, 'bitrate': 840554, 'time': 1086778620, 'size': 2787622 } (<class 'dict'>)
Expectation (Media data for video_special_time.avi): result = { 'width': 320, 'height': 240,
↪  'duration': 26.531264, 'bitrate': 840554, 'time': 1086778620, 'size': 2787622 } (<class
↪  'dict'>)
```

Success	Media data for video_no_date.avi is correct (Content {'width': 640, 'height': 480, 'ratio': 1.3333333333333333, 'duration': 11.016, 'bitrate': 2153411, 'size': 2965248, 'time': 1754841648, 'tm_is_subst': True} and Type is <class 'dict'>).

```
Media data identified: {'width': 640, 'height': 480, 'ratio': 1.3333333333333333, 'duration':
↪  11.016, 'bitrate': 2153411, 'size': 2965248, 'time': 1754841648, 'tm_is_subst': True}
Result (Media data for video_no_date.avi): { 'width': 640, 'height': 480, 'ratio':
↪  1.3333333333333333, 'duration': 11.016, 'bitrate': 2153411, 'size': 2965248, 'time':
↪  1754841648, 'tm_is_subst': True } (<class 'dict'>)
Expectation (Media data for video_no_date.avi): result = { 'width': 640, 'height': 480,
↪  'ratio': 1.3333333333333333, 'duration': 11.016, 'bitrate': 2153411, 'time': 1754841648,
↪  'tm_is_subst': True, 'size': 2965248 } (<class 'dict'>)
```

A.1.2 REQ-0002

Testresult

This test was passed with the state: Success.

Success	Type of image stored in instance, if no parameter is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).

```
Result (Type of image stored in instance, if no parameter is given): <class 'NoneType'>
↪  (<class 'type'>)
```

```
Expectation (Type of image stored in instance, if no parameter is given): result = <class
↪  'NoneType'> (<class 'type'>)
```

Success	Type of image stored in instance, if a unsupported parameter is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).

```
Instance type is not supported: <class 'int'>
```

```
Result (Type of image stored in instance, if a unsupported parameter is given): <class
↪  'NoneType'> (<class 'type'>)
```

```
Expectation (Type of image stored in instance, if a unsupported parameter is given): result =
↪  <class 'NoneType'> (<class 'type'>)
```

Success	Type of image stored in instance, if an unknown file is given is correct (Content <class 'NoneType'> and Type is <class 'type'>).

```
Filetype is not supported
↪  (/home/dirk/work/unittest_collection/media/unittest/input_data/unknown.txt)
```

```
Result (Type of image stored in instance, if an unknown file is given): <class 'NoneType'>
↪  (<class 'type'>)
```

```
Expectation (Type of image stored in instance, if an unknown file is given): result = <class
↪  'NoneType'> (<class 'type'>)
```

Success	Type of image stored in instance, if a image file is given is correct (Content <class 'PIL.Image.Image'> and Type is <class 'type'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
```

```
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
```

```
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
```

```
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
```

```
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
```

```
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
```

```
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
```

```
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
```

```
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
```

```
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
```

```
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
```

```
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Result (Type of image stored in instance, if a image file is given): <class 'PIL.Image.Image'>
↪  (<class 'type'>)
Expectation (Type of image stored in instance, if a image file is given): result = <class
↪  'PIL.Image.Image'> (<class 'type'>)
```

Success	Type of image stored in instance, if a video file is given is correct (Content <class 'PIL.Image.Image'> and Type is <class 'type'>).

```
loading image from '/home/dirk/work/unittest_collection/media/unittest/input_data/video.mp4'
Result (Type of image stored in instance, if a video file is given): <class 'PIL.Image.Image'>
↪  (<class 'type'>)
Expectation (Type of image stored in instance, if a video file is given): result = <class
↪  'PIL.Image.Image'> (<class 'type'>)
```

A.1.3 REQ-0003

Testresult

This test was passed with the state: Success.

Success	Returnvalue of failed save method is correct (Content False and Type is <class 'bool'>).

```
No image available to be saved
↪  ('/home/dirk/work/unittest_collection/media/unittest/output_data/saved_image.jpg')
```

```
Result (Returnvalue of failed save method): False (<class 'bool'>)
Expectation (Returnvalue of failed save method): result = False (<class 'bool'>)
```

Success Existance of saved file is correct (Content False and Type is <class 'bool'>).

```
Result (Existance of saved file): False (<class 'bool'>)
Expectation (Existance of saved file): result = False (<class 'bool'>)
```

Success Returnvalue of successful save method is correct (Content True and Type is <class 'bool'>).

```
loading image from '/home/dirk/work/unittest_collection/media/unittest/input_data/video.mp4'
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/saved_image.jpg'
Result (Returnvalue of successful save method): True (<class 'bool'>)
Expectation (Returnvalue of successful save method): result = True (<class 'bool'>)
```

Success Existance of saved file is correct (Content True and Type is <class 'bool'>).

```
Result (Existance of saved file): True (<class 'bool'>)
Expectation (Existance of saved file): result = True (<class 'bool'>)
```

A.1.4 REQ-0004

Testresult

This test was passed with the state: **Success**.

Success Filecompare for image_data.jpg is correct (Content True and Type is <class 'bool'>).

```
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
```

```
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
```

```
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Result (Filecompare for image_data.jpg): True (<class 'bool'>)
Expectation (Filecompare for image_data.jpg): result = True (<class 'bool'>)
```

A.1.5 REQ-0005

Testresult

This test was passed with the state: **Success**.

Success	Returnvalue of successful resize method is correct (Content True and Type is <class 'bool'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
```

```
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
```

```
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Result (Returnvalue of successful resize method): True (<class 'bool'>)
Expectation (Returnvalue of successful resize method): result = True (<class 'bool'>)
```

Success Resulution of resized image is correct (Content 300 and Type is <class 'int'>).

```
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/resized_image.jpg'
Result (Resulution of resized image): 300 (<class 'int'>)
Expectation (Resulution of resized image): result = 300 (<class 'int'>)
```

Success Returnvalue of failed resize method is correct (Content False and Type is <class 'bool'>).

```
No image available to be resized
Result (Returnvalue of failed resize method): False (<class 'bool'>)
Expectation (Returnvalue of failed resize method): result = False (<class 'bool'>)
```

A.1.6 REQ-0006

Testresult
This test was passed with the state: **Success**.

Success	Returnvalue of rotate method without loading an image is correct (Content False and Type is <class 'bool'>).

```
No image available, rotation not possible
Result (Returnvalue of rotate method without loading an image): False (<class 'bool'>)
Expectation (Returnvalue of rotate method without loading an image): result = False (<class
↪  'bool'>)
```

Success	Returnvalue of rotate method with invalid orientation is correct (Content False and Type is <class 'bool'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
```

```
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
```

```
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Orientation 17 unknown for rotation
Result (Returnvalue of rotate method with invalid orientation): False (<class 'bool'>)
Expectation (Returnvalue of rotate method with invalid orientation): result = False (<class
↪  'bool'>)
```

Success	Returnvalue of rotate method with no orientation in method call and exif is correct (Content False and Type is <class 'bool'>).

```
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_non_exif.jpg'
Result (Returnvalue of rotate method with no orientation in method call and exif): False
↪  (<class 'bool'>)
Expectation (Returnvalue of rotate method with no orientation in method call and exif): result
↪  = False (<class 'bool'>)
```

Success	Filecompare for rotated_image_none.jpg is correct (Content True and Type is <class 'bool'>).

```
Rotate with orientation None
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
```

```
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
```

```
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
No orientation given, orientation 6 extract from exif data
Rotating picture by 270 (deg)
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/rotated_image_none.jpg'
Result (Filecompare for rotated_image_none.jpg): True (<class 'bool'>)
Expectation (Filecompare for rotated_image_none.jpg): result = True (<class 'bool'>)
```

Success Filecompare for rotated_image_6.jpg is correct (Content True and Type is <class 'bool'>).

```
Rotate with orientation 6
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
```

```
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\」
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Rotating picture by 270 (deg)
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/rotated_image_6.jpg'
Result (Filecompare for rotated_image_6.jpg): True (<class 'bool'>)
Expectation (Filecompare for rotated_image_6.jpg): result = True (<class 'bool'>)
```

Success Filecompare for rotated_image_8.jpg is correct (Content True and Type is <class 'bool'>).

```
Rotate with orientation 8
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
```

```
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
```

```
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Rotating picture by 90 (deg)
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/rotated_image_8.jpg'
Result (Filecompare for rotated_image_8.jpg): True (<class 'bool'>)
```

```
Expectation (Filecompare for rotated_image_8.jpg): result = True (<class 'bool'>)
```

Success Filecompare for rotated_image_3.jpg is correct (Content True and Type is <class 'bool'>).

```
Rotate with orientation 3
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
```

```
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\''\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
```

```
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Rotating picture by 180 (deg)
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/rotated_image_3.jpg'
Result (Filecompare for rotated_image_3.jpg): True (<class 'bool'>)
Expectation (Filecompare for rotated_image_3.jpg): result = True (<class 'bool'>)
```

A.1.7 REQ-0007

Testresult

This test was passed with the state: **Success**.

Success	Returnvalue of join method without loading an image is correct (Content False and Type is <class 'bool'>).

```
No image available, joining not possible
Result (Returnvalue of join method without loading an image): False (<class 'bool'>)
Expectation (Returnvalue of join method without loading an image): result = False (<class
↪  'bool'>)
```

Success	Returnvalue of join method with invalid join position is correct (Content False and Type is <class 'bool'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
```

```
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
```

```
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\⌋
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Join position value 17 is not supported
Result (Returnvalue of join method with invalid join position): False (<class 'bool'>)
Expectation (Returnvalue of join method with invalid join position): result = False (<class
↪  'bool'>)
```

Success Returnvalue of join method with unknown join file is correct (Content False and Type is <class 'bool'>).

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
```

```
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
```

```
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\」
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
Instance type is not supported: <class 'int'>
Image to be joined is not supported None
Result (Returnvalue of join method with unknown join file): False (<class 'bool'>)
Expectation (Returnvalue of join method with unknown join file): result = False (<class
↪  'bool'>)
```

Success Filecompare for joined_image_3.jpg is correct (Content True and Type is <class 'bool'>).

```
Join with position 3
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
```

```
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
```

```
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\」
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
```

```
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Joining two images
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/joined_image_3.jpg'
Result (Filecompare for joined_image_3.jpg): True (<class 'bool'>)
Expectation (Filecompare for joined_image_3.jpg): result = True (<class 'bool'>)
```

Success Filecompare for joined_image_4.jpg is correct (Content True and Type is <class 'bool'>).

```
Join with position 4
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
```

```
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
```

```
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\」
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
```

```
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
```

```
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Joining two images
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/joined_image_4.jpg'
Result (Filecompare for joined_image_4.jpg): True (<class 'bool'>)
Expectation (Filecompare for joined_image_4.jpg): result = True (<class 'bool'>)
```

Success Filecompare for joined_image_5.jpg is correct (Content True and Type is <class 'bool'>).

```
Join with position 5
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
```

```
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
```

```
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
```

```
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
```

```
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Joining two images
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/joined_image_5.jpg'
Result (Filecompare for joined_image_5.jpg): True (<class 'bool'>)
Expectation (Filecompare for joined_image_5.jpg): result = True (<class 'bool'>)
```

Success Filecompare for joined_image_1.jpg is correct (Content True and Type is <class 'bool'>).

```
Join with position 1
```

```
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value:
↪  b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola
↪  one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table:
↪  49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value:
↪  b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value:
↪  b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value:
↪  b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 -
↪  value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location:
↪  690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location:
↪  714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 -
↪  value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
```

```
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\'\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\」
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
```

```
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location:
↪  802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
```

```
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value:
↪  b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value:
↪  <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value:
↪  <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value:
↪  b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value:
↪  b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 -
↪  value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 -
↪  value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Joining two images
Saving image to
↪  '/home/dirk/work/unittest_collection/media/unittest/output_data/joined_image_1.jpg'
Result (Filecompare for joined_image_1.jpg): True (<class 'bool'>)
Expectation (Filecompare for joined_image_1.jpg): result = True (<class 'bool'>)
```

Success Filecompare for joined_image_2.jpg is correct (Content True and Type is <class 'bool'>).

```
Join with position 2
tag: Make (271) - type: string (2) Tag Location: 22 - Data Location: 146 - value: b'motorola\x00'
tag: Model (272) - type: string (2) Tag Location: 34 - Data Location: 156 - value: b'motorola one\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x06'
tag: XResolution (282) - type: rational (5) Tag Location: 58 - Data Location: 170 - value: b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 70 - Data Location: 178 - value: b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 94 - Data Location: 186 - value: <table: 49 bytes>
tag: DateTime (306) - type: string (2) Tag Location: 106 - Data Location: 236 - value: b'2019:06:09 14:33:41\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x00'
tag: GPSInfoIFD (34853) - type: long (4) - value: b'\x00\x00\x04v'
tag: ExposureTime (33434) - type: rational (5) Tag Location: 270 - Data Location: 634 - value: b'\x00\x00\x00\x01\x00\x00\x00\x83'
tag: FNumber (33437) - type: rational (5) Tag Location: 282 - Data Location: 642 - value: b'\x00\x00\x00\x16\x00\x00\x00\n'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00d'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0220'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 330 - Data Location: 650 - value: b'2019:06:09 14:33:41\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 342 - Data Location: 670 - value: b'2019:06:09 14:33:41\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 366 - Data Location: 690 - value: b'\x00\x00\x1b}\x00\x00\x03\xe8'
tag: ApertureValue (37378) - type: rational (5) Tag Location: 378 - Data Location: 698 - value: b'\x00\x03x\xac\x00\x01\x86\xa0'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 390 - Data Location: 706 - value: b'\x00\x00\x00\x00\x00\x00\x00d'
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 402 - Data Location: 714 - value: b'\x00\x00\x00\x00\x00\x00\x00\x06'
tag: MaxApertureValue (37381) - type: rational (5) Tag Location: 414 - Data Location: 722 - value: b'\x00\x03x\xac\x00\x01\x86\xa0'
```

```
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x02'
tag: Flash (37385) - type: short (3) - value: b'\x00\x10'
tag: FocalLength (37386) - type: rational (5) Tag Location: 450 - Data Location: 730 - value:
↪  b'\x00\x00\r\x87\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 462 - Data Location: 738 - value:
↪  <table: 341 bytes>
tag: SubSec (37520) - type: string (2) Tag Location: 474 - Data Location: 1080 - value:
↪  b'013315\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 486 - Data Location: 1088 -
↪  value: b'013315\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 498 - Data Location: 1096 -
↪  value: b'013315\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x10@'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0c0'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00\x04X'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x00'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 618 - Data Location: 1104 -
↪  value: b'\x00\x00\x00d\x00\x00\x00d'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GPSVersionID (0) - type: byte (1) - value: b'\x02\x02\x00\x00'
tag: GPSLatitudeRef (1) - type: string (2) - value: b'N\x00'
tag: GPSLatitude (2) - type: rational (5) Tag Location: 1180 - Data Location: 1280 - value:
↪  b"\x00\x00\x004\x00\x00\x00\x01\x00\x00\x00;\x00\x00\x00\x01\x00\x05\xa3\x9c\x00\x00'\x10"
tag: GPSLongitudeRef (3) - type: string (2) - value: b'E\x00'
tag: GPSLongitude (4) - type: rational (5) Tag Location: 1204 - Data Location: 1304 - value:
↪  b'\x00\x00\x00\x0b\x00\x00\x00\x01\x00\x00\x00"\x00\x00\x00\x01\x00\x04iD\x00\x00\''\x10'
tag: GPSAltitudeRef (5) - type: byte (1) - value: b'\x01'
tag: GPSAltitude (6) - type: rational (5) Tag Location: 1228 - Data Location: 1328 - value:
↪  b'\x00\x00\xc1\xca\x00\x00\x03\xe8'
tag: GPSTimeStamp (7) - type: rational (5) Tag Location: 1240 - Data Location: 1336 - value:
↪  b"\x00\x00\x00\x0c\x00\x00\x00\x01\x00\x00\x00!\x00\x00\x00\x01\x00\x00\x00'\x00\x00\x00\
↪  x01"
tag: GPSMapDatum (18) - type: string (2) Tag Location: 1252 - Data Location: 1360 - value:
↪  b'WGS-84\x00'
tag: GPSProcessingMethod (27) - type: string (2) Tag Location: 1264 - Data Location: 1368 -
↪  value: b'ASCII\x00\x00\x00GPS\x00'
tag: GPSDateStamp (29) - type: string (2) Tag Location: 1276 - Data Location: 1380 - value:
↪  b'2019:06:09\x00'
```

```
loading image from
↪  '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_gps.jpg'
tag: ImageWidth (256) - type: short (3) - value: b'\x0b\xa0'
tag: ImageLength (257) - type: short (3) - value: b'\x0f\x80'
tag: BitsPerSample (258) - type: short (3) Tag Location: 46 - Data Location: 242 - value:
↪  b'\x00\x08\x00\x08\x00\x08'
tag: ImageDescription (270) - type: string (2) - value: b'bty\x00'
tag: Make (271) - type: string (2) Tag Location: 70 - Data Location: 194 - value:
↪  b'HUAWEI\x00'
tag: Model (272) - type: string (2) Tag Location: 82 - Data Location: 202 - value:
↪  b'EVA-L09\x00'
tag: Orientation (274) - type: short (3) - value: b'\x00\x00'
tag: XResolution (282) - type: rational (5) Tag Location: 106 - Data Location: 210 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: YResolution (283) - type: rational (5) Tag Location: 118 - Data Location: 218 - value:
↪  b'\x00\x00\x00H\x00\x00\x00\x01'
tag: ResolutionUnit (296) - type: short (3) - value: b'\x00\x02'
tag: Software (305) - type: string (2) Tag Location: 142 - Data Location: 226 - value:
↪  b'EVA-L09C432B394\x00'
tag: DateTime (306) - type: string (2) Tag Location: 154 - Data Location: 248 - value:
↪  b'2018:01:05 10:12:09\x00'
tag: YCbCrPositioning (531) - type: short (3) - value: b'\x00\x01'
tag: ExifIFD (34665) - type: long (4) - value: b'\x00\x00\x01\x0c'
tag: DeviceSettingDescription (41995) - type: undefined (7) - value: b'ipp\x00'
tag: DocumentName (269) - type: undefined (7)
tag: ExposureTime (33434) - type: rational (5) Tag Location: 294 - Data Location: 810 - value:
↪  b'\x01\xc9\xc3\x80;\x9a\xca\x00'
tag: FNumber (33437) - type: rational (5) Tag Location: 306 - Data Location: 8332 - value:
↪  b'\x00\x00\x00\xdc\x00\x00\x00d'
tag: ExposureProgram (34850) - type: short (3) - value: b'\x00\x02'
tag: ISOSpeedRatings (34855) - type: short (3) - value: b'\x00\xa0'
tag: ExifVersion (36864) - type: undefined (7) - value: b'0210'
tag: DateTimeOriginal (36867) - type: string (2) Tag Location: 354 - Data Location: 8348 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: DateTimeDigitized (36868) - type: string (2) Tag Location: 366 - Data Location: 8368 -
↪  value: b'2018:01:05 10:12:09\x00'
tag: ComponentsConfiguration (37121) - type: undefined (7) - value: b'\x01\x02\x03\x00'
tag: ShutterSpeedValue (37377) - type: signed rational (10) Tag Location: 390 - Data Location:
↪  818 - value: b"\x00\x04\x8f\xdd\x00\x00'\x10"
tag: ApertureValue (37378) - type: rational (5) Tag Location: 402 - Data Location: 8340 -
↪  value: b'\x00\x00\x00\xe3\x00\x00\x00d'
tag: BrightnessValue (37379) - type: signed rational (10) Tag Location: 414 - Data Location:
↪  794 - value: b'\x00\x00\x00\x00\x00\x00\x00\x01'
```

```
tag: ExposureBiasValue (37380) - type: signed rational (10) Tag Location: 426 - Data Location: 802 - value: b'\x00\x00\x00\x00\x00\x00\x00\n'
tag: MeteringMode (37383) - type: short (3) - value: b'\x00\x05'
tag: LightSource (37384) - type: short (3) - value: b'\x00\x01'
tag: Flash (37385) - type: short (3) - value: b'\x00\x01'
tag: FocalLength (37386) - type: rational (5) Tag Location: 474 - Data Location: 778 - value: b'\x00\x00\x11\x94\x00\x00\x03\xe8'
tag: MakerNote (37500) - type: undefined (7) Tag Location: 486 - Data Location: 8232 - value: <table: 100 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 498 - Data Location: 826 - value: <table: 7400 bytes>
tag: MakerNote (37500) - type: undefined (7) Tag Location: 510 - Data Location: 8226 - value: b'Auto\x00'
tag: SubSec (37520) - type: string (2) Tag Location: 522 - Data Location: 8388 - value: b'435482\x00'
tag: SubSecTimeOriginal (37521) - type: string (2) Tag Location: 534 - Data Location: 8396 - value: b'435482\x00'
tag: SubsecTimeDigitized (37522) - type: string (2) Tag Location: 546 - Data Location: 8404 - value: b'435482\x00'
tag: FlashPixVersion (40960) - type: undefined (7) - value: b'0100'
tag: ColorSpace (40961) - type: short (3) - value: b'\x00\x01'
tag: PixelXDimension (40962) - type: long (4) - value: b'\x00\x00\x0b\xa0'
tag: PixelYDimension (40963) - type: long (4) - value: b'\x00\x00\x0f\x80'
tag: InteroperabilityIFD (40965) - type: long (4) - value: b'\x00\x00 \xdc'
tag: SensingMethod (41495) - type: short (3) - value: b'\x00\x02'
tag: FileSource (41728) - type: undefined (7) - value: b'\x03'
tag: SceneType (41729) - type: undefined (7) - value: b'\x01'
tag: CustomRendered (41985) - type: short (3) - value: b'\x00\x01'
tag: ExposureMode (41986) - type: short (3) - value: b'\x00\x00'
tag: WhiteBalance (41987) - type: short (3) - value: b'\x00\x00'
tag: DigitalZoomRatio (41988) - type: rational (5) Tag Location: 690 - Data Location: 786 - value: b'\x00\x00\x00d\x00\x00\x00d'
tag: FocalLengthIn35mmFilm (41989) - type: short (3) - value: b'\x00\x1b'
tag: SceneCaptureType (41990) - type: short (3) - value: b'\x00\x00'
tag: GainControl (41991) - type: short (3) - value: b'\x00\x00'
tag: Contrast (41992) - type: short (3) - value: b'\x00\x00'
tag: Saturation (41993) - type: short (3) - value: b'\x00\x00'
tag: Sharpness (41994) - type: short (3) - value: b'\x00\x00'
tag: SubjectDistanceRange (41996) - type: short (3) - value: b'\x00\x00'
loading image from '/home/dirk/work/unittest_collection/media/unittest/input_data/image_exif_no_gps.jpg'
Resizing picture to max 300 pixel in whatever direction
Joining two images
Saving image to '/home/dirk/work/unittest_collection/media/unittest/output_data/joined_image_2.jpg'
Result (Filecompare for joined_image_2.jpg): True (<class 'bool'>)
Expectation (Filecompare for joined_image_2.jpg): result = True (<class 'bool'>)
```

B Test-Coverage

B.1 media

The line coverage for media was 68.7%
The branch coverage for media was 54.9%

B.1.1 media.CDDB.py

The line coverage for media.CDDB.py was 19.5%
The branch coverage for media.CDDB.py was 54.9%

```
1  import urllib
2  import socket
3  import os
4  import urllib.parse
5  import urllib.request
6  import subprocess
7  import logging
8  from .common import KEY_ALBUM, KEY_ARTIST, KEY_GENRE, KEY_TITLE, KEY_TRACK, KEY_YEAR,
       KEY_TRACKLIST
9
10 try:
11     from config import APP_NAME as ROOT_LOGGER_NAME
12 except ImportError:
13     ROOT_LOGGER_NAME = 'root'
14 logger = logging.getLogger(ROOT_LOGGER_NAME).getChild(__name__)
15
16
17 version = 2.0
18 if 'EMAIL' in os.environ:
19     (default_user, hostname) = os.environ['EMAIL'].split('@')
20 else:
21     default_user = os.environ.get('USER') or os.geteuid() or 'user'
22     hostname = socket.gethostname() or 'host'
23
24 proto = 6
25 default_server = 'http://gnudb.gnudb.org/~cddb/cddb.cgi'
26
27
28 def my_disc_metadata(**kwargs):
29     """Generate my disc metadata
30
31     kwargs needs to include the following data:
32         * KEY_ARTIST (str)
33         * KEY_ALBUM (str)
34         * KEY_YEAR (int) - will be converted here
35         * KEY_GENRE (str)
36         * "track_xx" (str) - where xx is the track number which will be converted to int here
37     """
38     main_dict = {}
39     for key in [KEY_ARTIST, KEY_ALBUM, KEY_YEAR, KEY_GENRE]:
40         try:
41             value = kwargs.pop(key)
42         except KeyError:
43             logger.error("Information is missing in kwargs - key=%s", key)
44             return None
45         if key in [KEY_YEAR]:
```

```
46              try:
47                  main_dict[key] = int(value)
48              except ValueError:
49                  logger.error("Can't convert %s (key=%s) to integer value", value, key)
50                  return None
51          else:
52              main_dict[key] = value
53      rv = dict(main_dict)
54      rv[KEY_TRACKLIST] = []
55      for key in list(kwargs):
56          value = kwargs.pop(key)
57          if key.startswith("track_"):
58              track = dict(main_dict)
59              try:
60                  track[KEY_TRACK] = int(key[6:])
61              except ValueError:
62                  logger.warning("Useless information kwargs - kwargs[%s] = %s", key, repr(value))
63              track[KEY_TITLE] = value
64              rv["tracks"].append(track)
65          else:
66              logger.warning("Useless information kwargs - key=%s", key)
67      return rv
68
69
70  def query(data_str, server_url=default_server, user=default_user, host=hostname, client_name=
        ROOT_LOGGER_NAME, client_version=version):
71      url = f"{server_url}?cmd=cddb+query+{data_str}&hello={user}+{host}+{client_name}+{
        client_version}&proto={proto}"
72      try:
73          response = urllib.request.urlopen(url)
74      except urllib.error.URLError as e:
75          logger.warning("Error while getting data from CDDB database: %s", repr(e))
76          return None
77      header = response.readline().decode("utf-8").rstrip().split(" ", 3)
78      header[0] = int(header[0])
79
80      if header[0] not in (210, ):
81          logger.error("Error while querying cddb entry: \"%d - %s\"", header[0], header[3])
82          return None
83
84      rv = {}
85      for line in response.readlines():
86          line = line.decode("utf-8").rstrip()
87          if line == '.':                 # end of matches
88              break
89          dummy, did, txt = line.split(" ", 2)
90          rv[did] = txt
91      return rv
92
93
94  def cddb(disc_id, server_url=default_server, user=default_user, host=hostname, client_name=
        ROOT_LOGGER_NAME, client_version=version):
95      KEY_TRANSLATOR = {
96          "DGENRE": KEY_GENRE,
97          "DYEAR": KEY_YEAR
98      }
99      #
100     url = f"{server_url}?cmd=cddb+read+data+{disc_id}&hello={default_server}+{hostname}+{
        client_name}+{client_version}&proto={proto}"
101     try:
102         response = urllib.request.urlopen(url)
103     except urllib.error.URLError as e:
104         logger.warning("Error while getting data from CDDB database: %s", repr(e))
105         return None
```

```
106
107     header = response.readline().decode("utf-8").rstrip().split(" ", 3)
108     header[0] = int(header[0])
109
110     if header[0] not in (210, ):
111         logger.error("Error while reading cddb entry: \"%s - %s\"", repr(header[1]), repr(header
    [3]))
112         return None
113     data = {}
114     for line in response.readlines():
115         logger.debug("CDDB line: %s", repr(line))
116         line = line.decode("utf-8").rstrip()
117         if line == '.':                 # end of matches
118             break
119         if not line.startswith("#"):
120             match = line.split('=', 2)
121             key = KEY_TRANSLATOR.get(match[0])
122             value = match[1].strip()
123             if key:
124                 if key == KEY_YEAR:
125                     try:
126                         value = int(value)
127                     except ValueError:
128                         logger.warning("Could not determine KEY_YEAR... value=%s", repr(value))
129                         value = 0
130                 data[key] = value
131             elif match[0] == "DTITLE":
132                 art_tit = value.split(" / ", 2)
133                 data[KEY_ARTIST] = art_tit[0].strip()
134                 data[KEY_ALBUM] = art_tit[1].strip()
135             elif match[0].startswith("TTITLE"):
136                 data["track_%02d" % (int(match[0][6:]) + 1)] = value
137             else:
138                 logger.debug("cddb line ignored: \"%s\"", line)
139     return my_disc_metadata(**data)
140
141
142 def discid():
143     discid_cmd = subprocess.getoutput("which cd-discid")
144     if not discid_cmd:
145         logger.error("cd-discid is required for encoding. You need to install it to your system."
    )
146         return None
147     else:
148         try:
149             return subprocess.check_output(discid_cmd).decode("utf-8").strip().replace(" ", "+")
150         except subprocess.CalledProcessError as e:
151             logger.error("disc-id command results in an exception")
152             return None
```

B.1.2 media.__init__.py

The line coverage for media.__init__.py was 100.0%
The branch coverage for media.__init__.py was 54.9%

```
1 #!/usr/bin/env python
2 # -*- coding: utf-8 -*-
3 #
4 """
```

```
media (Media Tools)
===================

**Author:**

* Dirk Alders <sudo-dirk@mount-mockery.de>

**Description:**

    This module helps on all issues with media files, like tags (e.g. exif, id3) and
    transformations.

**Submodules:**

* :func:`media.get_media_data`
* :class:`media.image`

**Unittest:**

    See also the :download:`unittest <../../media/_testresults_/unittest.pdf>` documentation.
"""
from .common import CALLBACK_CDDB_CHOICE
from .common import CALLBACK_MAN_INPUT
from .common import get_disc_device
from .common import KEY_ALBUM
from .common import KEY_APERTURE
from .common import KEY_ARTIST
from .common import KEY_BITRATE
from .common import KEY_CAMERA
from .common import KEY_DURATION
from .common import KEY_EXPOSURE_PROGRAM
from .common import KEY_EXPOSURE_TIME
from .common import KEY_FLASH
from .common import KEY_FOCAL_LENGTH
from .common import KEY_GENRE
from .common import KEY_GPS
from .common import KEY_HEIGHT
from .common import KEY_ISO
from .common import KEY_ORIENTATION
from .common import KEY_RATIO
from .common import KEY_SIZE
from .common import KEY_TIME
from .common import KEY_TIME_IS_SUBSTITUTION
from .common import KEY_TITLE
from .common import KEY_TRACK
from .common import KEY_TRACKLIST
from .common import KEY_WIDTH
from .common import KEY_YEAR
from .convert import disc_track_rip
from .convert import wav_to_mp3
from .convert import track_to_targetpath
from .image import image
from .image import ORIENTATION_HALF_ROTATED
from .image import ORIENTATION_HORIZONTAL_MIRRORED
from .image import ORIENTATION_LEFT_ROTATED
from .image import ORIENTATION_NORMAL
from .image import ORIENTATION_RIGHT_ROTATED
from .image import ORIENTATION_VERTICAL_MIRRORED
from .image import JOIN_BOT_LEFT, JOIN_BOT_RIGHT
from .image import JOIN_CENTER
from .image import JOIN_TOP_LEFT
```

```
from .image import JOIN_TOP_RIGHT
from .metadata import get_media_data
__DEPENDENCIES__ = []


__DESCRIPTION__ = """The Module {\\tt %s} is designed to help on all issues with media files, like tags (e.g. exif, id3) and transformations.
For more Information read the documentation.""" % __name__.replace('_', '\\_')
"""The Module Description"""
__INTERPRETER__ = (3, )
"""The Tested Interpreter-Versions"""
```

B.1.3 media.common.py

The line coverage for media.common.py was 84.1%
The branch coverage for media.common.py was 54.9%

```
import os
import logging

try:
    from config import APP_NAME as ROOT_LOGGER_NAME
except ImportError:
    ROOT_LOGGER_NAME = 'root'
logger = logging.getLogger(ROOT_LOGGER_NAME).getChild(__name__)

# make module usable without discid dependency
try:
    import discid
except ModuleNotFoundError:
    logger.warning("Python module discid not installed")
except OSError:
    logger.exception("You might install python3-libdiscid")

KEY_ALBUM = 'album'
KEY_APERTURE = 'aperture'
KEY_ARTIST = 'artist'
KEY_BITRATE = 'bitrate'
KEY_CAMERA = 'camera'
KEY_DURATION = 'duration'
KEY_EXPOSURE_PROGRAM = 'exposure_program'
KEY_EXPOSURE_TIME = 'exposure_time'
KEY_FLASH = 'flash'
KEY_FOCAL_LENGTH = 'focal_length'
KEY_GENRE = 'genre'
KEY_GPS = 'gps'
KEY_HEIGHT = 'height'
KEY_ISO = 'iso'
KEY_ORIENTATION = 'orientation'
KEY_RATIO = 'ratio'
KEY_SIZE = 'size'
KEY_TIME = 'time'   # USE time.localtime(value) or datetime.fromtimestamp(value) to convert the timestamp
KEY_TIME_IS_SUBSTITUTION = 'tm_is_subst'
KEY_TITLE = 'title'
KEY_TRACK = 'track'
KEY_TRACKLIST = 'tracks'
KEY_WIDTH = 'width'
KEY_YEAR = 'year'

```

```
43 FILETYPE_AUDIO = 'audio'
44 FILETYPE_IMAGE = 'image'
45 FILETYPE_VIDEO = 'video'
46 FILETYPE_DISC = 'disc'
47
48 CALLBACK_CDDB_CHOICE = 0
49 CALLBACK_MAN_INPUT = 1
50
51 EXTENTIONS_AUDIO = ['.mp3', ]
52 EXTENTIONS_IMAGE = ['.jpg', '.jpeg', '.jpe', '.png', '.tif', '.tiff', '.gif', ]
53 EXTENTIONS_VIDEO = ['.avi', '.mpg', '.mpeg', '.mpe', '.mov', '.qt', '.mp4', '.webm', '.ogv', '.
     flv', '.3gp', ]
54 PREFIX_DISC = '/dev/'
55
56
57 def get_filetype(full_path):
58     ext = os.path.splitext(full_path.lower())[1]
59     if ext in EXTENTIONS_AUDIO:
60         return FILETYPE_AUDIO
61     elif ext in EXTENTIONS_IMAGE:
62         return FILETYPE_IMAGE
63     elif ext in EXTENTIONS_VIDEO:
64         return FILETYPE_VIDEO
65     elif full_path.startswith(PREFIX_DISC):
66         return FILETYPE_DISC
67
68
69 def get_disc_device():
70     rv = discid.get_default_device()
71     logger.debug("Disc device is %s", repr(rv))
72     if not os.path.exists(rv):
73         logger.warning("Disk device does not exist!")
74     return rv
```

B.1.4 media.convert.py

The line coverage for media.convert.py was 37.5%
The branch coverage for media.convert.py was 54.9%

```
1 import io
2 from media import common
3 from PIL import Image
4 import subprocess
5 import platform
6 import logging
7 import os
8 import subprocess
9 from .common import KEY_TRACK
10
11 try:
12     from config import APP_NAME as ROOT_LOGGER_NAME
13 except ImportError:
14     ROOT_LOGGER_NAME = 'root'
15 logger = logging.getLogger(ROOT_LOGGER_NAME).getChild(__name__)
16
17
18 def get_pil_image(media_instance):
19     try:
20         media_instance = media_instance._im
21     except AttributeError:
22         pass
```

```
    #
    if type(media_instance) == str:
        ft = common.get_filetype(media_instance)
        if ft == common.FILETYPE_IMAGE:
            return Image.open(media_instance)
        elif ft == common.FILETYPE_VIDEO:
            if platform.system() == 'Linux':
                cmd = 'ffmpeg -ss 0.5 -i "' + media_instance + '" -vframes 1 -f image2pipe pipe:1 2> /dev/null'
            else:
                cmd = 'ffmpeg -ss 0.5 -i "' + media_instance + '" -vframes 1 -f image2pipe pipe:1 2> NULL'
            try:
                data = subprocess.check_output(cmd, shell=True)
            except subprocess.CalledProcessError:
                logger.warning('ffmpeg seems to be not installed')
                return None
            ffmpeg_handle = io.BytesIO(data)
            im = Image.open(ffmpeg_handle)
            return im.copy()
        logger.warning('Filetype is not supported (%s)', media_instance)
    elif type(media_instance) == Image.Image:
        return media_instance.copy()
    else:
        logger.warning('Instance type is not supported: %s' % type(media_instance))


def FilenameFilter(filename: str) -> str:
    # WHITELIST = [os.path.sep, os.path.extsep]
    WHITELIST = [chr(x) for x in range(ord('0'), ord('9') + 1)]
    WHITELIST += [chr(x) for x in range(ord('a'), ord('z') + 1)]
    WHITELIST += ["ä", "ö", "ü", "ß"]
    #
    rv = ""
    for c in filename.lower():
        rv += c if c in WHITELIST else '_'
    return rv


def track_to_targetpath(basepath: str, track: dict, ext: str):
    return os.path.join(
        basepath,
        FilenameFilter(track[common.KEY_ARTIST]),
        "%04d_" % track[common.KEY_YEAR] + FilenameFilter(track[common.KEY_ALBUM]),
        "%02d_" % track[common.KEY_TRACK] + FilenameFilter(track[common.KEY_TITLE]) + "." + ext
    )


def disc_track_rip(track_num: int, target_file: str, progress_callback):
    logger.info("Ripping track %d to %s", track_num, target_file)
    FAC_SEC_VAL = 1224
    #
    cdp_cmd = subprocess.getoutput("which cdparanoia")
    if not cdp_cmd:
        logger.error("cdparanoia is required for ripping. You need to install it to your system.")
    else:
        cmd = [cdp_cmd, "-e", "-X", "%d" % track_num, target_file]
        cdp = subprocess.Popen(cmd, text=True, stderr=subprocess.PIPE)
        #
```

```
        rval = 0
        min_sec = None
        max_sec = None
        min_read = None
        while (out := cdp.stderr.readline()) != "":
            out = out.strip()
            # identify minimum sector
            if ("Ripping from sector" in out):
                min_sec = int(list(filter(None, out.split(" ")))[3])
            # identify maximum sector
            if ("to sector" in out):
                max_sec = int(list(filter(None, out.split(" ")))[2])
            # identify progress
            if "[read]" in out:
                val = int(out.split(" ")[-1])
                if not min_read:
                    min_read = val
                rval = max(val, rval)
                try:
                    dsec = max_sec - min_sec
                except TypeError:
                    logger.exception("Error while parsing cdparanoia. Start and End sector could not be detrmined.")
                else:
                    p = (rval - min_read) / FAC_SEC_VAL / dsec
                    p = min(p, 1)
                    logger.debug("Rip progress = %002d%%", p * 100)
                    progress_callback(p, track_num=track_num)
        progress_callback(1, track_num=track_num)
        return cdp.wait()


def wav_to_mp3(infile: str, basepath: str, track_information, progress_callback, bitrate=256, vbr=0, quaulity=0):
    lame_parameter = {
        common.KEY_ARTIST: '--ta',
        common.KEY_ALBUM: '--tl',
        common.KEY_YEAR: '--ty',
        common.KEY_GENRE: '--tg',
        common.KEY_TRACK: '--tn',
        common.KEY_TITLE: '--tt'
    }
    lame_cmd = subprocess.getoutput("which lame")
    if not lame_cmd:
        logger.error("lame is required for encoding. You need to install it to your system.")
    else:
        outfile = track_to_targetpath(basepath, track_information, 'mp3')
        logger.info("Encoding %s to %s", infile, outfile)
        cmd = [lame_cmd, "-b", str(bitrate), "-V", str(vbr), "--vbr-old", "-q", str(quaulity), infile, outfile]
        cmd.extend(["--tc", "Encoded by lame"])
        for key in track_information:
            cmd.extend([lame_parameter[key], str(track_information[key])])
        lame = subprocess.Popen(cmd, text=True, stderr=subprocess.PIPE)
        while (out := lame.stderr.readline()) != "":
            out = out.strip()
            posb = out.find("(")
            posp = out.find("%")
            if posb >= 0 and posp >= 0:
                p = int(out[posb+1:posp]) / 100
                logger.debug("Encoding progress = %002d%%", p * 100)
                progress_callback(p, track_information[KEY_TRACK])
        progress_callback(1, track_information[KEY_TRACK])
        return lame.wait()
```

B.1.5 media.image.py

The line coverage for media.image.py was 99.2%
The branch coverage for media.image.py was 54.9%

```
import io
import logging
from PIL import Image, ImageEnhance, ExifTags

try:
    from config import APP_NAME as ROOT_LOGGER_NAME
except ImportError:
    ROOT_LOGGER_NAME = 'root'
logger = logging.getLogger(ROOT_LOGGER_NAME).getChild(__name__)


ORIENTATION_NORMAL = 1
ORIENTATION_VERTICAL_MIRRORED = 2
ORIENTATION_HALF_ROTATED = 3
ORIENTATION_HORIZONTAL_MIRRORED = 4
ORIENTATION_LEFT_ROTATED = 6
ORIENTATION_RIGHT_ROTATED = 8

JOIN_TOP_LEFT = 1
JOIN_TOP_RIGHT = 2
JOIN_BOT_LEFT = 3
JOIN_BOT_RIGHT = 4
JOIN_CENTER = 5


class image(object):
    def __init__(self, media_instance=None):
        if media_instance is not None:
            self.load_from_file(media_instance)
        else:
            self._im = None

    def load_from_file(self, media_instance):
        from media.convert import get_pil_image
        #
        self._im = get_pil_image(media_instance)
        if self._im is None:
            return False
        try:
            self._exif = dict(self._im._getexif().items())
        except AttributeError:
            self._exif = {}
        if type(self._im) is not Image.Image:
            self._im = self._im.copy()
        logger.debug('loading image from %s', repr(media_instance))
        return True

    def save(self, full_path):
        if self._im is None:
            logger.warning('No image available to be saved (%s)', repr(full_path))
            return False
        else:
            logger.debug('Saving image to %s', repr(full_path))
            with open(full_path, 'w') as fh:
                im = self._im.convert('RGB')
                im.save(fh, 'JPEG')
        return True
```

```
58
59      def image_data(self):
60          im = self._im.copy().convert('RGB')
61          output = io.BytesIO()
62          im.save(output, format='JPEG')
63          return output.getvalue()
64
65      def resize(self, max_size):
66          if self._im is None:
67              logger.warning('No image available to be resized')
68              return False
69          else:
70              logger.debug('Resizing picture to max %d pixel in whatever direction', max_size)
71              x, y = self._im.size
72              xy_max = max(x, y)
73              self._im = self._im.resize((int(x * float(max_size) / xy_max), int(y * float(max_size
    ) / xy_max)), Image.NEAREST).rotate(0)
74          return True
75
76      def rotate_by_orientation(self, orientation=None):
77          if self._im is None:
78              logger.warning('No image available, rotation not possible')
79              return False
80
81          if orientation is None:
82              exif_tags = dict((v, k) for k, v in ExifTags.TAGS.items())
83              try:
84                  orientation = self._exif[exif_tags['Orientation']]
85                  logger.debug("No orientation given, orientation %s extract from exif data", repr(
    orientation))
86              except KeyError:
87                  return False
88
89          if orientation == ORIENTATION_HALF_ROTATED:
90              angle = 180
91          elif orientation == ORIENTATION_LEFT_ROTATED:
92              angle = 270
93          elif orientation == ORIENTATION_RIGHT_ROTATED:
94              angle = 90
95          else:
96              if type(orientation) == int and orientation > 8:
97                  logger.warning('Orientation %s unknown for rotation', repr(orientation))
98              return False
99          logger.debug('Rotating picture by %d (deg)', angle)
100         self._im = self._im.rotate(angle, expand=True)
101         return True
102
103     def join(self, join_image, join_pos=JOIN_TOP_RIGHT, opacity=0.7):
104         from media.convert import get_pil_image
105
106         def rgba_copy(im):
107             if im.mode != 'RGBA':
108                 return im.convert('RGBA')
109             else:
110                 return im.copy()
111
112         if self._im is None:
113             logger.warning('No image available, joining not possible')
114             return False
115
116         # ensure type of join_image is PIL.Image
```

```
117         join_image = get_pil_image(join_image)
118         if join_image is None:
119             logger.warning('Image to be joined is not supported %s', repr(join_image))
120             return False
121 
122         im2 = rgba_copy(join_image)
123         # change opacity of im2
124         alpha = im2.split()[3]
125         alpha = ImageEnhance.Brightness(alpha).enhance(opacity)
126         im2.putalpha(alpha)
127 
128         self._im = rgba_copy(self._im)
129 
130         # create a transparent layer
131         layer = Image.new('RGBA', self._im.size, (0, 0, 0, 0))
132         # draw im2 in layer
133         if join_pos == JOIN_TOP_LEFT:
134             layer.paste(im2, (0, 0))
135         elif join_pos == JOIN_TOP_RIGHT:
136             layer.paste(im2, ((self._im.size[0] - im2.size[0]), 0))
137         elif join_pos == JOIN_BOT_LEFT:
138             layer.paste(im2, (0, (self._im.size[1] - im2.size[1])))
139         elif join_pos == JOIN_BOT_RIGHT:
140             layer.paste(im2, ((self._im.size[0] - im2.size[0]), (self._im.size[1] - im2.size[1]))
    )
141         elif join_pos == JOIN_CENTER:
142             layer.paste(im2, (int((self._im.size[0] - im2.size[0]) / 2), int((self._im.size[1] -
    im2.size[1]) / 2)))
143         else:
144             logger.warning("Join position value %s is not supported", join_pos)
145             return False
146 
147         logger.debug('Joining two images')
148         self._im = Image.composite(layer, self._im, layer)
149 
150         return True
```

B.1.6 media.metadata.py

The line coverage for media.metadata.py was 82.0%
The branch coverage for media.metadata.py was 54.9%

```
1 import media.CDDB
2 import time
3 import subprocess
4 from media import common
5 import math
6 from PIL import Image
7 import os
8 import logging
9 import sys
10 
11 
12 try:
13     from config import APP_NAME as ROOT_LOGGER_NAME
14 except ImportError:
15     ROOT_LOGGER_NAME = 'root'
16 logger = logging.getLogger(ROOT_LOGGER_NAME).getChild(__name__)
17 
18 # make module usable without discid dependency
```

```
try:
    import discid
except ModuleNotFoundError:
    logger.warning("Python module discid not installed")
except OSError:
    logger.exception("You might install python3-libdiscid")

__KEY_CAMERA_VENDOR__ = 'camera_vendor'
__KEY_CAMERA_MODEL__ = 'camera_model'


def get_media_data(full_path, user_callback=None):
    #
    ft = common.get_filetype(full_path)
    #
    rv = None
    if ft == common.FILETYPE_AUDIO:
        rv = get_audio_data(full_path)
    elif ft == common.FILETYPE_IMAGE:
        rv = get_image_data(full_path)
    elif ft == common.FILETYPE_VIDEO:
        rv = get_video_data(full_path)
    elif ft == common.FILETYPE_DISC:
        rv = get_disc_data(full_path, user_callback)
    else:
        logger.warning('Filetype not known: %s', full_path)
    logger.info("Media data identified: %s", repr(rv))
    return rv


def get_audio_data(full_path):
    conv_key_dict = {}
    conv_key_dict['album'] = (str, common.KEY_ALBUM)
    conv_key_dict['TAG:album'] = (str, common.KEY_ALBUM)
    conv_key_dict['TAG:artist'] = (str, common.KEY_ARTIST)
    conv_key_dict['artist'] = (str, common.KEY_ARTIST)
    conv_key_dict['bit_rate'] = (__int_conv__, common.KEY_BITRATE)
    conv_key_dict['duration'] = (float, common.KEY_DURATION)
    conv_key_dict['TAG:genre'] = (str, common.KEY_GENRE)
    conv_key_dict['genre'] = (str, common.KEY_GENRE)
    conv_key_dict['TAG:title'] = (str, common.KEY_TITLE)
    conv_key_dict['title'] = (str, common.KEY_TITLE)
    conv_key_dict['TAG:track'] = (__int_conv__, common.KEY_TRACK)
    conv_key_dict['track'] = (__int_conv__, common.KEY_TRACK)
    conv_key_dict['TAG:date'] = (__int_conv__, common.KEY_YEAR)
    conv_key_dict['date'] = (__int_conv__, common.KEY_YEAR)
    return __adapt__data__(__get_xxprobe_data__(full_path, conv_key_dict), full_path)


def get_disc_data_dummy():
    data = {
        common.KEY_ARTIST: "Artist",
        common.KEY_ALBUM: "Album",
        common.KEY_YEAR: "1987",
        common.KEY_GENRE: "Genre"
    }
    for i in range(0, 3):
        data["track_%02d" % (i + 1)] = "Track %02d" % (i + 1)
    return media.CDDB.my_disc_metadata(**data)


def get_disc_data(full_path, user_callback):
```

```
81      #
82      # Read Information from CDDB database
83      #
84      did = media.CDDB.discid()
85      if did is None:
86          logger.error("Could not determine disc id...")
87          return None
88      logger.debug("Disc-ID identified %s", repr(did))
89      q = media.CDDB.query(did)
90      if q is None:
91          data = {
92              common.KEY_ARTIST: None,
93              common.KEY_ALBUM: None,
94              common.KEY_YEAR: None,
95              common.KEY_GENRE: None
96          }
97          for i in range(0, int(did.split('+')[1])):
98              data["track_%02d" % (i + 1)] = None
99          data = user_callback(common.CALLBACK_MAN_INPUT, data)
100         try:
101             return media.CDDB.my_disc_metadata(**data)
102         except TypeError:
103             return None
104
105     if len(q) == 1:
106         logger.debug("Single database entry identified")
107         # Only one entry
108         did = tuple(q.keys())[0]
109     else:
110         logger.debug("Multiple databse entries identified. Asking user for feedback...")
111         # multiple entries (choose)
112         if user_callback is None:
113             logger.warning("No usercallback to handle multiple cddb choices...")
114             sys.exit(1)
115         did = user_callback(common.CALLBACK_CDDB_CHOICE, q)
116
117     return media.CDDB.cddb(did)
118     """
119     musicbrainzngs.set_useragent("pyrip", "0.1", "your@mail")
120     disc = discid.read()
121     disc_id = disc.id
122     disc_data = {}
123     try:
124         result = musicbrainzngs.get_releases_by_discid(disc_id, includes=["artists", "recordings"
        ])
125     except musicbrainzngs.ResponseError:
126         logger.exception("disc not found or bad response")
127         sys.exit(1)
128     else:
129         disc_data[common.KEY_ARTIST] = result["disc"]["release-list"][0]["artist-credit-phrase"]
130         disc_data[common.KEY_ALBUM] = result["disc"]["release-list"][0]["title"]
131         disc_data[common.KEY_YEAR] = int(result["disc"]["release-list"][0]["date"][:4])
132         data_copy = dict(disc_data)
133         disc_data["id"] = result["disc"]["release-list"][0]["id"]
134         disc_data["tracks"] = []
135         # get tracklist
136         for entry in result["disc"]["release-list"][0]["medium-list"][0]["track-list"]:
137             track = dict(data_copy)
138             track[common.KEY_TITLE] = entry["recording"]["title"]
139             track[common.KEY_TRACK] = int(entry['number'])
140             disc_data["tracks"].append(track)
141     return disc_data
142     """
143
144
```

```
145 def get_video_data(full_path):
146     conv_key_dict = {}
147     conv_key_dict['creation_time'] = (__vid_datetime_conv__, common.KEY_TIME)
148     conv_key_dict['TAG:creation_time'] = (__vid_datetime_conv__, common.KEY_TIME)
149     conv_key_dict['bit_rate'] = (__int_conv__, common.KEY_BITRATE)
150     conv_key_dict['duration'] = (float, common.KEY_DURATION)
151     conv_key_dict['height'] = (__int_conv__, common.KEY_HEIGHT)
152     conv_key_dict['width'] = (__int_conv__, common.KEY_WIDTH)
153     conv_key_dict['display_aspect_ratio'] = (__ratio_conv__, common.KEY_RATIO)
154     return __adapt__data__(__get_xxprobe_data__(full_path, conv_key_dict), full_path)
155
156
157 def get_image_data(full_path):
158     return __adapt__data__(__get_exif_data__(full_path), full_path)
159
160
161 def __adapt__data__(data, full_path):
162     data[common.KEY_SIZE] = os.path.getsize(full_path)
163     # Join Camera Vendor and Camera Model
164     if __KEY_CAMERA_MODEL__ in data and __KEY_CAMERA_VENDOR__ in data:
165         model = data.pop(__KEY_CAMERA_MODEL__)
166         vendor = data.pop(__KEY_CAMERA_VENDOR__)
167         data[common.KEY_CAMERA] = '%s: %s' % (vendor, model)
168     # Add time if not exists
169     if common.KEY_TIME not in data:
170         if common.KEY_YEAR in data and common.KEY_TRACK in data:
171             if data[common.KEY_YEAR] != 0:  # ignore year 0 - must be wrong
172                 # Use a date where track 1 is the newest in the given year
173                 minute = int(data[common.KEY_TRACK] / 60)
174                 second = (data[common.KEY_TRACK] - 60 * minute) % 60
175                 #
176                 data[common.KEY_TIME] = int(time.mktime((data[common.KEY_YEAR], 1, 1, 0, 59 -
    minute, 59 - second, 0, 0, 0)))
177                 data[common.KEY_TIME_IS_SUBSTITUTION] = True
178         else:
179             data[common.KEY_TIME] = int(os.path.getmtime(full_path))
180             data[common.KEY_TIME_IS_SUBSTITUTION] = True
181     return data
182
183
184 def __get_xxprobe_data__(full_path, conv_key_dict):
185     def _ffprobe_command(full_path):
186         return ['ffprobe', '-v', 'quiet', '-show_format', '-show_streams', full_path]
187
188     def _avprobe_command(full_path):
189         return ['avprobe', '-v', 'quiet', '-show_format', '-show_streams', full_path]
190
191     try:
192         xxprobe_text = subprocess.check_output(_avprobe_command(full_path))
193     except FileNotFoundError:
194         try:
195             xxprobe_text = subprocess.check_output(_ffprobe_command(full_path))
196         except FileNotFoundError:
197             logger.warning('ffprobe and avprobe seem to be not installed')
198             return {}
199     #
200     rv = {}
201     for line in xxprobe_text.decode('utf-8').splitlines():
202         try:
203             key, val = [snippet.strip() for snippet in line.split('=')]
204         except ValueError:
205             continue
```

```
206         else:
207             if key in conv_key_dict:
208                 tp, name = conv_key_dict[key]
209                 try:
210                     rv[name] = tp(val)
211                 except ValueError:
212                     logger.log(logging.WARNING if val else logger.INFO, 'Can\'t convert %s (%s)
    for %s', repr(val), name, name)
213     return rv
214
215
216 def __get_exif_data__(full_path):
217     rv = {}
218     im = Image.open(full_path)
219     try:
220         exif = dict(im._getexif().items())
221     except AttributeError:
222         logger.debug('%s does not have any exif information', full_path)
223     else:
224         conv_key_dict = {}
225         # IMAGE
226         conv_key_dict[0x9003] = (__datetime_conv__, common.KEY_TIME)
227         conv_key_dict[0x8822] = (__exposure_program_conv__, common.KEY_EXPOSURE_PROGRAM)
228         conv_key_dict[0x829A] = (__num_denum_conv__, common.KEY_EXPOSURE_TIME)
229         conv_key_dict[0x9209] = (__flash_conv__, common.KEY_FLASH)
230         conv_key_dict[0x829D] = (__num_denum_conv__, common.KEY_APERTURE)
231         conv_key_dict[0x920A] = (__num_denum_conv__, common.KEY_FOCAL_LENGTH)
232         conv_key_dict[0x8825] = (__gps_conv__, common.KEY_GPS)
233         conv_key_dict[0xA003] = (__int_conv__, common.KEY_HEIGHT)
234         conv_key_dict[0x8827] = (__int_conv__, common.KEY_ISO)
235         conv_key_dict[0x010F] = (str, __KEY_CAMERA_VENDOR__)
236         conv_key_dict[0x0110] = (str, __KEY_CAMERA_MODEL__)
237         conv_key_dict[0x0112] = (__int_conv__, common.KEY_ORIENTATION)
238         conv_key_dict[0xA002] = (__int_conv__, common.KEY_WIDTH)
239         for key in conv_key_dict:
240             if key in exif:
241                 tp, name = conv_key_dict[key]
242                 raw_value = exif[key]
243                 logger.debug("Converting %s out of %s", name, repr(raw_value))
244                 value = tp(raw_value)
245                 if value is not None:
246                     rv[name] = value
247     return rv
248
249
250 # TODO: Join datetime converter __datetime_conv__ and __vid_datetime_conv_
251 def __datetime_conv__(dt):
252     format_string = "%Y:%m:%d %H:%M:%S"
253     return int(time.mktime(time.strptime(dt, format_string)))
254
255
256 def __vid_datetime_conv__(dt):
257     try:
258         dt = dt[:dt.index('.')]
259     except ValueError:
260         pass  # time string seems to have no '.'
261     dt = dt.replace('T', ' ').replace('/', '').replace('\\', '')
262     if len(dt) == 16:
263         dt += ':00'
264     format_string = '%Y-%m-%d %H:%M:%S'
265     return int(time.mktime(time.strptime(dt, format_string)))
```

```


def __exposure_program_conv__(n):
    return {
        0: 'Unidentified',
        1: 'Manual',
        2: 'Program Normal',
        3: 'Aperture Priority',
        4: 'Shutter Priority',
        5: 'Program Creative',
        6: 'Program Action',
        7: 'Portrait Mode',
        8: 'Landscape Mode'
    }.get(n, None)


def __flash_conv__(n):
    return {
        0: 'No',
        1: 'Fired',
        5: 'Fired (?)',  # no return sensed
        7: 'Fired (!)',  # return sensed
        9: 'Fill Fired',
        13: 'Fill Fired (?)',
        15: 'Fill Fired (!)',
        16: 'Off',
        24: 'Auto Off',
        25: 'Auto Fired',
        29: 'Auto Fired (?)',
        31: 'Auto Fired (!)',
        32: 'Not Available'
    }.get(n, None)


def __int_conv__(value):
    try:
        return int(value)
    except ValueError:
        for c in ['.', '/', '-']:
            p = value.find(c)
            if p >= 0:
                value = value[:p]
    try:
        return int(value)
    except ValueError:
        return None


def __num_denum_conv__(data):
    try:
        return float(data)
    except TypeError:
        num, denum = data
        return num / denum


def __gps_conv__(data):
    def lat_lon_cal(lon_or_lat):
        lon_lat = 0.
        fac = 1.
        for data in lon_or_lat:
```

```
327                 try:
328                     lon_lat += float(data[0]) / float(data[1]) * fac
329                 except TypeError:
330                     lon_lat += data * fac
331                 except ZeroDivisionError:
332                     return 0.
333                 fac *= 1. / 60.
334             if math.isnan(lon_lat):
335                 return 0.
336             return lon_lat
337         try:
338             lon = lat_lon_cal(data[0x0004])
339             lat = lat_lon_cal(data[0x0002])
340             if lon != 0 or lat != 0:    # do not use lon and lat equal 0, caused by motorola gps
    weakness
341                 return {'lon': lon, 'lat': lat}
342         except KeyError:
343             logger.warning('GPS data extraction failed for %s', repr(data))
344
345
346 def __ratio_conv__(ratio):
347     ratio = ratio.replace('\\', '')
348     num, denum = ratio.split(':')
349     return float(num) / float(denum)
```