

Totally Objects EXIF Reader

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Introduction

Buried within each and every JPEG is a whole string of data about the image. This is known as EXIF and comprises a list of “tags”. EXIF tags are stored as byte streams within the JPEG file and each has a different makeup from all the others.

This code has been developed to enable a user of Instantiations VAST Smalltalk to interrogate any JPEG and extract the EXIF data held within. It is a standalone application that requires no prerequisites. There is a small list of class methods that provide the results covering the main requirements.

This software provides direct access into JPEG files. If you choose to use this software on your files of this type, please take the normal precautions that you would take before using any such type of software; i.e. make backups etc.

EXIF data

Each EXIF tag definition has the same format as all others as follows:

Tag (Hex)

Type (Byte, ASCII, Short, Long, Rational, Undefined, Long, Rational)

Count (Number of values - see later)

Default (The initialised value).

EXIF data is defined by the Japanese Electronics and Information Technology Industries Association (JEITA). The software has been developed using their document JEITA CP-3451 Exchangeable Image file format for digital still cameras: Exif Version 2.2. The latest version CP-3451C (2.3 dated April 2010) is available from <https://rb.gy/zphlvn>.

Smalltalk data object

tagName - the output name of the tag

fieldName - the EXIF defined name of the tag

count - as above

tagDec - decimal representation of the Tag as above

type - as “Type” above

originalNames - Type as above (an array)

typeName - originalNames as Smalltalk symbols

tagHex - Tag as above

Usage

There are four class methods provided that give access to the EXIF data within a single JPEG.

SoSExifReader createCompleteTagListForFile: aFilePath

SoSExifReader createTagListForFile: aFilePath using: aTagList

SoSExifReader parseAFileCalled: aFileName

SoSExifReader showTagListFor: aJPEGFile

There is one further class method that shows the generic list of Tags

SoSExifReader showTagDefinitions

The image is passed as a file name in the form “testimage.jpg”. No path is required for images in the Smalltalk root directory - normally CfsDirectoryDescriptor startUpDirectoryPath

SoSExifReader createCompleteTagListForFile: aFilePath

Creates and answers complete tag list with data for the chosen image

SoSExifReader createTagListForFile: aFilePath using: aTagList

Creates complete tag dictionary with data for the chosen image and returns only the tags in aTagList. Data returned is the actual data for each entry in the dictionary. The tag names in the list should be

SoSExifReader parseAFileCalled: aFileName

An Execute will show all the tags for the current image to the Transcript. An Inspect will also answer a complete ASCII list of the EXIF tags with their constituent data (see EXIF Data above) to the Transcript.

SoSExifReader showTagListFor: aJPEGFile

This provides an OrderedCollection of the available tags within the chosen image.

SoSExifReader showTagDefinitions

Answers a Dictionary of all EXIF tags with their constituent data requirements.

Requirements

There is one requirement for the program to execute correctly. It requires a list of tag data to be loaded before it can analyse any image. This data is provided within a CSV file called tags.csv. This file MUST be within the root directory of the calling program. The data held within this CSV is provided in the appendix of this document.

Testing

Each of the class methods has a comment that includes the code to execute with a sample JPEG. This JPEG is called testimage.jpg and should be in the root directory of the image. If it is elsewhere then insert a path before execution.

In Use

The above mentioned class methods are the ones to call to provide the required data. When providing a tag list, this should be a list of the #fieldname for each tag - see the example in the appropriate comment.

Installation

The program is provided as a VAST application and should be installed using the Applications Editions menu option and then the Import menu item. Once installed, it needs to be loaded. Tags.CSV and test image.jpg should be placed in the root directory and then all the class methods in SoSEXIFReader can be executed.

Note: the file contained is exist is a Smalltalk only app and contains no VAST elements. A further release will be made of a VAST version which will include a demonstration management window

Known issues

There are two tags that currently are not displayed even though the data may be within the image (this is certainly true of the test image.jpg photo). The two tags were released after V 2.2 of the EXIF document and are, thus, not in this release. Two known tags were added in 2.3 but these will not, currently, be resolved:

BodySerialNumber

LensSerialNumber

A new version will be issued once the problem is resolved.

Warranty

This program is provided without support. We cannot guarantee that we will resolve any issues you may find. Paid support on an hourly or contract basis is available.

Usage

The software is free for use but is supplied without responsibility for its use or results. Any use should rigorously test the software before using. The only limitation is that it cannot be resold as a stand alone EXIF reader. It can be incorporated into your own software as a function, however. See the attached licence (Appendix 2) for details.

Contact details

Please advise any issues and suggestions to david@totallyobjects.com

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Appendix 1

Output Tag Name	Tag Name	Dec. Tag	Hex Tag	Type	Size
Aperture	ApertureValue	37378	9202	RATIONAL	1
Body Serial Number	BodySerialNumber	42033	A431	ASCII	Any
Brightness	BrightnessValue	37379	9203	SRATIONAL	1
Bytes of JPEG data	JPEGInterchangeFormatLength	514	202	LONG	1
Bytes per compressed strip	StripByteCounts	279	117	SHORT or LONG	*S
Camera Owner Name	CameraOwnerName	42032	A430	ASCII	Any
CFA pattern	CFAPattern	41730	A302	UNDEFINED	Any
Chromaticities of primaries	PrimaryChromaticities	319	13F	RATIONAL	6
Color space information	ColorSpace	40961	A001	SHORT	1
Color space transformation matrix coefficients	YCbCrCoefficients	529	211	RATIONAL	3
Compression scheme	Compression	259	103	SHORT	1
Contrast	Contrast	41992	A408	SHORT	1
Copyright holder	Copyright	33432	8298	ASCII	Any
Custom image processing	CustomRendered	41985	A401	SHORT	1
Date and time of digital data generation	DateTimeDigitized	36868	9004	ASCII	20
Date and time of original data generation	DateTimeOriginal	36867	9003	ASCII	20
DateTime subseconds	SubSecTime	37520	9290	ASCII	Any
DateTimeDigitized subseconds	SubSecTimeDigitized	37522	9292	ASCII	Any
DateTimeOriginal subseconds	SubSecTimeOriginal	37521	9291	ASCII	Any
Device settings description	DeviceSettingDescription	41995	A40B	UNDEFINED	Any
Digital zoom ratio	DigitalZoomRatio	41988	A404	RATIONAL	1
Exif IFD Pointer	ExifIFDPointer	34665	8769	LONG	1
Exif version	ExifVersion	36864	9000	UNDEFINED	4
Exposure bias	ExposureBiasValue	37380	9204	SRATIONAL	1
Exposure index	ExposureIndex	41493	A215	RATIONAL	1
Exposure mode	ExposureMode	41986	A402	SHORT	1
Exposure program	ExposureProgram	34850	8822	SHORT	1
Exposure time	ExposureTime	33434	829A	RATIONAL	1
F number	FNumber	33437	829D	RATIONAL	1
File change date and time	DateTime	306	132	ASCII	20
File source	FileSource	41728	A300	UNDEFINED	1
Flash	Flash	37385	9209	SHORT	1
Flash energy	FlashEnergy	41483	A20B	RATIONAL	1
Focal length in 35 mm film	FocalLengthIn35mmFilm	41989	A405	SHORT	1
Focal plane resolution unit	FocalPlaneResolutionUnit	41488	A210	SHORT	1
Focal plane X resolution	FocalPlaneXResolution	41486	A20E	RATIONAL	1
Focal plane Y resolution	FocalPlaneYResolution	41487	A20F	RATIONAL	1
Gain control	GainControl	41991	A407	SHORT	1
Image compression mode	CompressedBitsPerPixel	37122	9102	RATIONAL	1
Image data arrangement	PlanarConfiguration	284	11C	SHORT	1
Image data location	StripOffsets	273	111	SHORT or LONG *	S
Image height	ImageLength	257	101	SHORT or LONG	1
Image input equipment					
Manufacturer	Make	271	10F	ASCII	Any
Image input equipment model	Model	272	110	ASCII	Any
Image resolution in height direction	YResolution	283	11B	RATIONAL	1
Image resolution in width direction	XResolution	282	11A	RATIONAL	1
Image title	ImageDescription	270	10E	ASCII	Any
Image width	ImageWidth	256	100	SHORT or LONG	1
Interoperability IFD Pointer	InteroperabilityIFDPointer	40965	A005	LONG	1
ISO speed rating	ISOSpeedRatings	34855	8827	SHORT	Any
Lens focal length	FocalLength	37386	920A	RATIONAL	1
Lens Make	LensMake	42035	A433	ASCII	Any
Lens Model	LensModel	42036	A434	ASCII	Any
Lens Serial Number	LensSerialNumber	42037	ASCII	Any	
Lens Specification	LensSpecification	42034	A432	RATIONAL	4

Output Tag Name	Tag Name	Dec. Tag	Hex Tag	Type	Size
Light source	LightSource	37384	9208	SHORT	1
Manufacturer notes	MakerNote	37500	927C	UNDEFINED	Any
Maximum lens aperture	MaxApertureValue	37381	9205	RATIONAL	1
Meaning of each component	ComponentsConfiguration	37121	9101	UNDEFINED	4
Metering mode	MeteringMode	37383	9207	SHORT	1
Number of bits per component	BitsPerSample	258	102	SHORT	3
Number of components	SamplesPerPixel	277	115	SHORT	1
Number of rows per strip	RowsPerStrip	278	116	SHORT or LONG	1
Offset to JPEG SOI	JPEGInterchangeFormat	513	201	LONG	1
Optoelectric conversion factor	OECF	34856	8828	UNDEFINED	Any
Orientation of image	Orientation	274	112	SHORT	1
Pair of black and white reference values	ReferenceBlackWhite	532	214	RATIONAL	6
Person who created the image	Artist	315	13B	ASCII	Any
Pixel composition	PhotometricInterpretation	262	106	SHORT	1
Related audio file	RelatedSoundFile	40964	A004	ASCII	13
Saturation	Saturation	41993	A409	SHORT	1
Scene capture type	SceneCaptureType	41990	A406	SHORT	1
Scene type	SceneType	41729	A301	UNDEFINED	1
Sensing method	SensingMethod	41495	A217	SHORT	1
Sharpness	Sharpness	41994	A40A	SHORT	1
Shutter speed	ShutterSpeedValue	37377	9201	SRATIONAL	1
Software used	Software	305	131	ASCII	Any
Spatial frequency response	SpatialFrequencyResponse	41484	A20C	UNDEFINED	Any
Spectral sensitivity	SpectralSensitivity	34852	8824	ASCII	Any
Subject area	SubjectArea	37396	9214	SHORT	2 or 3 or 4
Subject distance	SubjectDistance	37382	9206	RATIONAL	1
Subject distance range	SubjectDistanceRange	41996	A40C	SHORT	1
Subject location	SubjectLocation	41492	A214	SHORT	2
Subsampling ratio of Y to C	YCbCrSubSampling	530	212	SHORT	2
Supported Flashpix version	FlashpixVersion	40960	A000	UNDEFINED	4
Transfer function	TransferFunction	301	12D	SHORT	3 * 256
Unique image ID	ImageUniqueID	42016	A420	ASCII	33
Unit of X and Y resolution	ResolutionUnit	296	128	SHORT	1
User comments	UserComment	37510	9286	UNDEFINED	Any
Valid image height	PixelYDimension	40963	A003	SHORT or LONG	1
Valid image width	PixelXDimension	40962	A002	SHORT or LONG	1
White balance	WhiteBalance	41987	A403	SHORT	1
White point chromaticity	WhitePoint	318	13E	RATIONAL	2
Y and C positioning	YCbCrPositioning	531	213	SHORT	1

Appendix 2 - Licence
Totally Objects EXIF Reader
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