

Support for TIFF format in popular image viewers and converters

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Our task was to compare how popular image viewers and converters support TIFF file format basing on image collection prepared with the help of Adobe Photoshop CS3 software. We reviewed only raster contents of TIFF format. The research of nonstandard variants of TIFF format was performed separately.

Causes and goals of research

TIFF format is one of most widely used graphics file formats. The main sphere of application for this format is archiving documents and images, due to its lossless compression features, ability to save images in different color spaces as well as store detailed satellite metadata.

Data archiving means preserving high information accessibility. Your documents should open even after many years of storage. Providing this support is very easy with uniform format specification. Today the format uses the sixth version of its specification. Regretfully, different software titles support different features of the format. Will modern software be able to read any TIFF file created within last ten years? The main goal of our research is to find out how well popular image viewers and converters support TIFF format.

Exploratory procedure

The main idea of the research is very simple: viewing/converting a batch of sample images with the help of different image viewers/converters. Support for TIFF format in the application by the study is expressed as the ratio of files opened or converted by the application to the general number of sample images, i.e

$$K = \frac{N_{\text{all tested}} - N_{\text{damaged}}}{N_{\text{all tested}}} \cdot 100\%$$

,where K is the value of support for TIFF format in the application, $N_{\text{all tested}}$ is the number of tested files, N_{damaged} is the number of wrongly converted or displayed files.

To avoid inaccuracies and possible errors in sample TIFF files, we decided to generate them with the help of Adobe Photoshop CS3 software. This solution was based on the fact that today Adobe Systems company owns all rights to TIFF format specification; hence it would be logical to suppose that Adobe products provide best support for TIFF format. Actually, this issue is disputable and should be researched separately, but we will take it for granted within the frame of our current research. One more advantage of generating sample files is the fact that research results can be reproduced by everyone.

So, we generated 162 different variants of TIFF files for our research. Each variant was specified by its own parameters: color space, bpp, color channel encoding variants. All variants of TIFF format used in the research are included into the TIFF format support spreadsheet.

Our research does not include software support for other graphics standards, or additional image conversion/processing features (image postprocessing, applying additional effects, etc.)

Selection of software for research

We reviewed two groups of image software products: image viewers and image converters. Viewers read information from graphics files, while converters transform image files according to the specified settings. We didn't the class of image editors, as their mode of operation does not dictate extensive support for any format, including TIFF. Software titles were selected according to popularity ratings of various Internet sources. The selected titles are listed below:

Image viewers:

FastStone 3.5(1 662 976 bytes)

ACDSee 10.0 Build 238 (11 040 080 bytes)

IrfanView 4.20 (470 016 bytes)

XnView v1.94.2 en Libformat 5.05 (1 595 904 bytes)

Offline image converters:

FreeImageConverter 0.6.1.38 (114 688 bytes)

Image Converter .EXE v2.0.0.81 (888 832 bytes)

TotalImageConverter 2.1.1.11 (3 694 816 bytes)

ImageConverter Plus 7.1.20 b:80708 (1 986 560 bytes)

Research procedure

TIFF file format support was tested on the following hardware: Intel Pentium D 2.8, 1Gb Ram, Windows XP sp3, two monitors in Dualview mode.

Testing image viewers

Monitor #1 displayed Adobe Photoshop CS3 software displaying several images from the batch with characteristic visual differences (Bitmap, Grayscale, Index and RGB).

Monitor #2 displayed the viewer under study used to view TIFF files from the batch one by one; these files were visually compared with sample files opened in Adobe Photoshop CS3 software.

The file was considered unsupported if the viewer crashed, the file could not be displayed at all or was only partially displayed, or there were visual artifacts (strong color distortion and differences from the sample image). The unsupported file was included into the corresponding section of Appendix 1.

The most unstable viewer whose testing took most time is XnView v1.94.2 en Libformat 5.05. The program would often crash while trying to convert images with photometric interpretation Grayscale, 64bpp depth, also CMYK with LZW compression.

Testing image converters

Testing procedure included two steps:

1. Batch conversion of sample files into BMP format.
2. Viewing converted images with the standard Windows viewer (Picture and Fax Viewer) (see "Testing image viewers") and detecting files that failed to convert correctly or were not converted at all.

The file was considered unsupported if the converter crashed, the file was not converted at all (no resulting file was present in the target directory), or the converted image had visual artifacts (strong color distortion and differences from the sample image). The unsupported file was included into the corresponding section of Appendix 1.

The most unstable image converter whose testing took most time is Image Converter .EXE v2.00.0081. When batch-converting files, the program mixes converted files as soon as it encounters the unsupported one, which is unacceptable.

Research results

The raw research results were processed and included into a spreadsheet available in Appendix 1.

The spreadsheet structure allows thorough data grouping to find out about influences of different modes of saving into TIFF format on the ability to view or transform the image with the help of popular programs.

As seen from the table, the main difficulties in supporting TIFF format show up when high BPP values are used. Saving the image with 8bpp ensures about 80% probability of viewing/converting your file.

As bpp value is increased, this probability is reduced - to 50% for 16bpp and only 30% for 32bpp. Files with 128bpp cannot be processed by any of the programs under test. Most likely, the difficulty of supporting TIFF files with high BPP stems from the fact that they are not widely spread.

Interleaved or Perchannel values hardly influence the ability to open TIFF files. As a rule, both options are well-supported by software, while Interleaved features a small advantage.

As a rule, each program provides solid support for NONE, LZW, JPG compression algorithms. ZIP compression is not fully supported by only a few supported programs.

Big problems emerge when it comes to supporting LAB color space.

Most of software titles under test encountered difficulties with opening files created with ZIP compression.

The results of testing each program separately are provided in table 1.

Software	Support for TIFF format, %	Notes
ACDSee 10.0	43,82	Problems with 64,128bpp, LAB color space, PerChannel option
FastStone 3.5	27,16	Does not support ZIP compression, LAB color space, PerChannel option, has problems with medium and large bpp.
FreeImageConverter 0.6.1.38	19,75	Does not support ZIP compression, LAB color space, PerChannel option
Image Converter .EXE v2.0.0.81	14,81	Does not support ZIP compression, LAB color space, PerChannel option
ImageConverter Plus 7.1.20	69,13	Best support amongst image converters. Problems with 128bpp, LAB color space
IrfanView 4.20	54,32	Problems with 64,128bpp, LAB color space, PerChannel option
TotalImageConverter 2.1.1.11	39,50	Problems with 16,32,64,128bpp, LAB color space, PerChannel
XnView v1.94.2 en Libformat 5.05	55,55	Problems with 64,128bpp, LAB color space, PerChannel option

From all tested popular software titles, the fullest TIFF support is provided by ImageConverter Plus 7.1.20 (image converter) and XnView v1.94.2 en Libformat 5.05 (image viewer).

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