WinJPEG v.1.2

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Introduction

WinJPEG v1.2 is an image viewer with image processing and conversion capabilities for Microsoft Windows 3.x. It has the following features:

 - display JPEG, TARGA, GIF (GIF87a), or Windows BMP images
 - export an image to JPEG, TARGA, GIF (GIF87a), Windows BMP, or OS/2 BMP format
 - display of JPEG images with 1-pass/2-pass quantization and Floyd-Steinberg dithering
 - color balance: red, green, and blue adjustment
 - hue, saturation, and brightness adjustment
 - image rotation, vertical/horizontal flip, and image resizing
 - batch file conversion of GIF or TARGA files to JPEG File Interchange Format (JFIF)
 - slideshow: display selected files sequentially with a cycle option

   There are two versions of WinJPEG. One is a plain JPEG/GIF viewer and the second is the full version with the features listed above. The viewer version is about 10% faster than the full featured one.

JPEG

  Joint Photographic Experts Group (JPEG) refers to a set of still-picture compression algorithms specified by the JPEG committee. The algorithm mode used by the Independent JPEG Group's(IJPEG) software, which is incorporated into WinJPEG, is sequential buildup; in this mode, each component of an image is encoded in a left-to-right and top-to-bottom scan. Also, sequential mode is lossy, which means that every time you compress an image, you will lose information. When you decode the compressed image, the decoded image will not exactly match the original. One reason that sequential mode JPEG is lossy is that the algorithm compresses an image by removing visually insignificant information, colors that the human eye cannot detect.
   For a detailed description of JPEG, I recommend that you read "The JPEG Still Picture Compression Standard," written by Wallace. This paper was published in the April 1991 issue (vol. 34 no. 4) of *Communications of the ACM*. A revised version of this paper is available as a Postscript file, wallace.ps.Z, in the graphics/jpeg directory of the ftp site, ftp.uu.net. Also, Tom Lane's JPEG FAQ, which is posted to comp.graphics and the /pub/pics/jpeg directory of nic.funet.fi, is a good source that discusses the practicality of JPEG.

JPEG File Formats

  The JPEG committee has not specified a standard file format, and consequently, many applications of the JPEG algorithm use their own proprietary format. WinJPEG uses the JPEG

File Interchange Format(JFIF) which transports only pixel information. JFIF is supported by the IJPEG Group's software and other programs based on their code.

Handmade Software's GIF2JPG and Image Alchemy by default use a proprietary JPEG format that is not compatible with the JFIF standard. This proprietary format is not supported by WinJPEG. When you use GIF2JPG, remember to use the "-j" option to produce a JPEG file that is compatible with the JFIF standard and viewable with WinJPEG.

For some reason, the GIF2JPG's "-j" option doesn't always produce a file in JFIF. If you have to use a DOS converter, I recommend that you use the IJPEG Group's cjpeg program. Make sure you have the 386 version if you have a 386/486-based computer; it is much faster than the normal version.

Corrupt Images

If you attempt to view a corrupt image file, an error message will be displayed, and you will be given the option of displaying the part of the image that was successfully decoded. If you are trying to view a corrupt JPEG, you must use 1-pass quantization.

There are some GIF files that display with no errors under other image viewers but when they are viewed under WinJPEG, a "Premature End of GIF" error message is displayed . These GIF files are probably corrupt; the GIF decoder routines in WinJPEG are stricter than those used in other viewers. If you want to avoid this error message, load the corrupt GIF into WinJPEG and save it off as a GIF.

Memory Usage

We suggest that you have at least:

 1) 4 Mb of memory according to Windows (under the "Help"/"About Program Manager" menu item of Program Manager) **or**
 2) 2 Mb of physical memory (with no Windows swap disk/file) and sufficient space for a temporary file.

WinJPEG can use a temporary file or available memory. If you choose the temporary file option, the temporary drive should have free space that is at least three times the area of a selected JPEG image in bytes (e.g., a 1024x1024 image would need 1024x1024x3 bytes or 3 Mb of disk space). If you do not have enough space for the temporary file, WinJPEG will warn you and continue. However, the image will be garbled: portions of the image may be repeated.

When you select "Available memory" under "Memory options," WinJPEG will use the available physical and virtual memory. If there isn't enough memory for the decoding routines, a temporary file will automatically be used. You may want to play around with these memory options to determine what is optimum for your system configuration. The choice between using available memory and using a temporary file depends on the size of the image and how much physical memory you have. Generally, if you don't have much physical memory(less than 4 Mb), stick with the temporary file for optimum speed. If you have at least 8 Mb of physical memory, it may display faster if you select "Available memory." If you have memory that is between these two thresholds, you should use "Available memory" for small images and use a temporary file for large(greater than 800x600) images.

A large amount of memory is needed for 2-pass quantization; if you do not have enough free memory, you may still be able to view the image by selecting the 1-pass quantization display option.

Description of Menu Items

File
  Open
   Select the name of a file to display and the file format which is the JPEG File Interchange Format (JFIF), GIF(GIF 87a), TARGA, or Windows BMP. When you click on one of the file format buttons, WinJPEG will display a list of all the files in that format in the current path. Pressing the "Display" button will display an image (with the selected display options if the image is a JPEG). Pressing the "Preview" button will display a JPEG image with 1-pass quantization and dithering off. This combination will display an image 25-50% faster than 2-pass quantization with dithering on.

  Save
   Select the name of the output file and the output format, which is the JPEG File Interchange Format(JFIF), GIF(GIF 87a), TARGA, BMP or OS/2 BMP. When you save an image to one of the BMP formats, the type of the BMP is the same as the bitmap that is currently displayed. For example, if an 8-bit bitmap is displayed(the image is stored in an 8-bit bitmap when you are in 256-color mode or you check the "Use 8-bit bitmap" option), WinJPEG will save the picture to an 8-bit BMP. Similarly, if you have a 24-bit bitmap loaded, it will save to a 24-bit BMP.

 Batch Conversion
   Select GIF and TARGA files to convert to JPEG format. The list box on the left displays the files in the current path and the list box on the right displays a list of files to be converted. To add a file to the latter box, select the files you want to convert and press the "Add" button. Files without the appropriate extension, ".gif" or ".tga," will not be added. If you decide to abort the conversion while it is in the process of converting, click on the window with the left mouse button and the conversion will halt after the current file is completed. The output file(s) will have the same name as the input file(s) except that they will have a ".jpg" extension. Also, the output file(s) will be placed in the same path as the input file(s).
   If any file is corrupt, WinJPEG will display an error message and the batch conversion will continue. However, the JPEG output file corresponding to the corrupt image will be invalid; it will be a zero-length file.

  Slideshow
   Select the GIF, TARGA, and JPEG files to display in a slideshow. The order in which you add the files will be the order in which they are displayed. After a picture is loaded and displayed, there will be a user-selected delay before the next picture is loaded. If you would like the slideshow to go back to the first picture after the last one is displayed and to display continuously the selected files, check off the Cycle Slideshow menu option. If you would like to abort the slideshow, click on the window with the left mouse button and the slideshow will stop after the currently loading picture is displayed.

  JPEG Options

1-pass quantization is faster than the 2-pass(Heckbert) option but the output for the former generally looks more grainy. Also, 2-pass quantization requires more memory so it may be even slower because the routines will swap to hard disk when they run out of physical memory.

The dithering method is Floyd-Steinberg; dithering is useful when quantizing to 256 colors but it is not needed for a true-color (24-bit) display. In some cases, you may want to turn off dithering since it sometimes causes a grainy output.

There are two save options: quality factor and entropy optimization. The quality factor, an integer between 0 and 100 inclusive, determines the tradeoff between the output file size and the output image quality. If you choose a high quality factor, the image quality will be high but the file size will be large. A lower quality setting will yield a smaller file at a cost of lower quality. Since the JPEG algorithm is lossy, a quality factor of 100 will not give you a losslessly compressed image. Entropy optimization produces a smaller JPEG file but it takes more time to encode the image.

Memory Options
See Memory Usage section above.

Save All Options
This will save all the WinJPEG options to a file named "winjpeg.sav" in the same directory as WinJPEG. When WinJPEG is initially loaded, the options will be loaded if "winjpeg.sav" exists. For the viewer version, the file containing the saved options is "winjpegv.sav."

Exit
Exit from WinJPEG.

Edit
HSV Adjustment
Use the scroll bars to adjust the amount of hue, saturation, and value/brightness in an image. A value of 0 on the scroll bar means that there is no change in the corresponding color component. When the value is increased or decreased, the color component is increased or decreased, respectively. Warning: The HSV calculations are very slow in 24-bit mode.

Color Balance
Use the scroll bars to adjust the amount of red, green, and blue in an image. A value of 0 on the scroll bar means that there is no change in the corresponding color component. When the value is increased or decreased, the color component is increased or decreased, respectively.

Rotate
Rotate the image clockwise by 90 degrees.

Flip Horizontal
Flip the image around the vertical axis.

Flip Vertical
Flip the image around the horizontal axis.

Resize
Change the spatial resolution of the image.

<u>O</u>ptions
<u>8</u>-bit Bitmap
   When you load a JPEG or TARGA image with this menu item checked, WinJPEG will quantize the number of colors to 256, and display the image in an 8-bit bitmap. If this menu item is unchecked, the JPEG or TARGA image will be loaded into a 24-bit bitmap with no quantization. An example of an application of this option is to convert a 24-bit image to another 24-bit format although you are using an 8-bit display mode. Note that this option affects only viewing JPEG or TARGA images.

<u>A</u>uto-resize
   This menu item allows you to turn on/off the auto-resizing feature. When it is checked, WinJPEG will automatically resize the window so that the image will fit just inside the window. When an image is initially loaded, the window size is changed so that the largest possible portion of the image is displayed. When you change the window size so that it is larger than the image size, the window will be resized so that it just fits around the image. Also, scroll bar(s) are activated if they are needed.

<u>S</u>how Scrollbars
   This option is available only if auto-resize is off. It lets you choose whether or not the scroll bars are displayed.

<u>C</u>ycle Slideshow
   When a slideshow is running, this option determines whether or not a list of images are continuously displayed in a cycle. If this option is on, the slideshow returns back to the first picture after the last one is displayed and continues to display all the images in a selected list until you abort the slideshow by clicking on the window with the left mouse button.

Low <u>P</u>riority
   When this menu item is checked, WinJPEG will give more CPU time to other programs running at the same time as WinJPEG. This option works during the compression/ decompression of JPEG images and loading of TARGA images. There is a small tradeoff in speed.

Reporting Errors

  If you encounter a problem with this program, please send in a bug report by sending email to nyee@osiris.ee.tufts.edu. Please give us a description of the hardware configuration of the system you are using, what other software was running in the background, what file you were loading, what the symptoms are, and anything else that might help us reproduce the problem.

Where to Find JPEG Images

1) Usenet has several alt.binaries.pictures.xxx newsgroups to which JPEG images are often posted. If your system doesn't have access to these newsgoups, you can use "telnet" (if you have access to "telnet") to connect to sites which give you free access to these newsgroups.

   One such telnet site is bbs.oit.unc.edu (152.2.22.80). To access the Usenet newsgroups, type "bbs" at the "login:" prompt, type in a username and password when asked, and choose "Network News Access" from the main menu. This site gives you instant read-access to all newgroups.
   Another telnet site is freenet-in-b.cwru.edu (129.22.8.75). This site does not give you access to the Usenet and Freenet newsgroups until you register with them by mail.
   Once you have access to the alt.binaries.pictures newsgroups, you have to capture all the messages that contain the uuencoded parts of a picture, edit out the message headers and trailers, and uudecode the edited file.

2) If you have access to "ftp," you can connect to anonymous-ftp sites.   To log onto these sites, type "anonymous" for username and "guest" for password. Some ftp sites require that you enter your email address for the password prompt before you get access to some files. After logging on, you can look for files by typing "dir" for a list of files in the current directory and by using the "cd" command to change directory. When you see the file you want, type "binary" for binary transmission(you only have to do this once per log-in) and then type "get <file>" where <file> is to file you wish to download to your account.
   Most FTP sites that I've logged onto contain only a handful of JPEG images. However, I've found one site that has a large collection of JPEG pictures. A variety of JPEG images is available in the pub/pics/jpeg directory of nic.funet.fi (128.214.6.100).

3) Local BBS's in your area are other sources for JPEG images.

Registration

   If you use WinJPEG for more than 14 days, you are expected to register WinJPEG or to delete your copy of WinJPEG. When you register, you will receive the latest version of WinJPEG, a user manual, and a collection of JPEG images (I will put as many as I can fit on 2 720k 3 1/2" floppies, on 1 1.44M 3 1/2" floppy, or on 4 360k 5 1/4" floppies). The registered version does not have the nag screen at the start. Once you are registered, you will receive updates of WinJPEG for free except for a small charge for the disk and shipping costs. If you have an Internet account or Compuserve account, you will be e-mailed updates at no charge.
   The registration fee is only $15. MA residents, add 5% sales tax to the registration fee. US residents, add $3 for shipping and non-US residents, add $8 for shipping.   If you want WinJPEG e-mailed to your account instead of having it physically mailed to you, there is no extra shipping charge.
   To register, complete the order form and send a check in US funds to:

   Norman Yee
   58 Chandler St.
   Boston, MA 02116

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Acknowledgments

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