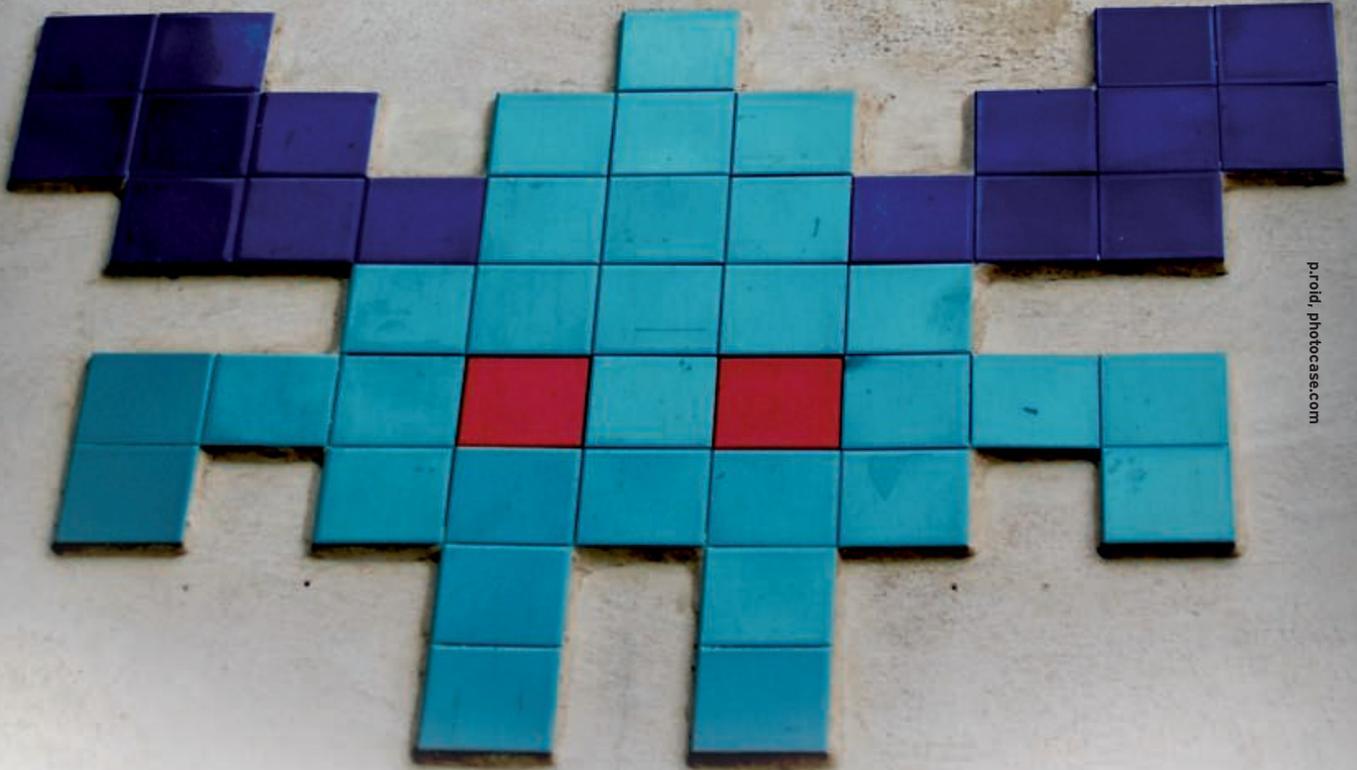


Image processing on the console

# PIXEL PERFECT



p.roid, photofcase.com

GIMP isn't the only option for photo manipulation. ImageMagick, a collection of command-line programs for image processing, can help you process multiple images in one go. **BY TIM SCHÜRMANN**

The holidays are over and your new digital camera is bursting at the seams. Before setting up a photo gallery on your website, you need to sort through the photos and put together a few preview shots. Normally, you would fire up GIMP, open a single

photo, process it, resize it, and then save it, repeating this process until you have sorted through all your photos. This method could eat up hours of your busy weekend.

Fortunately, ImageMagick includes a

collection of command-line tools for your images. These tools are almost exclusively accessed from the console and let you process a bunch of images easily in an assembly-line manner. For exam-

## Typical Tasks

The ImageMagick program is especially suitable for the following types of tasks:

- Converting photos into different image formats
- Changing the size of an image
- Rotating, scaling, and cutting out sections with pixel precision
- Using filters and effects
- Creating animations for the web
- Creating simple images using basic geometric shapes or by copying and pasting small snippets of graphics
- Generating thumbnails and frames
- Putting multiple pictures together into a complete work (e.g., as a poster, collage, or photo gallery)

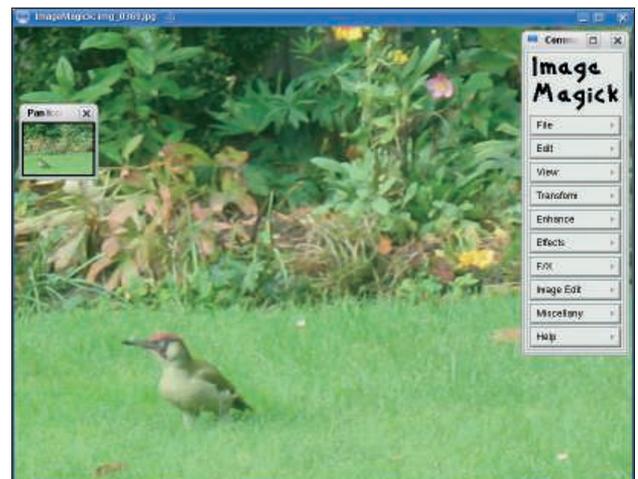


Figure 1: Left-click the photo to open the menu; the small window helps you navigate in oversized images.

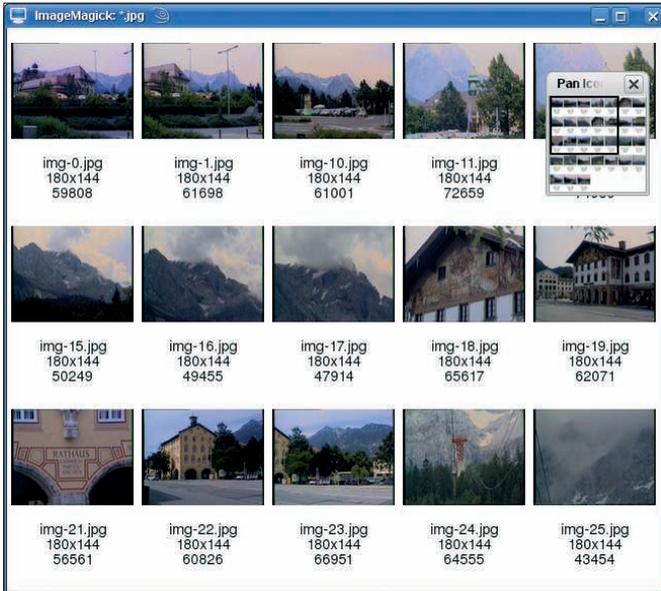


Figure 2: The “display” command creates an overview of the photos that are not yet open.

ple, adding a frame to each of your 451 vacation photos only requires a short command.

## Leftover Goods

First, the *display* program can help you sort through all your images (Figure 1). The *display \*.jpg* command, for example, displays all of the JPEG images in the current directory. Pressing the space bar moves you from one image to the next. An overview (Figure 2) of your current photos, which also can be saved by pressing Ctrl + S, can be generated by the *display vid:\*.jpg* command.

The *identify image.jpg* command provides you with more detailed informa-

tion about a photo (Figure 3), including some somewhat cryptic information. The example shown in Figure 3 concerns a JPEG file with a resolution of 3264x2448 pixels, where each color channel contains 8 bits of color information. Using three color channels (for red, green, and blue) results in a color depth of 24 bits. The last value gives file size information. The Exif information hidden in many photos is dug out by the *-verbose* parameter:

```
$ identify -verbose image.jpg
```

After you have determined which photographs you don’t want and deleted them, it’s time to prepare the other photos for your website.

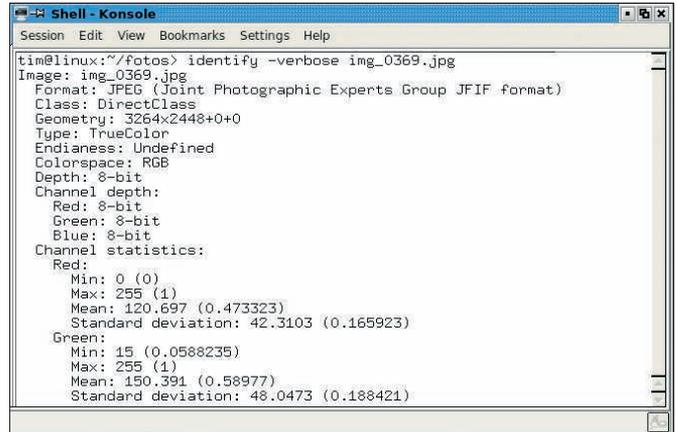


Figure 3: See more detailed information about your photo, including resolution, color, and file size.

tion about a photo (Figure 3), including some somewhat cryptic information.

Cameras normally generate photos in JPEG format, which has a serious disadvantage: To achieve high compression, JPEG tends to throw image information overboard, which is evident as soon as you try to apply filters and effects. These changes can leave unwanted artifacts in the image. If you still want to post-process your vacation photos, you first need to convert them into an uncompressed format; for example, photographers like the TIFF format, which is generated by the *convert image.tiff* command.

## Converting Files

If you have a large number of files, the following shell command helps you convert them all in one go:

```
$ for i in *.jpg; do convert z
  $i $(basename $i .jpg).tiff; z
done
```



Figure 4: The solarization effect generates a negative image. The practical benefits of most filters are somewhat limited...



Figure 5: ...but the final results can turn out quite nicely. In this example, the swirl effect puts the image through the mixer.

For each file ending with *.jpg*, the shell removes the ending from the file name, replaces it with *.tiff*, and calls *convert* with the results.

### File Extensions

Like all of its companions in the ImageMagick package, *convert* independently detects the file format by its extension. Each application automatically knows that a photo named *image.jpg* is a JPEG photo.

If the converted file needs an exotic ending for some reason – for example, *exot.exo* – simply put the format at the beginning of the file name:

```
$ convert image.jpg 2
TIFF:exot.exo
```

### What Goes Around

The *mogrify* command along with the *-rotate* parameter rotates sideways images into an upright position. Using the following command rotates your images:

```
$ mogrify -rotate "90>" 2
image.tiff rotated.tiff
```

This command rotates *image.tiff* clockwise 90 degrees.

Note that you do need the quotation marks; otherwise, the shell would interpret the pointy bracket as a redirect and would delete the *image.tiff*.

### Filters

A number of effects and filters can change or enhance your images after the fact. In many cases, the sharpen filter is helpful:

```
convert -sharpen 6 image.tiff 2
scharf.tiff
```

The number behind the *-sharpen* parameter indicates the strength of the filter effect. Using *convert*, you can quickly and gently lighten photos that are too dark:

```
$ convert image.tiff -sigmoidal 2
-contract 4,0% 2
lighter-image.tiff
```

#### TIP

Instead of the file name, you can also use the name of the font – for example, *Courier*.

If an image doesn't really convey the atmosphere you were hoping for, you might want to try converting it into a black and white photo:

```
$ convert 2
image.tiff 2
-colorspace 2
gray 2
black-white.2
tiff
```

However, the results of this type of conversion can be quite dull in some cases.

### Color Channels

If this happens, one popular trick is to use a color channel:

```
$ convert image.tiff 2
-channel R 2
-separate black-white.tiff
```

This command extracts the red channel in the image and converts the intensity values to gray scale in the final image.

### Fun Effects

In addition to these basic effects, there also are a few more fun effects. The following results in a charcoal drawing:

```
$ convert image.tiff 2
-charcoal 5 2
charcoal-image.tiff
```

The value behind *-charcoal* determines the hardness of the “charcoal pencil.”

The *-solarize* parameter (Figure 4) produces a negative, a swirl is generated by

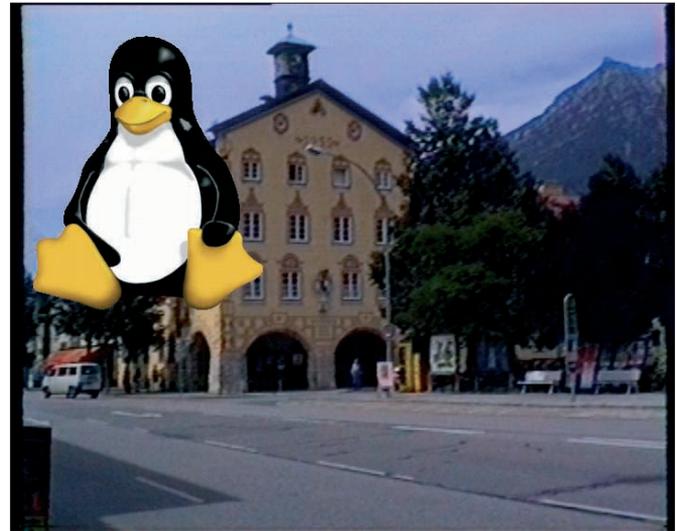


Figure 6: Here you can see Tux floating above the photo as a logo that turned out a little bit too big.

*-swirl* (Figure 5), and *-implode* implodes the image.

### Watermarks

Before you load the final results into your website, consider investing a bit more work to prevent any viewers from stealing your images simply by applying a watermark.

To apply a watermark, first create a logo and place it, for example, in the upper left corner:

```
$ composite -geometry +100+100 2
logo.png photo.tiff 2
photo_logo.tiff
```

This command copies the image from *logo.png* to the (100, 100) position on the image *photo.tiff* and places the results in the *photo\_logo.tiff* file (Figure 6).

A logo inserted in this manner does indeed indicate the origin of the image; however, this doesn't really look like a typical watermark. The *-watermark* parameter was created specifically to take care of this problem:

#### Listing 1: Convert

```
01 $ convert -font @/home/tim/fonts/font.ttf -pointsize 20 -fill black
-draw "text 100, 150 'Vacation in the mountains'" image.tiff
caption.tiff
```

#### Listing 2: Add a Frame

```
01 convert -font @/home/tim/fonts/font.ttf -pointsize 20 -fill red
-stroke black -strokewidth 3 -draw "text 100, 150 'Vacation in the
mountains" image.jpg caption.tiff
```

```
$ composite -watermark 30% 2
-gravity south logo.png 2
photo.tiff mit2
watermark.tiff
```

In this parameter, the percentage indicates how visible the watermark should be. The *composite* command not only integrates logos and watermarks, but it also easily creates collages. For example, you could add an arrow from one photo that has a small ski hut in the background to another photo of the ski hut.

Also, adding a caption is a good idea.

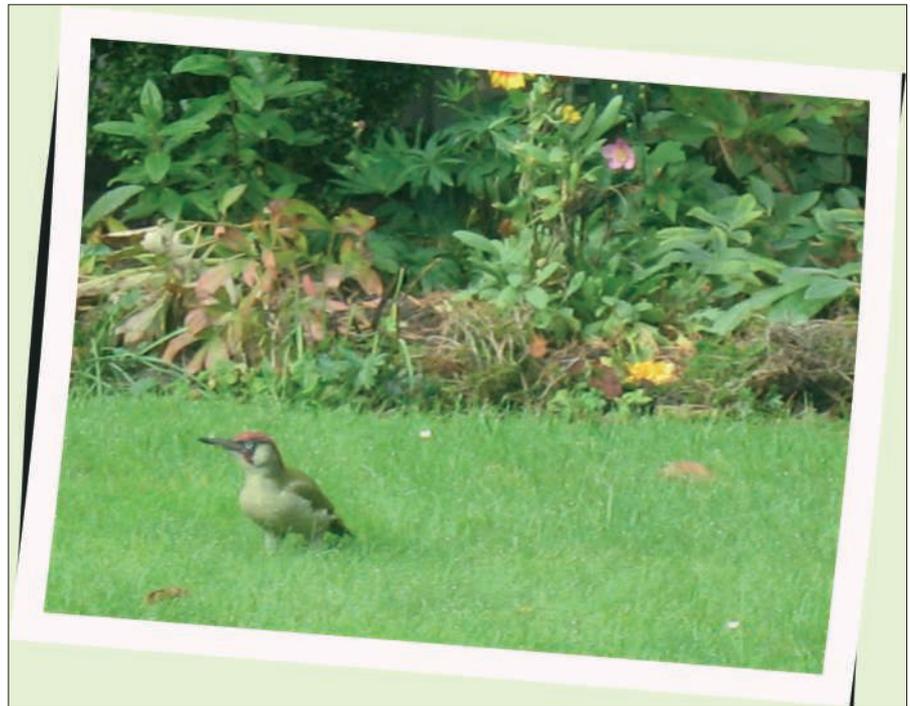
## Captions

Captions under the image can indicate the precise location the picture was taken or who the people in the picture are. To add captions, you first need a file with the font you want to use, preferably in a TrueType format (ending *.ttf*).

On KDE and Gnome, perform a search for the fonts using search engines such as Tracker or Beagle. Then it is time to use *convert* again, which you pass on behind *-font*, where the font is located. Listing 1 shows the somewhat long, yet complete, command.

The *@* symbol before the file name tells *convert* that it is dealing with a TrueType font. The rest of the command places the text *Vacation in the mountains* (*-draw*) at the (100, 150) position in black, with a point size of 20 pixels (*-pointsize 20*), in the *font.ttf* font. Enter the English name for the color after *-fill* – for example, *red*, or enter the corresponding RGB values directly. In the second case, select between decimal notation, for instance, *rgb(255,0,0)*, or hexadecimal notation, "*#FF0000*", which you may know from HTML programming.

In both cases, you should see the color red. The *convert -list color* command lists



**Figure 7:** The *-polaroid* option lets you create images that look like they have been taken with a Polaroid camera.

all the known color names and their RGB values.

## Text Frames

This is not an exhaustive list of everything that ImageMagick can do with text. For example, you also can add a frame around the text and fill it with green with the use of the *-stroke* parameter for the border and *-stroke width* parameter to set the thickness of the border (Listing 2).

## Handling Borders

If you like to decorate your photo albums, you can easily put frames around your images with the following:

```
$ convert -bordercolor blue 2
-border 10x10 image.tiff 2
border.tiff
```

The command generates an image with a border (*-border*) that is 10x10 pixels wide. The border color is specified by *bordercolor* – blue, in this example.

The additional *+polaroid* option bends the image in

such a way that it looks like a photo that has been glued in and has slight waves in the paper (Figure 7):

```
$ convert -bordercolor snow 2
-background black +polaroid 2
image.tiff polaroid-photo.tiff
```

To create a three-dimensional edge effect, configure the *-frame* parameter. This parameter also adds a border to the image; however, it gives you finer control than the *-border* parameter. The option *-mattecolor* sets the color of the edge; for example:

```
$ convert -mattecolor peru 2
-frame 9x9+3+3 image.tiff 2
image-w-3D-bordmen.tiff
```

The numbers after the plus symbols determine the width of the interior and exterior edge of the image.

## Shrunken Heads

After you have the effects right, process the photos to be published online. First,

### TIP

Some parameters are used by more than one of the ImageMagick tools. This means that *composite* produces text according to the same process as *convert*, for example.

**Table 1: Program Overview**

Program	Function
<i>convert</i> :	Converts the original image into another format; in the process, any filters or effects used apply only to the resulting image.
<i>mogrify</i> :	Changes the image directly, as opposed to <i>convert</i> .
<i>composite</i> :	Overlays multiple images.
<i>montage</i> :	Combines images into a panorama, a poster, or an overview.
<i>import</i> :	Creates screen shots.
<i>identify</i> :	Provides information about an image file.
<i>display</i> :	Shows pictures in a window.
<i>animate</i> :	Plays an animation.

you should scale down their size a bit. Monster images with a resolution of 3264x2448 pixels only fit into a small corner of most monitors, plus they unnecessarily eat up disk space. If you want to drop the extra weight, use the option `-resize`:

```
$ convert -resize 200x200 ↵
photo.tiff small-photo.png
```

The command reduces *photo.tiff* to a size of 200x200 pixels – or rather, it tries to. To prevent distortions, *convert* confines itself only to the dimensions specified. An image that was originally 3264x2448 pixels ends up at 320x100 pixels. If it is imperative that the image measure 200x200 pixels, even if it turns out distorted in the end (Figure 8), place an exclamation mark behind the size:

```
$ convert -resize 200x200! ↵
foto.tiff small-photo.png
```

Alternatively, you can work with percent values. The following example reduces to 75 percent of its original size:

```
$ convert -resize 75% ↵
photo.tiff ↵
small-photo.png
```

The following shell can help you easily convert all of your vacation photos into space-saving thumbnails at one go:

```
$ for i in *.tiff;do
convert ↵
$i -resize 800x600↵
$(basename ↵
$i .tiff).png; done
```

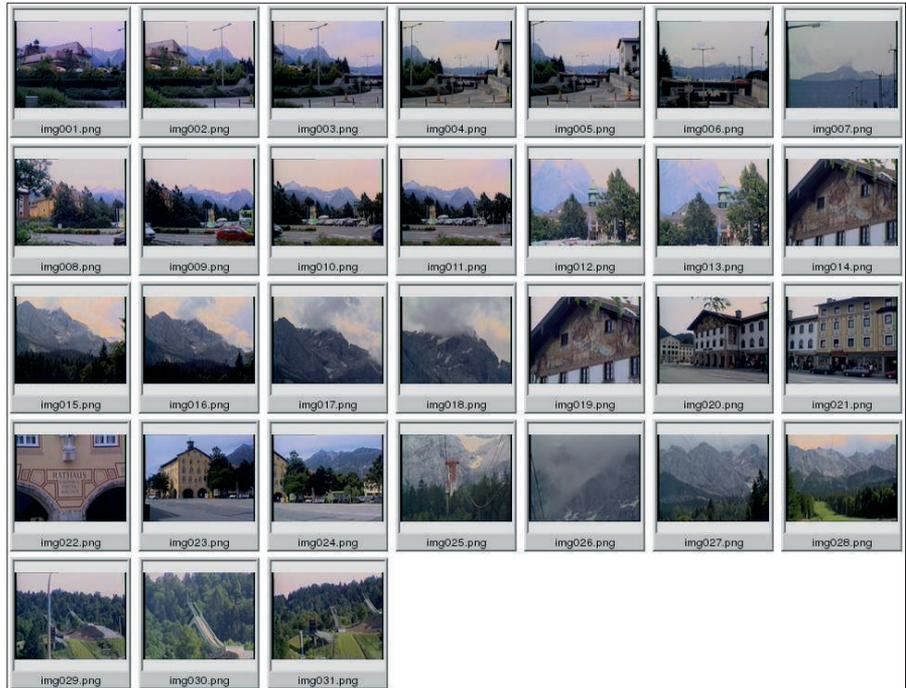
The command reduces the size of the images to a monitor-friendly 800x600 pixels and simultaneously converts them into space-saving PNG format, too.

### Thumbnails

Future visitors to your website probably will not want to see all of your photos, so a thumbnail overview is helpful. Thumbnails also help when you want to print any of your images and makes it easy to locate specific photos on the overview.



**Figure 8: The house has been squeezed into 200x200 pixels.**



**Figure 9: The montage option creates this overview and also automatically reduces the photographs.**

Collecting all of the photos is handled by the *montage* option, which actually prefers working with thumbnails:

```
$ montage -label '%f' *.png ↵
-frame 5 overview.png
```

This command adds a border to every preview image, writes the file name at the bottom (`-label '%f'`), and packs the finished candidates in the *overview.png* file. The result is a large poster like the one in Figure 9.

### Destined for Stardom

On your website, it should be possible to click the preview image to display the entire photo. This task also is no problem for ImageMagick, even if it does take a slight detour with the use of visual directories. These directories contain small preview images

that display the corresponding photo when clicked. You can create a visual directory using *convert vid:\*.png mein-dir.vid*, the results of which open *display mein-dir.vid*. To look at a photo, right-click to open the context menu and select *Load*. With the use of the command

```
convert 'vid:*.png' ↵
HTML:index.html
```

in the console, the visual directory can generate an entire preview page for your website, resulting in multiple files. *index.png* contains the actual overview graphic, and *index.html* links it and notifies the browser which photo is behind which preview image.

To work properly place both files together with the correct photos on a web server. As soon as visitors request *index.html*, they see an overview of the available photos. Clicking one of the preview images loads the photo at its actual size in the browser.

### Conclusion

The tools available in the ImageMagick package use a rather cryptic syntax that takes getting used to, but the learning curve is worth it if you have a large number of images that need to be manipulated. Also, shell scripts offer nearly unlimited options for automation. ■

THE AUTHOR

Kristian officially studied German philology, history, and social science in Berlin but wasted a lot of his time with computers. He got hooked on Linux in the 1990s and works now as editor for LinuxUser.