

PMUG Special Topics SIG

Photos Editing and Scanning, an introduction

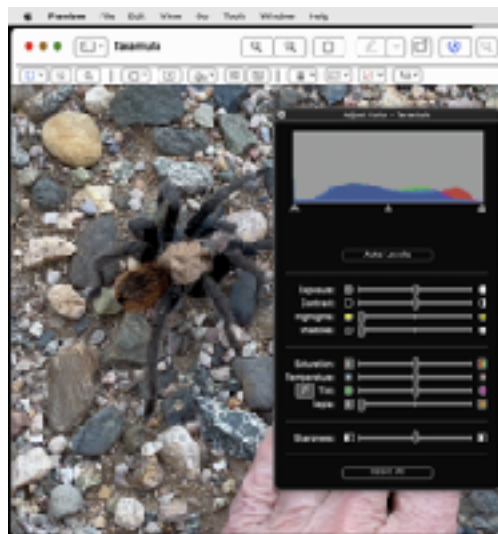
John Carter, July 26, 2021

Introduction

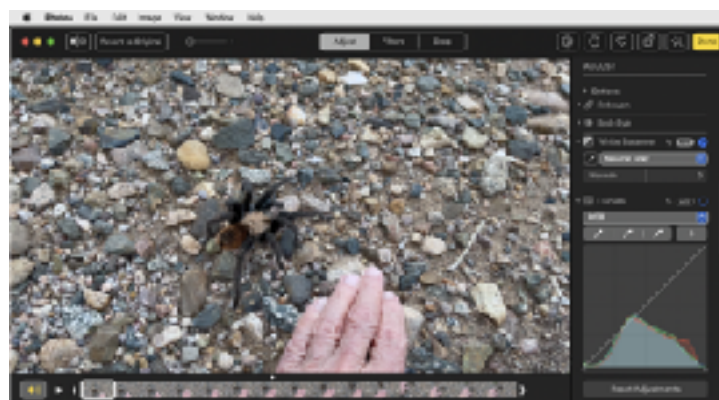
The applications available for editing photos ranges from the too simple to the too complex, from the free to the very expensive. The purpose of this talk is to identify just those photo editing apps that are free or inexpensive, and to also identify which ones in that group are easy (intuitive) to use and which ones require delving into tutorials, help guides, and manuals.

Photo editing apps

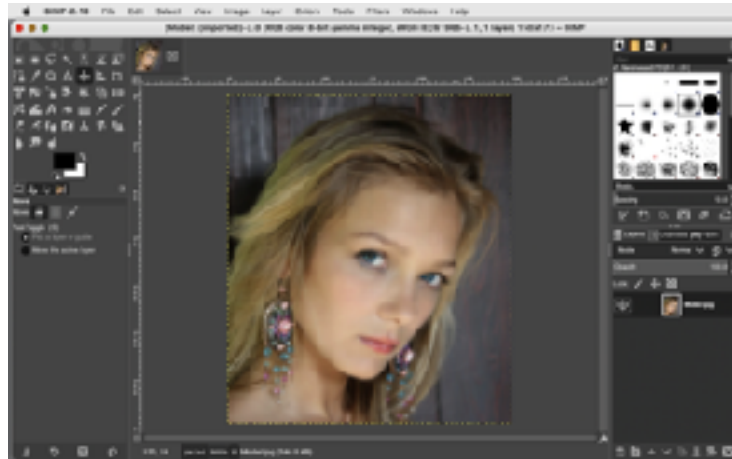
The **Preview** app in macOS is actually a subset of Apple Photos. There is a limited set of photo editing features in Preview, making this the simplest possible photo editor and quite easy to use. One advanced feature of Preview is Levels.



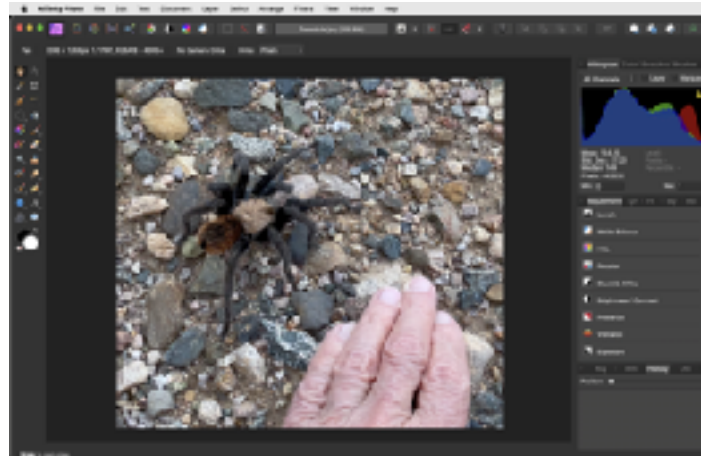
The **Photos** app in macOS is probably the most intuitive app for photo editing and includes a few advanced features. However, free and intuitive does not equate to fully functional. All the very “basic” tools are included in Photos. Photos contains a link to access all of the features available in Preview and can even pass the image to an external photo editor for more advanced editing.



GIMP is a free app that runs on any operating system. Being free does not equate to being intuitive because it is designed around the Adobe Photoshop CS – the BIG Photoshop – with a promise to be equivalent in every possible way. GIMP does require extensive “training” in order to use more than the “basic” tools. Even learning to use the basic tools can be a challenge for some, but this is probably because the interface is a bit overwhelming. Just like driving a new car, you do have to familiarize yourself with the layout of the controls before you jump in and take off.



Affinity Photo costs \$49.99., but for all of what it does, the current price is extremely enticing even to professional photo editors and those wishing to never have to pay another high annual price for Adobe Photoshop CS. When compared to GIMP, Affinity Photo is a bit more intuitive for using the basic tools if only because the user interface is less complex. It actually looks a lot like Photoshop. However, there are five Personas for using Affinity Photo (Photos, Liquify, Develop, Tone Mapping, and Export), and that’s where the complexity comes in and can put off the casual user.



Pixelmator Pro is another paid for app designed exclusively for the Mac by Mac developers. The first time buyer price is \$59.99. On the surface, Pixelmator Pro appears to be very intuitive. The default interface is a lot like Photoshop. When Pixelmator Pro first launches, you are shown the Finder to select an existing photo to edit or to start a new document. Pixelmator Pro has four different layouts or work-

spaces to use depending on the task. These include Default, Photography, Design, Illustration, Painting, and customize your own. Since Pixelmator Pro was designed for the Mac, it can directly access and edit all photos in the Photos library. A built in optional extension preserves nondestructive edits (layers, etc). The current version is 2.1.2. Older versions can be purchased on eBay for under \$10, but I personally would avoid them as there is no telling what unwanted code might be attached.

By examining the Preferences of a photo editor you can get a clue as to how complex the app is. The more options you have for configuring the app, the more complex it tends to be. GIMP and Affinity Photo definitely fall into the complex category.



Image types

The focus of any photo editor is in the features that it provides and about what kind of images can be edited. To select which editor to use, you need to know if the editor can work with your file type. This ranges from the simple JPEG to the more complex RAW images. All cameras take RAW images, but the default file format delivered has been JPEG, which has been the standard default output for decades. The JPEG format is compressed from the RAW image that every camera takes, and its only purpose is to save on disk space while providing a reasonable looking image. The downside of JPEG is that the process of compressing the image throws away a lot of the information that is available in the RAW image. Editing a JPEG image throws out even more information each time the same image is edited.

Below is a list of 9 popular image formats that you are likely to encounter:

- [JPEG](#) (And JPG) — Joint Photographic Experts Group
- [PNG](#) — Portable Network Graphics
- [GIF](#) — Graphics Interchange Format
- [TIFF](#) — Tagged Image File Format
- [BMP](#) — Bitmap
- [HEIF](#) — High Efficiency Image Format, which is HEIC for the iPhone.
- [PDF](#) — Portable Document Format

- [PSD](#) — Photoshop Document
- [RAW](#) — Unformatted

There are eight different RAW types depending on which camera make you use. For the Apple iPhone, the format is actually called ProRAW, and it is disabled by default. A ProRAW image is 10 to 12 times larger than HEIC or JPEG. Since HEIC is a lossless format, there is no reason to enable ProRAW on an iPhone unless the editing app you are using is not compatible with HEIC.

There are many other formats that are not covered here.

The Apple HEIC format compresses the RAW image out of the sensor up to 50% in a lossless format, and it can be repeatedly edited with no loss of information from the original image as long as it is saved in the same format. PNG and TIFF are other image formats that are lossless but may have some compression of information.

Right out of the camera, all images are said to be linear if and only if the image is an exact representation of the data recorded by the sensor. This means no changes have been made to alter the image in any way. Images delivered by a camera that compresses the data in any way, except for HEIC, are non-linear. The advantage of a linear image is that the dynamic range and tonality have not been compromised making it possible for the user to work with all of the data that the sensor can deliver.

Canvas

All images are bounded by a canvas. The original pixel size of an image is also the canvas size. Changing the image size in pixels effectively changes the canvas size to match. Some apps allow you to increase the size of the canvas without changing the pixel size of the image. This enables you to add more elements to an image in the extra canvas space, such as combining two images side by side or to extend the edges of a photo to add a border. Pixelmator Pro, GIMP, and Affinity Photo all have the option to change the canvas size. Preview and Photos do not have that feature.

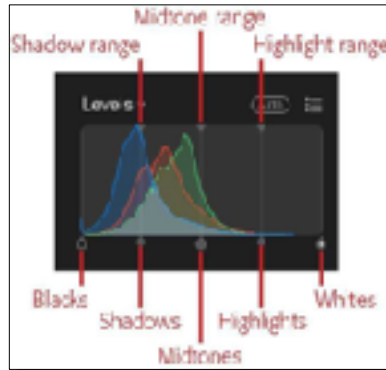


Basic Editing Features

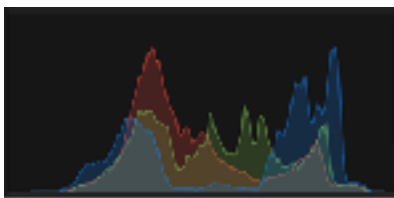
Basic editing features described here are available in all apps mentioned above. This could also mean that they are available in any photo editing app.

Levels

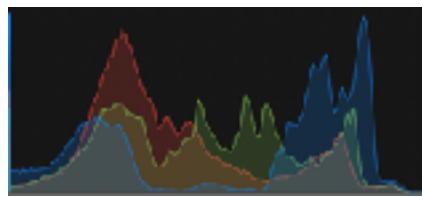
A Levels adjustment controls the brightness level of the tones across the image. Most apps only provide three adjustments: blacks, midtones, and whites. The Levels tool in Apple Photos provides five handles for adjusting blacks, shadows, midtones, highlights, and whites, and another three for adjusting the range of shadows, midtones, and highlights.



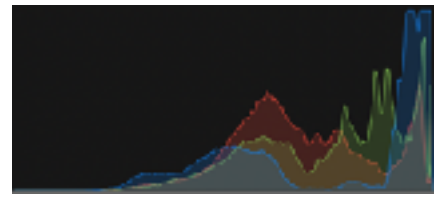
It can be a mistake to lower the whites level if any of the white is already saturated because this increases the overall whiteness of an image. Similarly, raising the blacks level increases the overall blackness of an image and could obliterate any detail in the dark regions. When using the auto adjustment, reset the blacks and whites level and see if that isn't more appealing.



Balanced



Black clipped



White clipped

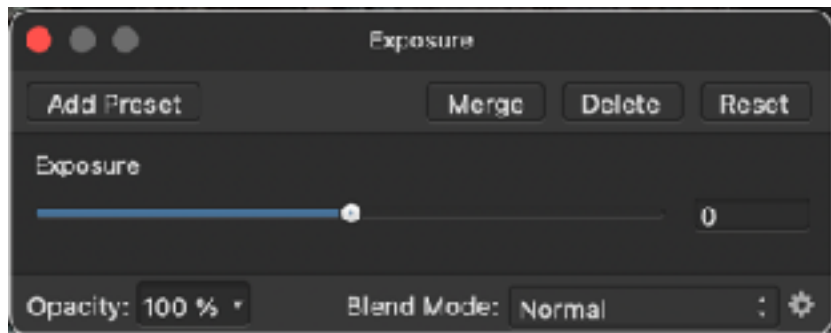
Crop

Cutting an image down in size is to remove data from the edges. There is no practical limit to the amount of data that a user might want to remove, and it does not have to be orthogonal or proportional. The purpose of cropping is to remove unwanted information or to reframe the subject of the image.



Exposure

Exposure is an adjustment to alter the original lightness/darkness of an image. It is the equivalent of increasing or decreasing the amount of time that a shutter is open. It is counterproductive to increase the exposure of an image that has parts of it already saturated. If anything, it is preferred to take a snapshot with a slightly decreased exposure.



Contrast

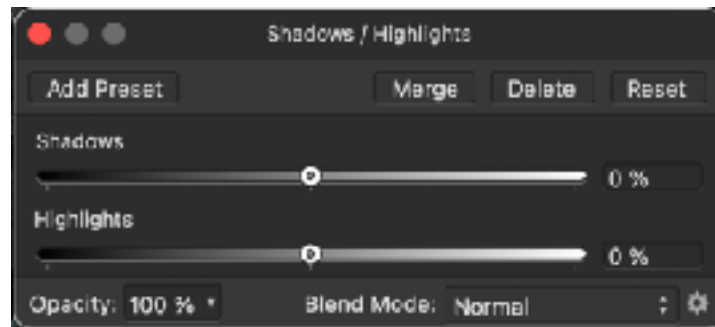
A contrast adjustment is similar to raising or lowering the shadows and then doing the opposite to the highlights an image.



Shadows / Highlights

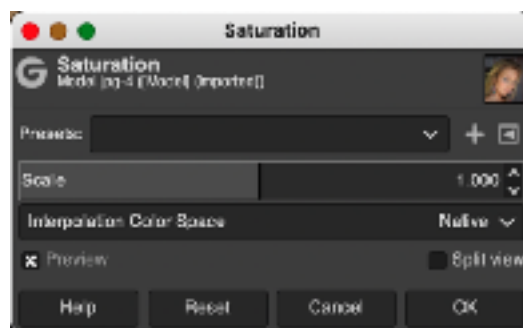
A shadows adjustment only affects that portion of the image on the far left of the histogram.

A highlight adjustment only affects that portion of the image on the far right of the histogram.



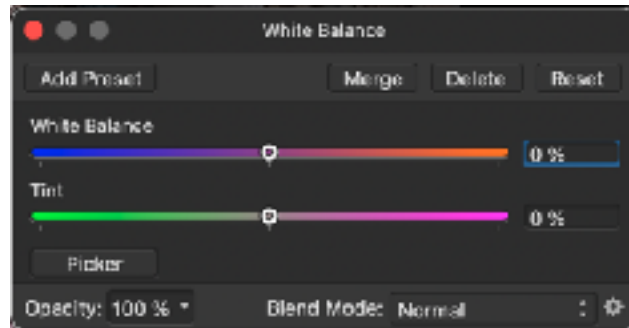
Saturation

A saturation adjustment is boosting or lowering the intensity or luminosity of the entire image.



Tint

A tint adjustment is to add either more green or more red to the image. Only Preview and Pixelmator Pro have a specific tint control. For the other apps, tinting is done with several of the other Color adjustments.

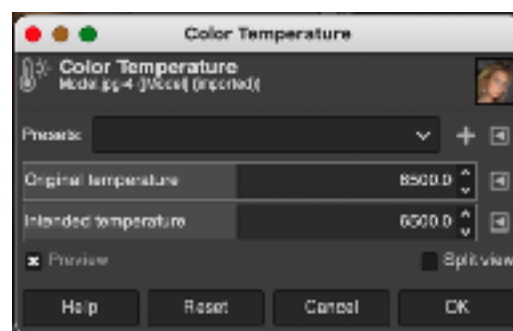


Temperature

A temperature adjustment changes how warm or cold an image is with the measurement units in Kelvin. In photography, what are considered as “warm” colors are at lower temperatures than “cool” colors. In Physics, it is just the opposite with blue having a higher temperature than red and hence is hotter. A temperature of 5500K corresponds to midday light where white appears as white. Lowering the temperature changes white to red. Increasing the temperature turns white to blue. At least, that’s the science. Apple Photos does just the opposite. Affinity Photos and Pixelmator Pro avoid showing the Kelvin units. GIMP seems to be confusing by showing two different temperature adjustments; one for “original” and one for “intended” where adjusting the original seems to follow the science rule and adjusting the intended does the opposite.

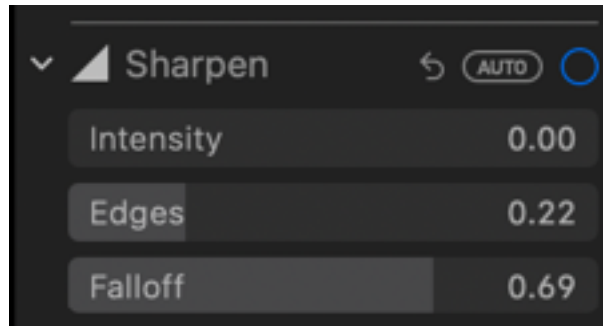
As it turns out, the Kelvin value is given to set it to what the original scene was like - overcast, incandescent light, and so on. So if an image is taken with incandescent lighting (3300K) and the camera was not adjusted accordingly (image appears more red), setting the Kelvin value to incandescent light should correct the image (make it more blue). So even though the GIMP temperature settings appear confusing, it is giving you more control over setting a proper temperature.

Where Kelvin units are not given, the reference values range from a negative value to a positive value with zero being the default or “starting” point.



Sharpness

A sharpness adjustment affects the edges of objects in an image, which is something like changing the contrast between adjacent colors. There are several possible names for sharpen adjustments. In Affinity Photo, these are called unsharp mask, high pass, and clarity. In Pixelmator Pro, they are radius and intensity. In Apple Photo, they are intensity, edges, and falloff. In GIMP, they are radius, amount, and threshold. In Preview, it is just sharpness.

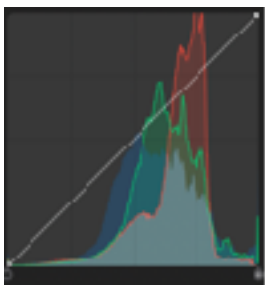


Intermediate Editing Features

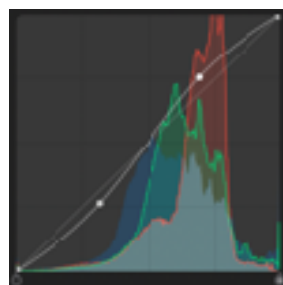
Intermediate editing features described here are not available in Preview and are available in all other apps mentioned above. This also means that they may not be available in any other photo editing app.

Curves

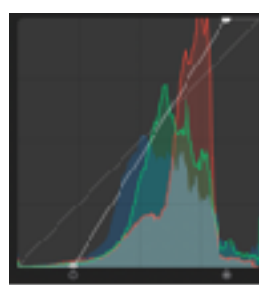
Curves adjusts the “weight” given to the intensity values of an image. With no adjustments, the image is said to be linear. Making any adjustments makes the image nonlinear. A typical curves adjustment is to lower the level in the shadows and increase the level in the highlights. This is called a contrast adjustment. Clipping the image in the black (removing portions of the image where there is little black information) and clipping the image in the white (removing portions of the image where there is little white information), is called stretching the image. Essentially, the diagonal line of the curves tool represents the range of brightness values in your image.



No adjustment



Contrast



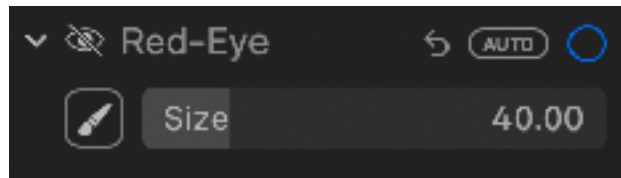
Stretched

The curves tool allows you to make precise color and brightness adjustments to an image. With curves, you can quickly remap black and white levels, brighten or darken the midtones, and even match colors between various shots in a sequence.

As an experiment, adjust the line so that it is straight across at the middle (move the black point up and the white point down). The image will turn 50% gray. What you have done is to give every pixel in the image the same value of brightness.

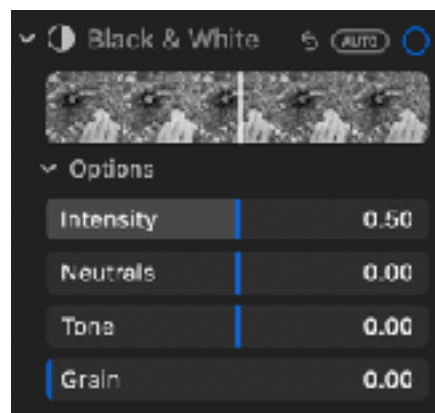
Red-Eye

Removing redness from the iris of an eye is a specialty of many photo editing apps. Some do it by employing artificial intelligence. Others can only achieve it manually by working with selections and color replacement.



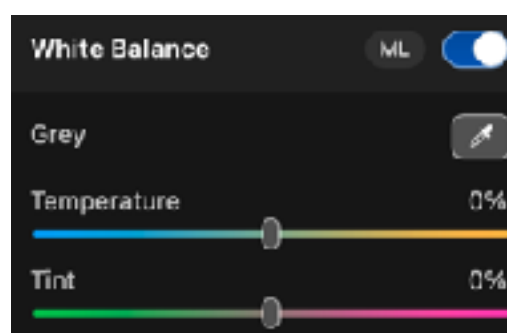
Black & White

There are many varieties of converting an image to black and white. Simply reducing the color saturation to zero is one way. Converting an image to black and white or even working with a monochrome image right out the camera is an art form for many.



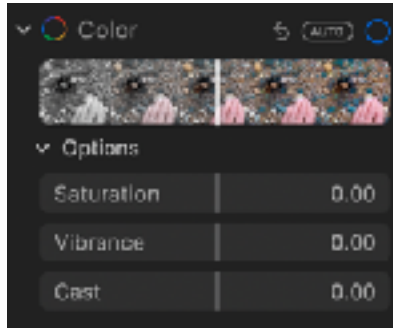
White Balance

True white balance can only be achieved if you know the exact RGB values of a small portion of the image to use as a reference point. For most white balance adjustments, just picking something that is supposed to be gray is enough. Professional photographers will put a 50% gray card in the scene to be photograph, and that color is selected in the image to achieve a perfect white balance. For almost any image, this could be done by selecting the gray portion of a cloud. When gray is not readily available, choose something white. In Photos, there are three modalities to choose from: Neutral Gray, Skin Tone, and Temperature/Tint along with an auto selection, which isn't necessarily accurate. In Pixelmator Pro, a neutral gray and temperature/tint is available in addition to an automatic white balance that is extremely accurate with almost any image. GIMP has an auto white balance that will most likely destroy any image. Affinity Photo has a color picker for selecting a gray color and temperature/tint is available.



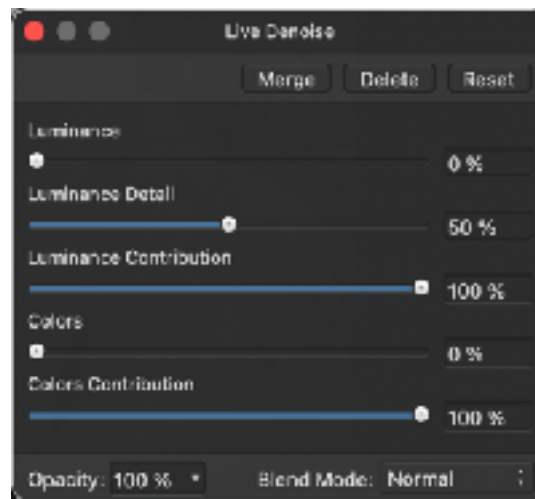
Color

Every app has a variety of tools for working on color. The basic color adjustments are hue, saturation, luminosity, temperature, and tint. Some apps have dedicated tools for working with specific kinds of color manipulation, like vibrance, definition, and more.



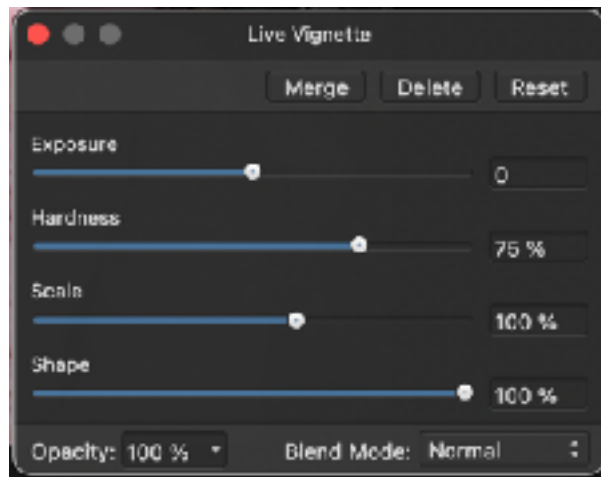
Noise Reduction

Every camera produces noise in an image. For bright images, this is probably imperceptible and can be ignored. For dark images (inadequate lighting) the noise becomes quite noticeable. Using too high of an ISO value for a given amount of light can also introduce “graininess” to an image, which is still noise. Some apps have a limited range of noise reduction which might have to be applied repetitively to achieve any desired result. Affinity Photo, Pixelmator Pro, and GIMP have advanced noise reduction tools, and there are some third party apps like Noise Ninja.



Vignette

All cameras have a certain amount of vignette in the image. This is a darkening around the corners of the image when compared to the center of the image. Decreasing the vignette balances the image intensity across the field of the image. But you might want either a greater intensity of vignette to bring attention to the center of the image. Adjusting to an extreme in the opposite direction creates a whitening at the corners, and that provides a unique effect to the image.



Advanced Editing Features

Advanced editing features described here are not available in Preview or Photos and are available in the other apps mentioned above.

Nondestructive editing.

Nondestructive editing means that the original image is kept intact – somewhere – even though extensive editing is in process on the image – until the edits are saved. Nondestructive editing is useful because it allows the user to back out of an edit through a history list. The more history that is saved during the editing, the more memory is needed. When there is insufficient memory, the history is saved to disk which makes it slower to edit. Apple Photos does not have a history per se, unless you consider Time Machine, but you can revert back to the original even after saving an edit or after editing the same image many times. Apple makes a copy of the image and keeps it safe in a separate folder. Advanced users are careful to work on a copy rather than the original even though Photos retains the original. Hence, even the “original” of a copy is saved.

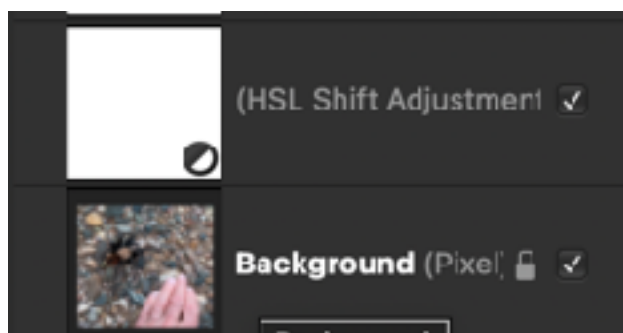


Layers

A feature highly desired by advanced users is Layers. Currently, Apple Preview and Photos do not support Layers. The other apps mentioned above do support Layers. Layers is a way of creating copies of the bottommost image in a stack, called the background. Each layer can have its own edits or adjustments. Layers can be grouped wherein adjustments to a layer in a group only affects that group as a whole. Layer visibility can be turned off and on individually. Edits in any layer affect all the layers below them. Any layer can be revisited to change the adjustment or to remove it entirely. New layers can be added anywhere in the stack, while the default is to put a new layer on top of whatever layer is active. If no layer is active, the new layer goes on the top of the stack.

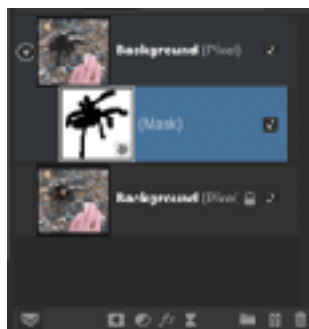
Editing with layers is a nondestructive process. The background layer is the original image and typically is never directly edited. If the stack is compressed (merged to the background), all of the edits are then applied to the background.

An image edited with Layers can be saved with the layers intact. This increases the saved file size *considerably!* The advantage is that when the image is again edited, all of the layers and their adjustments are intact. It must be noted that the history of the previous editing session is not saved.



Masks

A “mask” is a feature that enables a portion of an image or layer to be editing without affecting the rest of the image or layer. A mask can be any shape created in any imaginative manner. The edge of the mask can be feathered. The opacity of the mask can be adjusted. A mask is generally either all white or all black, and it can be any shade of gray. The concept of a mask is that white reveals what is below the mask and black conceals what is below the mask. A mask enables you to apply an adjustment to an entire layer while the mask only allows the adjustment to be “seen” where the mask is or isn’t depending on the color of the mask. The application of a mask in Affinity Photo is by far the most advanced and the easiest to implement.

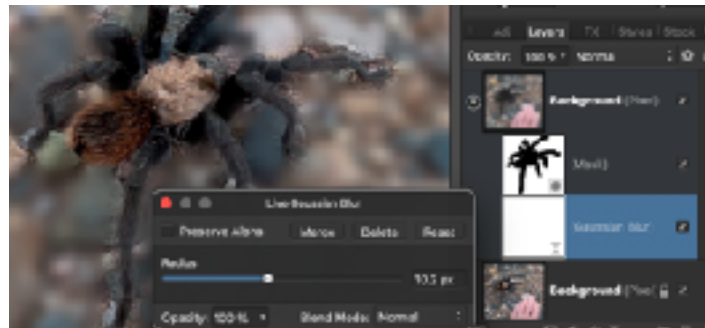


Filters

Filters includes a wide variety of special effects that can be applied to an image or a layer. In Affinity Photo, filters are available in both non-destructive and destructive forms. A variety of filters are available as live filters which are non-destructive.

As well as to pixel layers, you can apply destructive filters to mask layers, adjustment layers, live filter layers and masked fill layers; spare channels can also take destructive filters too.

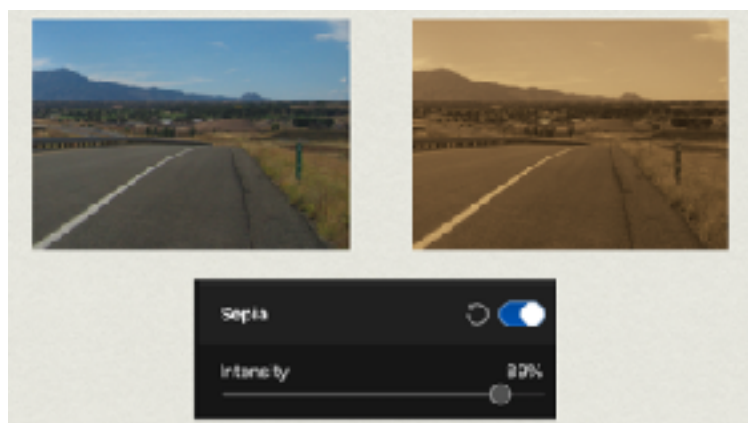
For destructive filters, it's a great idea to make a duplicate layer of the layer you planned to work on. By applying a filter to the duplicated layer, you preserve the original layer's contents, with the option to hide the 'filter' layer as needed.



Sepia

A sepia adjustment turns the image into a brownish, old photo or “antique” appearance. Preview does have a sepia option but Photos does not. Any app that does not have a sepia adjustment can simulate a sepia look. This link explains the process:

<https://discussions.apple.com/docs/DOC-12731>



Compositing

When you want to make a collage of several images in a single canvas, you are essentially compositing, so don't let the fancy title throw you. Compositing generally starts with an empty, new canvas with your choice of a background. Images are then placed in the canvas and arranged as desired. Images can



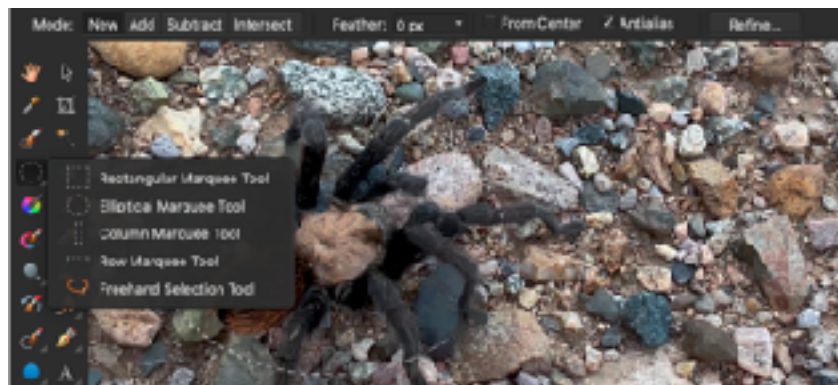
be side by side touching or not touching or even be overlapping each other. Using layers is the best way to create such a collage as it allows for each image to be on its own layer and it can be adjusted without affecting the other images.

Selection

There are many ways to make a selection. The more different ways you have and the adjustments that can be made to a selection means that you have more freedom and precision in making a selection. It can also take up a lot of time trying to be precise.

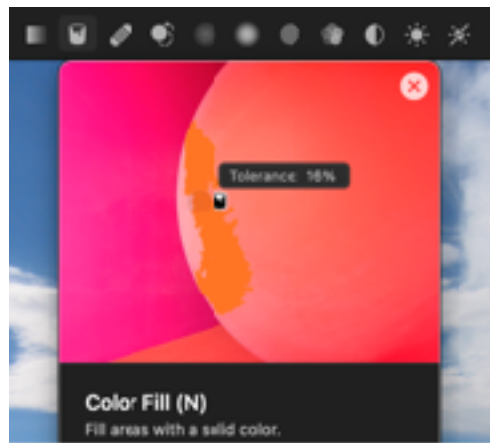
Depending on the app, the types of selection can include rectangular (or polygonal), circular (or oval), free, magnetic, quick, and selection by color. The kinds of adjustments can include feathering (or blurring of the edges), adding, subtracting, expanding, refining, and inverting.

Selections can be converted into a mask or you can cut or copy a selection. A copied selection can be pasted as a duplicate in the same image or used as a new image or pasted into another image.



Fill

A fill adjustment can be selective to affect only contiguous colors or affect anything within a tolerance for the selected color.



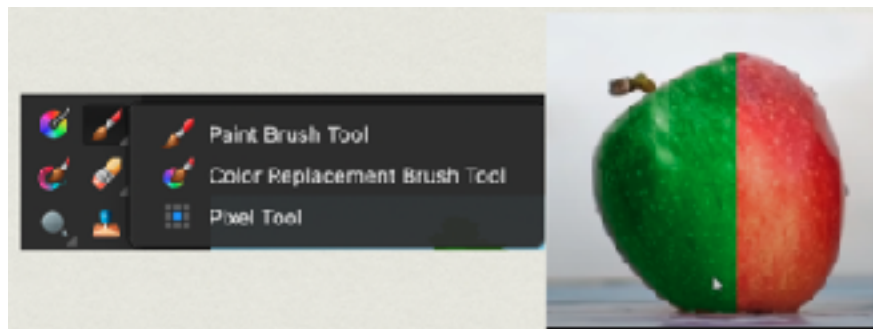
Color Replacement

Pixelmator Pro has a Color Replace tool for replacing one color with any other color, such as turning a blue dress into a green dress and retaining all the shadows. It first requires selecting an object to work on. Otherwise, the color to be replaced is done on the entire image.

Affinity Photo can do color replacement, but in a more manual mode by selecting the object then adjusting the color with the HSL tool and blend modes.

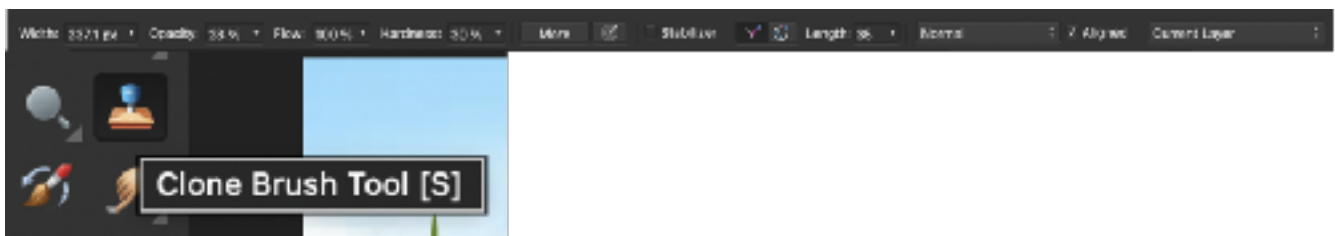
GIMP has a Color Exchange tool for swapping colors of an object, and it also requires creating a selection of what you want to work on.

Hence, if you can select an area of an image to work with, replacing one color with another just requires knowing which tool to use.



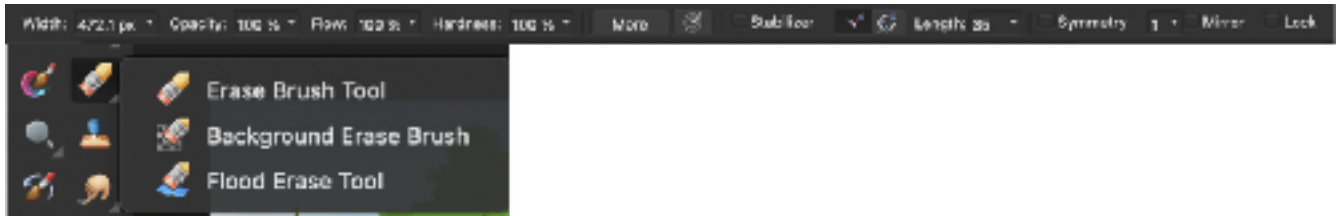
Clone

A clone adjustment captures a color swatch based on the size of the brush from one place and replicates it anywhere else in the image. There are controls to determine how the clone is applied.



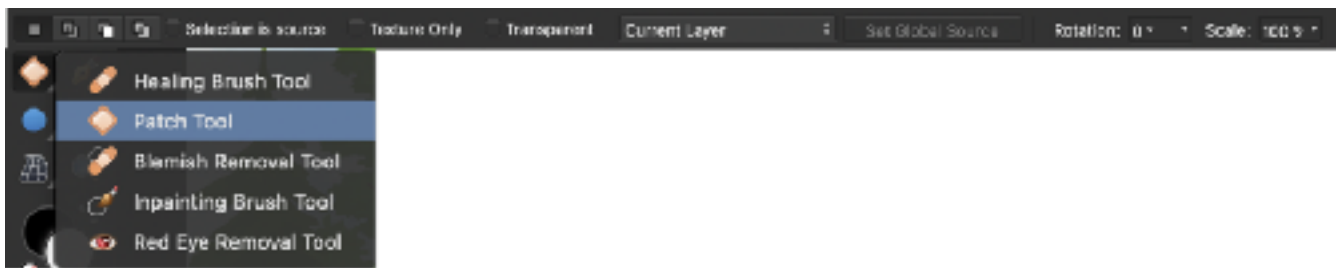
Erase

An erase adjustment is used to wipe out everything within the boundary of the brush or pen tool. What is left is the background of the image, which may be transparent (meaning no color).



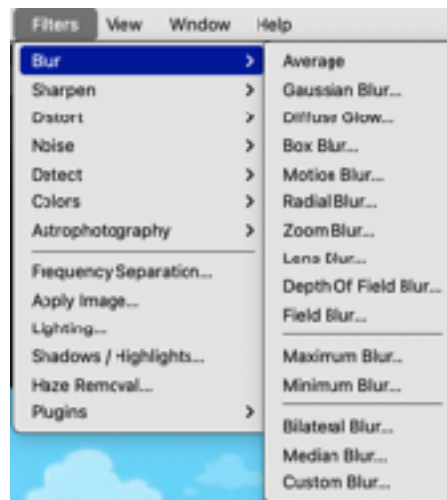
Patch

A patch adjustment is used for fixing scratches, blemishes and other unwanted artifacts in an image.



Blur

The blur tool smears out the sharpness of an image to soften or tone down otherwise dramatic appearances. It can be used to effectively defocus the background of an image.



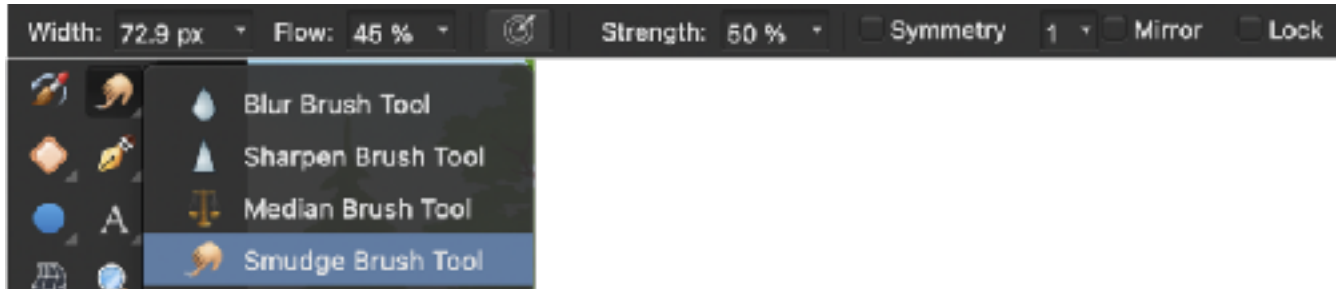
Burn

The name of this tool is left over from the film days when excessive light was applied to a negative to “burn” or darken the portion that was exposed. If you have highlights in only certain places, using the burn tool is probably more effective than reducing the highlights of the entire image.



Smudge

The smudge tool has the effect of dragging your finger through wet paint and creating interesting brush effects. This is not the same as the blur tool.



Transform - Warp

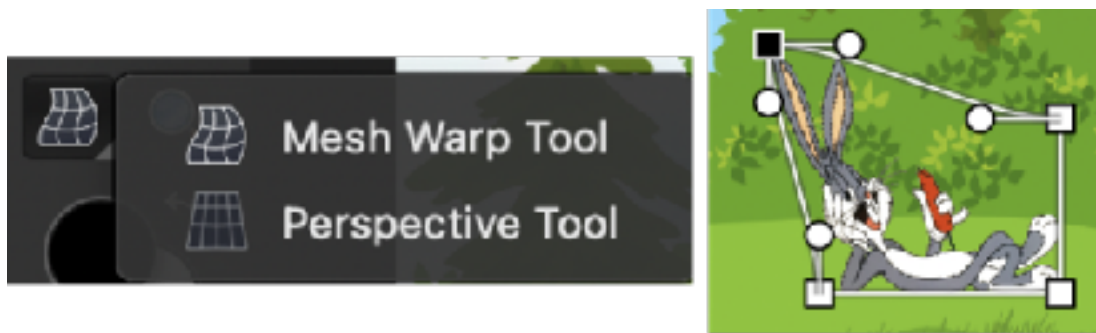
Transforming an image is useful if you notice that the vertical lines on the sides of the image are not really vertical. The image can be “sheared” to pull the vertical lines back into vertical. After the shear is applied, the image will have to be cropped. If the sides of the image are bowed out, like in a fish-eye effect, if the image is opened in the Develop mode of Affinity Photo, it is automatically corrected, but only for mild cases of fish-eye. If the camera used a fish-eye lens, then a plug-in for Affinity Photo would have to be used. Similarly, GIMP requires a plug-in to correct for an image taken with a fish-eye lens.



Warp

A warp adjustment is for fun. In Pixelmator Pro, wherever you place the brush and click, it either acts like a black hole and sucks light in or it can do the opposite and push light apart.

In Affinity Photo, the Mesh Warp tool can stretch an image in many different ways.



Scanning

When it comes to saving a printed copy of a photo or document in a digital format, scanning the item with a printer that has a scanner is the first thing that comes to mind. The printer menu contains controls for scanning. The options include saving the scan to the computer or to an attached flash memory card. But the easiest way to scan from a printer to the computer is using the Image Capture app in macOS. (The Preview app can also perform the same function.) There is no need to ever install the printer driver or apps that come with a CD that accompanies the printer, or to download the software from the vendor. MacOS takes care of all that for you automatically. The only printer that you might have to download software for is a Brother Printer.

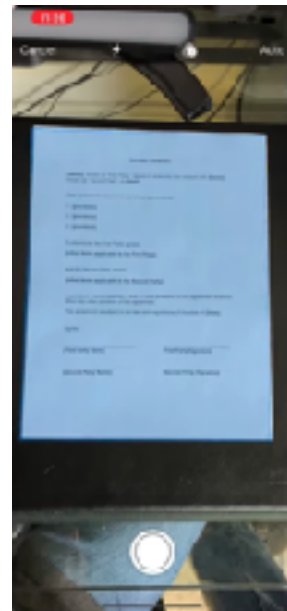
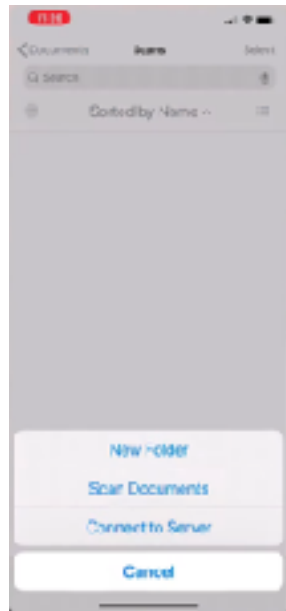
The Image Capture app detects any printer with a scanner option. There are controls for scanning from a document feeder if the printer has that feature or from the platen (flatbed). Every conceivable control is available to perform a scan, more than you will ever find on any printer menu.

When scanning photos from a printer, multiple photos can be placed on the platen and Image Capture will detect the individual photos and separate them out into their own file.

The iPhone and iPad can also serve as a scanner by using the Notes app with the phone camera. The scan option in Notes can automatically take an image, straighten it out, and do a quick edit. You can also manually do a scan and adjust the corners of the document prior to saving the result.

There are several iOS apps such as Genius Scan that are designed for scanning direct from the phone camera and save as either an image or as a PDF. When saving as a PDF, multiple pages can be combined into a single PDF file.

IOS – using Files



macOS – using Image Capture

