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# PROCEDURE: Setting Up FastStone Image Viewer

## Application for HMML's Work

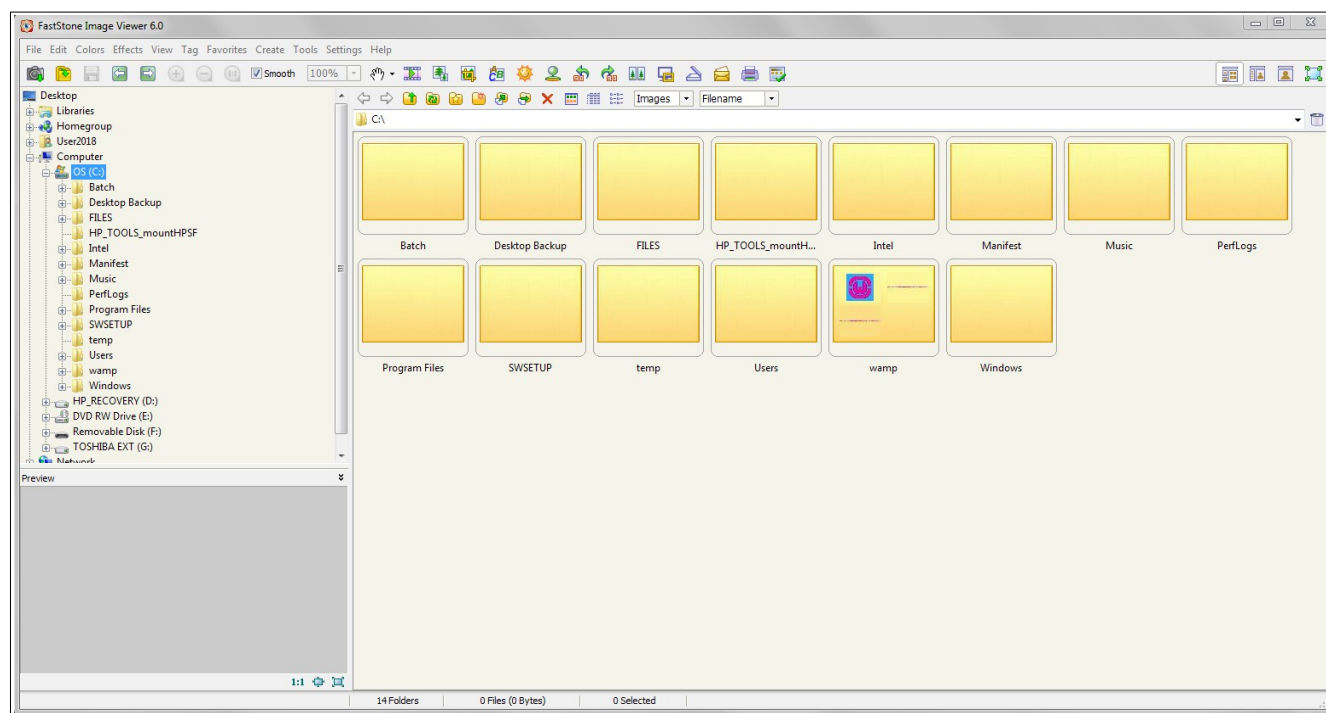
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FastStone Image Viewer is a freeware image viewing application for Microsoft Windows. It's a multipurpose imaging application with many features, but at HMML we use it mostly because it has the ability to rotate JPEG images losslessly, as opposed to most other imaging applications that perform "lossy" operations on JPEG images that can lead to a degradation in image quality if multiple operations are performed.

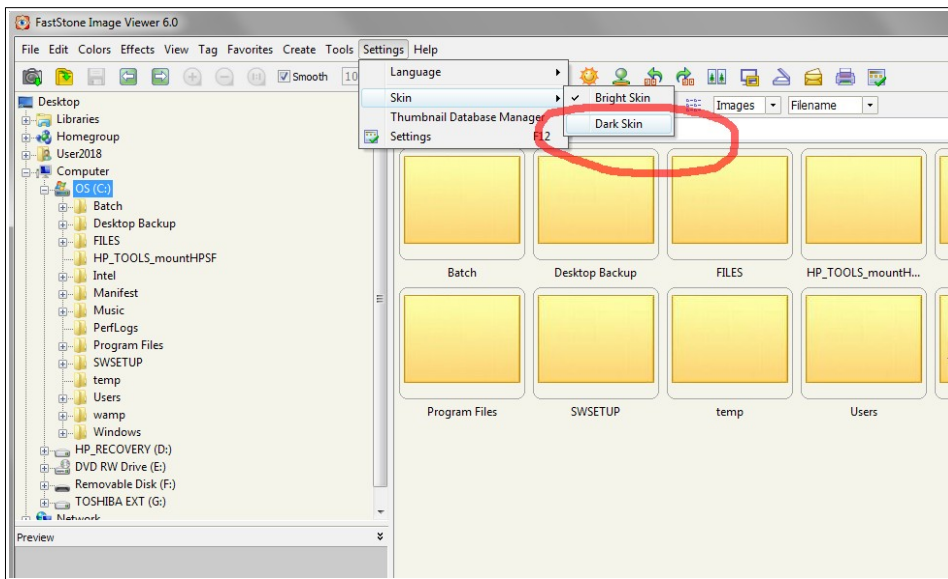
### Setting up FastStone

The application is similar to many other imaging apps in that it presents the user with a navigation "tree" on the left and an image viewing window on the right. The navigation pane allows the user to choose the hard drive and directory containing images.

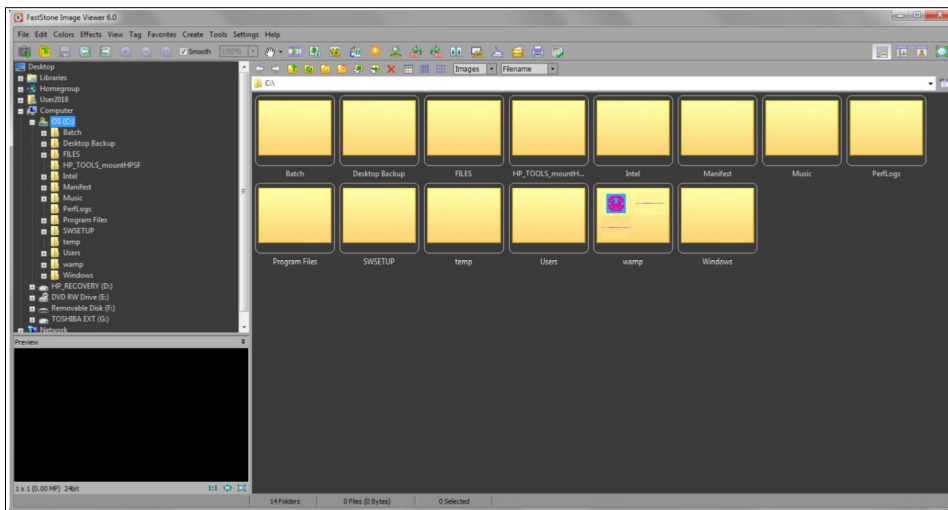


**Initial FastStone Screen Display.** Navigation pane in on left, contents of selected folder on right.

The first thing I do with FastStone is to change the display "theme" to a darker tone, which I feel is better for the evaluation of digital images. By default, the application theme is set to "Bright Skin." I change this to "Dark Skin."

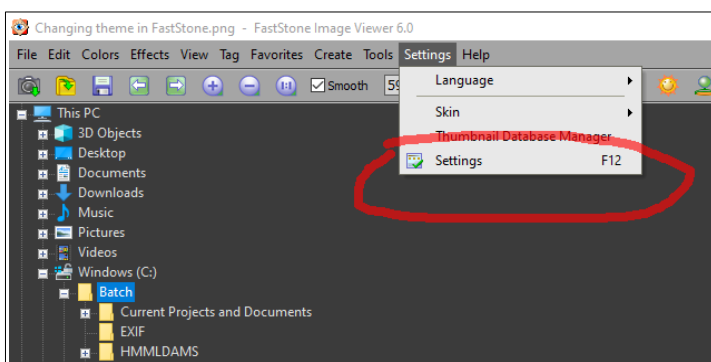


**Changing the Appearance of FastStone.** The “Dark Skin” theme is better for critical image color inspection purposes.



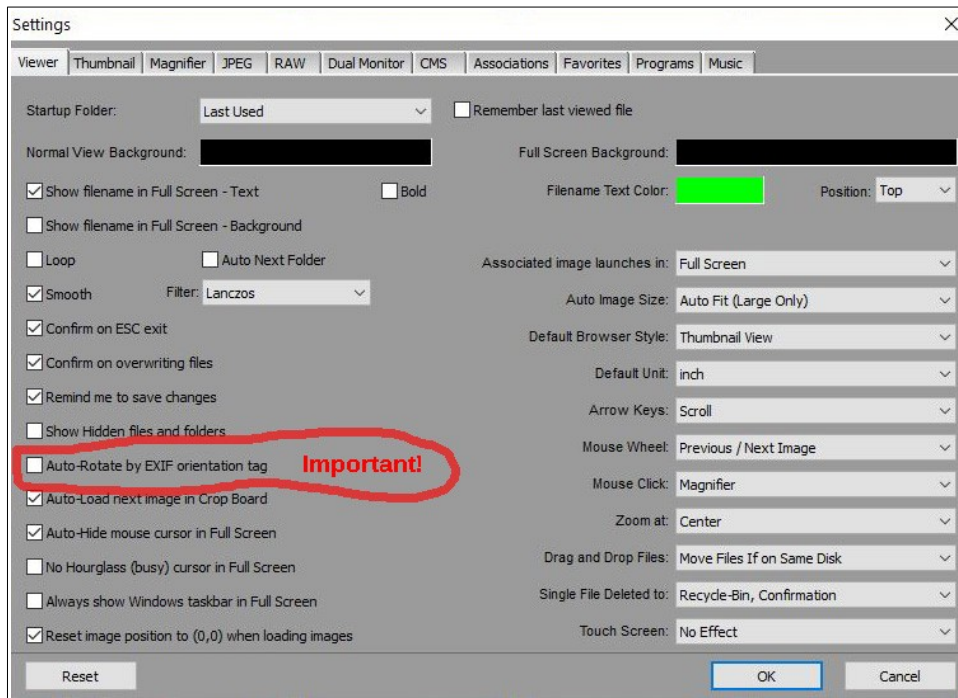
**FastStone with “Dark Skin” theme enabled.** Much better for image viewing.

Next, open up the “Settings” in FastStone by selecting it from the menu or pressing F12 on the computer keyboard.



**Settings in FastStone.** This brings up a number of user-configurable settings that are important for HMML's work.

A multi-tabbed settings window will appear. In the first tab, configure the settings to look like the following screenshot.

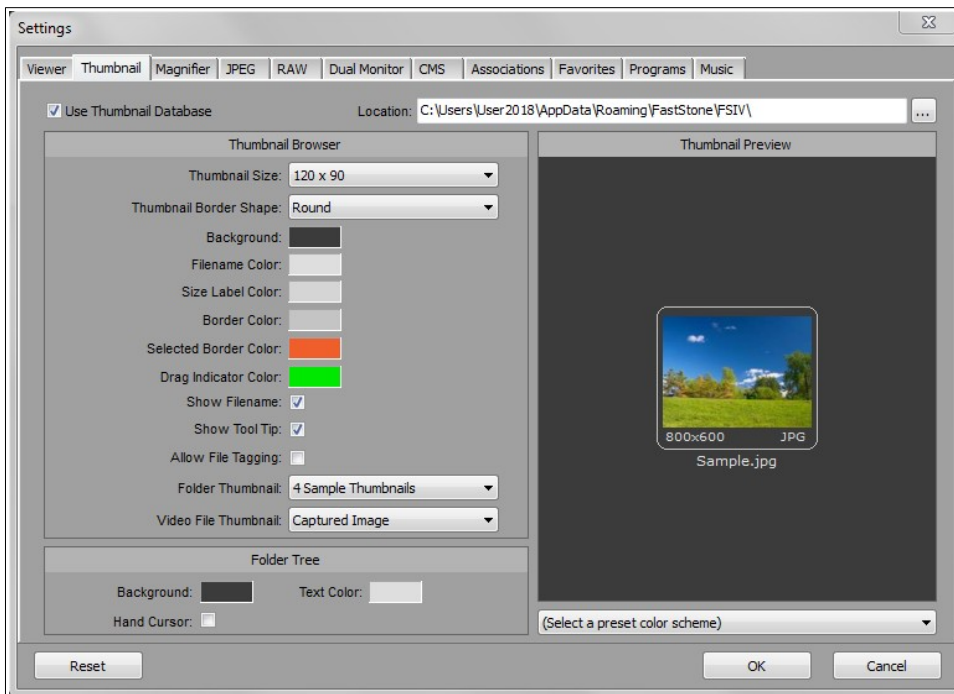


**First Tab in Settings.** The most important item here is to make sure that the setting for “Auto-Rotate by EXIF orientation tag” is UNCHECKED.

It is vital to “uncheck” the item labeled “Auto-Rotate by EXIF orientation tag.” If this is checked, the viewer will rotate images by the embedded EXIF orientation tag rather than showing the view the *true state* of the image’s pixel array. We need to know the actual state of the image, as the online viewer for HMML Reading Room does not read or use the EXIF orientation tag.

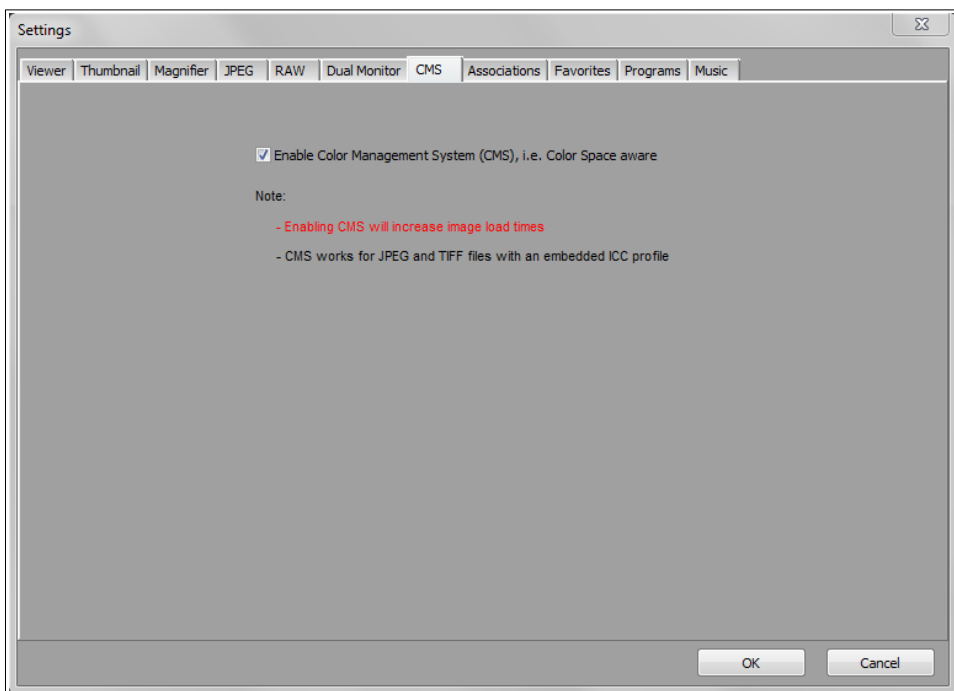
Next, go to the “Thumbnail” settings tab. The only setting of interest here is the one for choosing the pixel size of the thumbnails displayed by FastStone. This is a balance between how easy it is to see the thumbnail images versus how many can be displayed on the computer screen at one time. Each time you change this, the application will ask you for confirmation of your choice, then it will update its thumbnail database. The 120x90 pixel setting is a good one to start with.

NOTE: When making these settings changes, always remember to click the “OK” button to make sure the settings are saved.



**Thumbnail Settings.** The user can change the default size for thumbnail images here.

Finally, go to the “CMS” tab in the settings windows and enable color management. This will provide a more accurate color rendition of the image files.

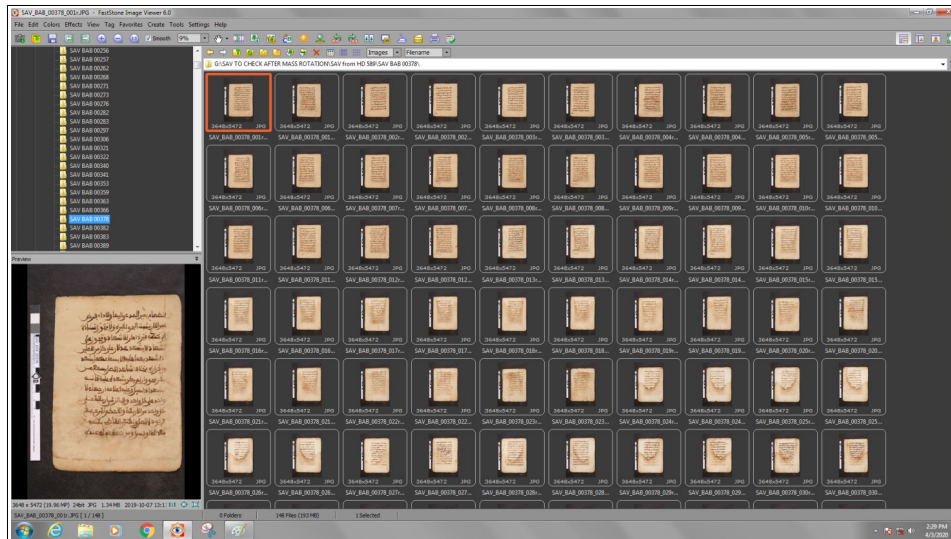


**Color Management Setting.** Check this box so that FastStone displays the most accurate rendition of color possible.

Once these settings are configured, FastStone is ready to use for HMML projects.

## Using FastStone

FastStone works like most other image viewers. The user navigates to the folder, selects it, and sees the folder contents on the right. Selecting an individual image will display a small preview in the lower left of the display.



**Image Folder Contents.** The navigation tree is in the upper left, the images are on the right, and a small image preview is at the lower left, which displays the image file selected (outlined in red).

The user can double-click on a thumbnail to display it in “full-screen” mode. Once the image is in full-screen mode, clicking and holding the left mouse button enlarges the image to “100%” and allows the user to hold the button and scroll around the enlarged image. Press the “Esc” key at the upper left of the keyboard to get out of full-screen mode and back to the normal view. If you accidentally press the “Esc” key twice, it will ask if you want to quit FastStone altogether (which is usually not the case).

## Rotating Images

The ability of FastStone to rotate JPEG images losslessly is a key reason for HMML’s use of the application. To understand why, it’s important to understand a bit about how image files are rotated.

A raster image is made up of individual square picture elements, called *pixels*, lined up in rows and columns like the squares on an enormous checkerboard. When there are enough of them, the eye doesn’t see the little squares, only the illusion of continuous tone and color making up the overall image. An image file created by a Canon 6D MKII digital camera measures 6240 by 4160 pixels.

In a TIFF image file, each and every pixel in the image is given a set of color specifications for Red-Green-Blue (RGB) color encoding, along with the pixel’s sequence in the array, which specifies where in the mosaic it is located. Thus, every pixel has information about its location and color written in the TIFF file. This means that TIFF files are quite “large,” in that they take up lots of disk space and take longer to send over computer networks.

In 1992, the popular JPEG compression algorithm was created by a consortium called the Joint Photographic Experts Group. Files created using this compression technique became known as “JPEG” images, with a file extension of either “jpeg” or “jpg.”

In truth, the images we think of as “JPEGs” are technically JPEG-compressed TIFFs. The JPEG algorithm uses a complex process to analyze a TIFF raster map and describe it mathematically. This description can rather verbose, resulting in a very high-quality image (low compression, high-quality) or very brief and lightweight, resulting in a low-quality image (high compression, low-quality). The user can specify this “quality level” when saving a file as a JPEG. The JPEG images produced by the digital cameras used by HMML are set to be of the highest quality possible with the camera’s settings.

When a JPEG is opened in an application or viewed with a program like FastStone, the mathematical description of the file is read and a complete raster map is created from it. With highly compressed files, there is less specific information to go by (because of the very brief mathematical description), so the resulting image can display rendering errors called “compression artifacts.”

If a JPEG file is opened and some sort of *change* is made to it, such as cropping, rotation, contrast or brightness adjustments, etc., the raster map is now *different* than it was when the file was first opened. Now, when the JPEG is saved and closed, the algorithm, realizing that changes have been made, will apply whatever “native” compression setting was originally chosen to this “new” raster map. This is called “recompression,” and it can allow a degradation in image quality in files that are altered and resaved too many times.

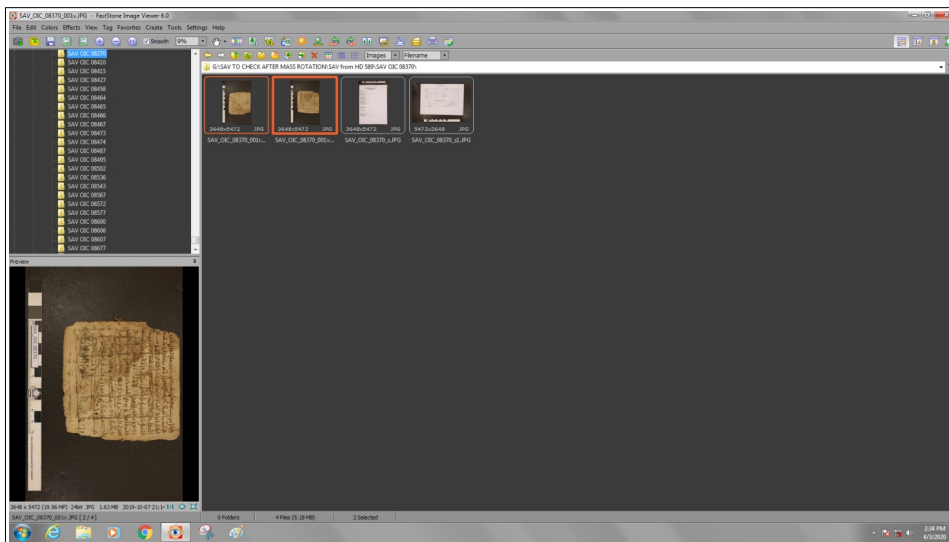
What this means for rotation is that using traditional methods, the JPEG is decoded into the raster map, the raster map is rotated, and the new raster map is then re-encoded using compression. If this is done enough times to a JPEG file, image quality can suffer.

With lossless rotation, there is no decoding and re-encoding of the raster map, which involves recompression. What happens, metaphorically, is that the *mathematical description is rotated*, meaning that the raster map is not affected, but is now in the new, chosen orientation when the JPEG is decoded.

The only caveat is that this lossless rotation only works using the 16-pixel blocks that JPEG compression works on—the math change can only work in multiples of 16. Thus, an image might be cropped by up to 15 pixels when lossless rotation is employed. This sounds like an issue but it’s not because all modern digital cameras produce images whose pixel dimensions are evenly divisible by 16 across both width and height. This is also why HMML doesn’t crop original camera JPEGs.

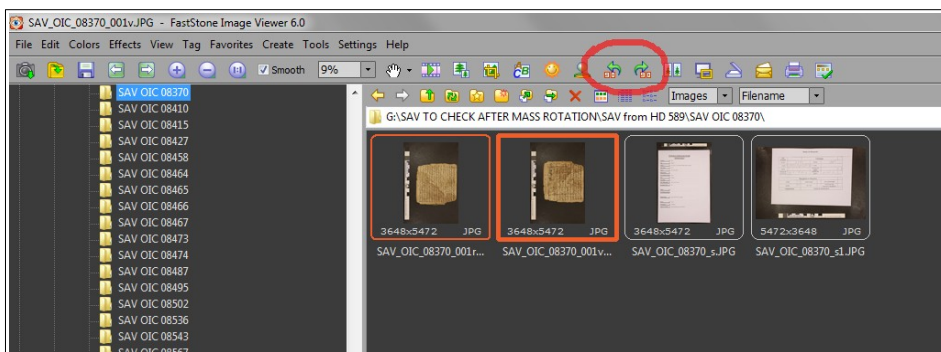
To losslessly rotate JPEG images in FastStone, select the folder in question and then the images that appear in the right-hand pane. You can select all the images using “control + A” or selectively choose images using control-clicking or shift-clicking to select a consecutive range of images.





**Images Selected in FastStone.** Red borders indicate the selected images.

Choose to rotate the images using one of two methods. There are left and right rotation icons that the user can click.

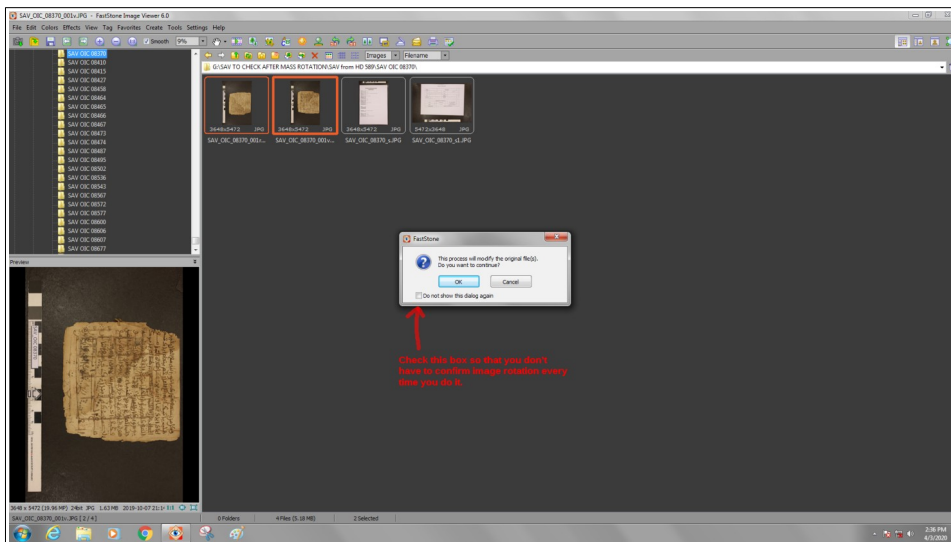


**Left and Right Rotation Icons.** If you hover the mouse over these, the application will indicate that these operations are lossless for JPEG images.

The second method is use keyboard commands. They are:

**Control + Alt + l**                      rotates left  
**Control + Alt + r**                      rotates right

The first time you run a rotation command after installing FastStone, a small popup message will appear. This message asks you confirm that you actually intend to modify the image. BEFORE you click on “OK,” click the checkbox next to “Do not show this dialog again.” From that point on, you can simply run the rotation command without having to confirm it every time.



**Confirmation Message Popup.** Check the little box at the lower left so that you won't have to confirm every rotation operation you perform in the future.

All installations of FastStone in an imaging lab should be set up the same way to ensure consistency of operation.