SnapFuse(TM) User Manual

General Description

SnapFuse(TM) is an image fusion software, it can be used to fuse together a collection of images to form a well exposed image (Exposure Fusion), or a well focused image (Focus Stacking).

Exposure Fusion is a photographic technique that blends multiple images of same scene exposed at different level into one single image. Exposure Fusion is different from another commonly known similar technique, HDR. The difference is Exposure Fusion selects best tonalities from each of the (low dynamic) image collection to form a single image, it does not create high dynamic range at all. HDR on the other hand attempts to create a high dynamic range from a set of low dynamic images.

Focus Stacking is another photographic (or digital image processing) technique that blends multiple images at different focal depth into one single well focused image. This technique is well suited for situations where each individual images have shallow depth of field, such as macro photography or micro photography. Of course, it can be used in other situations, as well, for example landscape photography.

Installation

Windows Installation

To install SnapFuse, download either SnapFuseSetup32.msi or SnapFuseSetup64.msi file and double click on it to start installation process. The SnapFuseSetup32.msi is 32bit version and runs on both 64bit or 32bit Windows. However, the 32bit version is slow and only handle smaller images due to memory limitation. The 64bit version is much faster and can handle large image files.

Once SnapFuse installation process finishes, SnapFuse icon will show up on windows desktop. To start it, simply double click on it.

Mac OS Installation
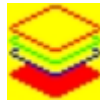
Currently, Mac OS is not supported.

Trial Version

User can use SnapFuse free of charge up to 30 days with full feature enabled.

After 30 days, user can either purchase a full license or continue to use SnapFuse with output file size reduced which has longest side limited to 768 pixels. No water mark in the reduced image. This is good for those who just want to showcase their work on internet, social media, etc.

A license file can be obtained (either purchased or granted) to fully enable an expired version via email. Contact pylin@mjkzz.com
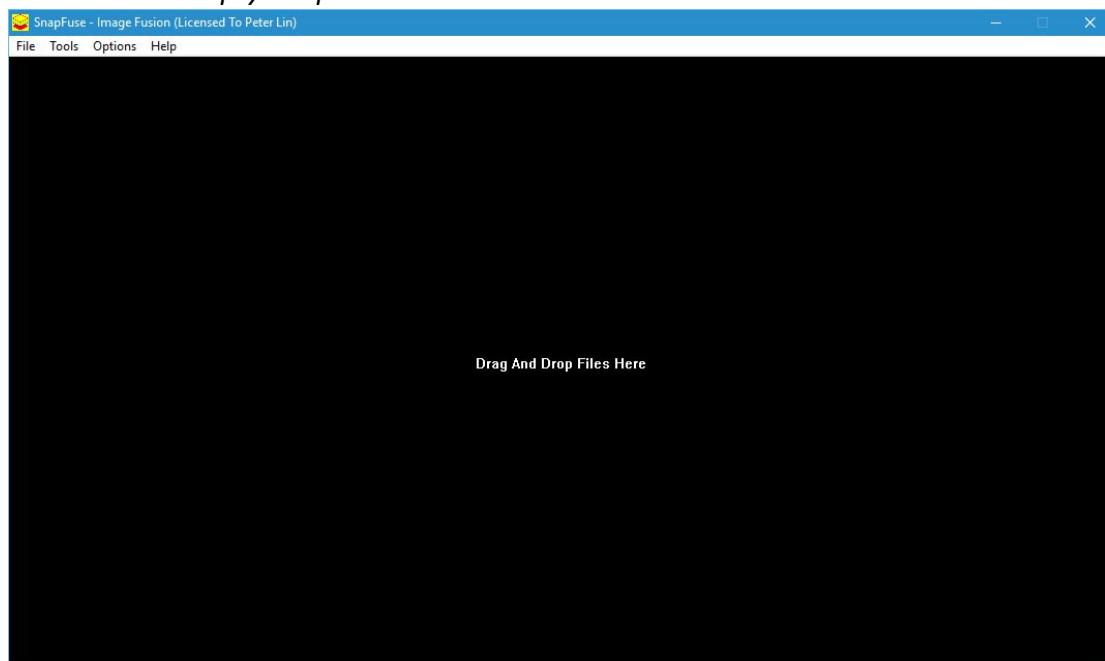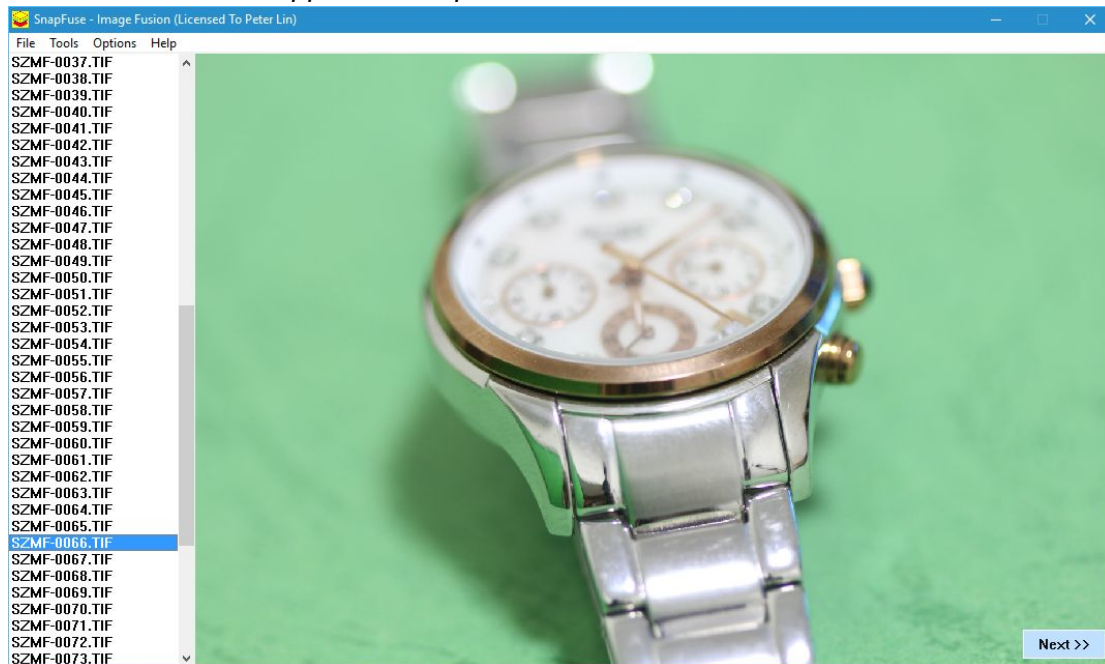
General Operation

Once installed, an SnapFuse icon will be on desktop. Simple double click on this icon will launch SnapFuse.

To add images to blend, simply select all images you want to blend from File Explorer and drag and drop them on the Main View of SnapFuse. When drag and drop cursor moves into SnapFuse main windows, a "+" sign will show next to the cursor, indicating that SnapFuse will accept these files. **Important Note: Only Main View will accept files drag and dropped. All other views will not accept that.**
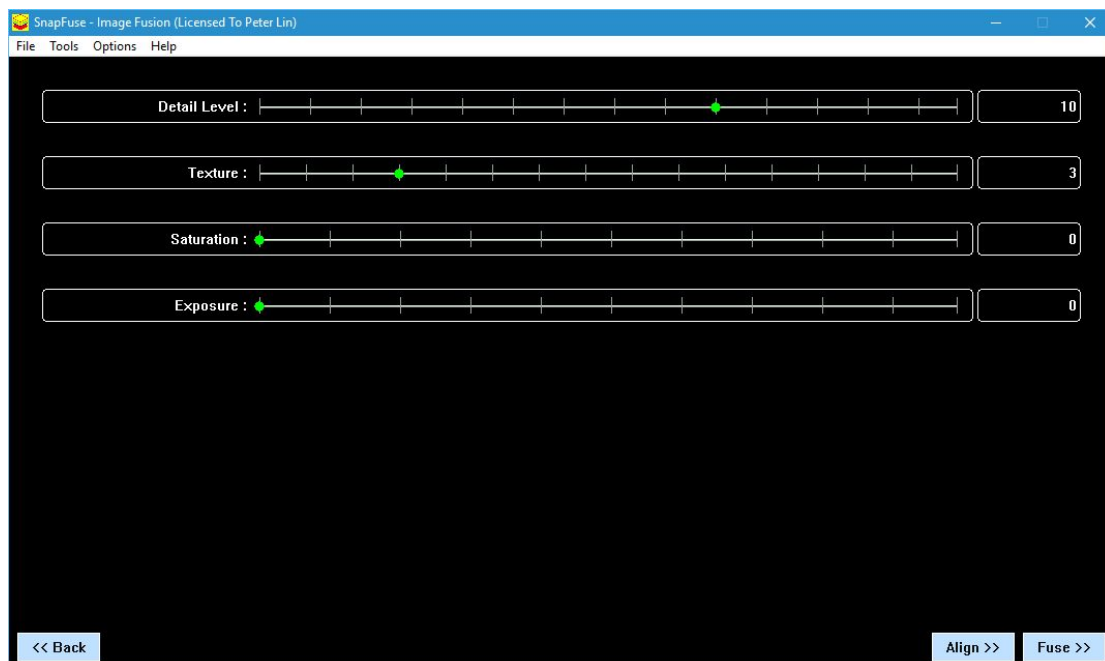
Main View -- Empty SnapFuse

Main View -- Files Dropped On SnapFuse

Click "Next" after image files are dropped in to start image blending will take user to Parameter View. If there are some resultant images perform earlier, another button, "Result" will appear and clicking on it will take user to Result View. On Parameter View, there four parameters to adjust. For each of the parameters, they control one aspect of final results

Parameter View

Detail Level Parameter -- this parameter contributes amount of fine details in the final image. General rule of thumb of setting this parameter is, the larger this value is, the more fine details will be in final images depending on image size. For moderate image size, such as 1536x1024, a value of 3 to 4 is good enough. For larger files, such as 6000x4000 images, a value of 12 - 15 is better. For focus stacking, this parameter plays heavy role in final image quality, while for exposure fusion, this is less important in comparison.

Illustration of Detail Parameter

The image on the left has Detail parameter set to 4 while the one on the right has Detail parameter set to 12. As can be seen, the one on the right with D=12 has more pronounced and high contrast fine details than the one on the left with D=4. Both Images has Texture set to 15 (max). Input images are of size 6000x4000 and above images are just part of them.

Texture Parameter -- this parameter affects how texture contributes to final image, ie, the weight it contributes to final image. The larger this value is, the more accentuated the texture is in the final image. For focus stacking, this parameter plays heavy role in final image quality, while for exposure fusion, this is less important in comparison.

While for exposure fusion purposes, this parameter determines the weighing factor of texture or contrast, the higher this value is (relative to Saturation and Exposure) the more texture or contrast contributes to final image.

Illustration of Texture Parameter

The image on the left has Texture parameter set to 2 while the one on the right is set to 11. Both detail parameter are set to the same value of 4. Notice the difference of fine details on the right around golden rim where arrows point at. The higher the Texture value produces finer details.

Saturation Parameter -- this parameter contributes how saturation affects final image. This parameter contributes heavily in exposure fusion while less important in focus stacking.

Exposure Parameter -- this parameter controls how pixel is selected based on its "well exposedness". This parameter is very important in exposure fusion and normally it is set to zero for focus stacking.

On this Analysis Parameter View, there are three buttons at the bottom, namely "Back", "Align", and "Fuse".
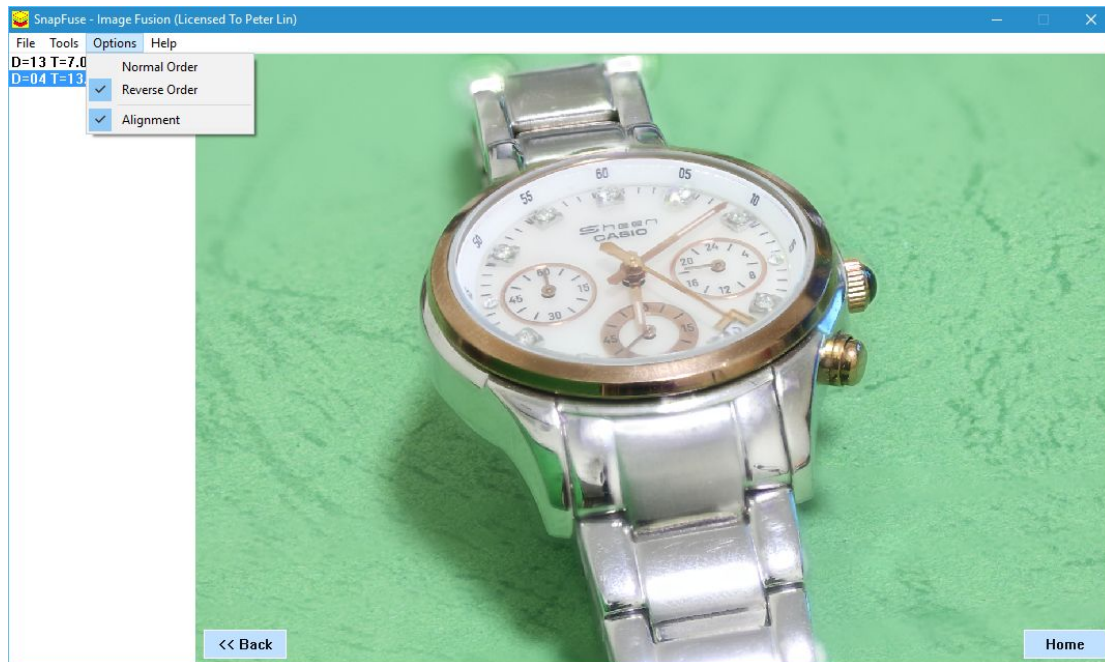
The "Back" button will take user back to the main image picking view.

The "Align" button will perform image alignment. The first image that appear in the image list of Main View will be the reference image and all other images will be aligned to this reference image. Each aligned image will be **SAVED** with "_A.TIFF" extension to the original image. For example, if a file is named "image_0001.jpg", the aligned image will be named as "image_0001_A.tiff" in the **SAME** folder as the original image.

It is possible to use the last image as reference image and all other images will be aligned to it. To reverse image order, please select menu item "Options->Revers

Order" as shown in "Reversing Image Process Order" Picture below. Why would it matter to reverse image processing order? If images are taken with increasing size (as camera moves closer to subject), aligning to the first image with relative smaller subject image will cause later images to be shrank resulting unwanted border lines. On the other hand, if aligning to an image with larger subject, this will not happen and resulting a nicer clean image. Note, this depends on how image sequence were captured. It is highly recommended to view each image in the sequence and visually decide if reversing order is necessary.
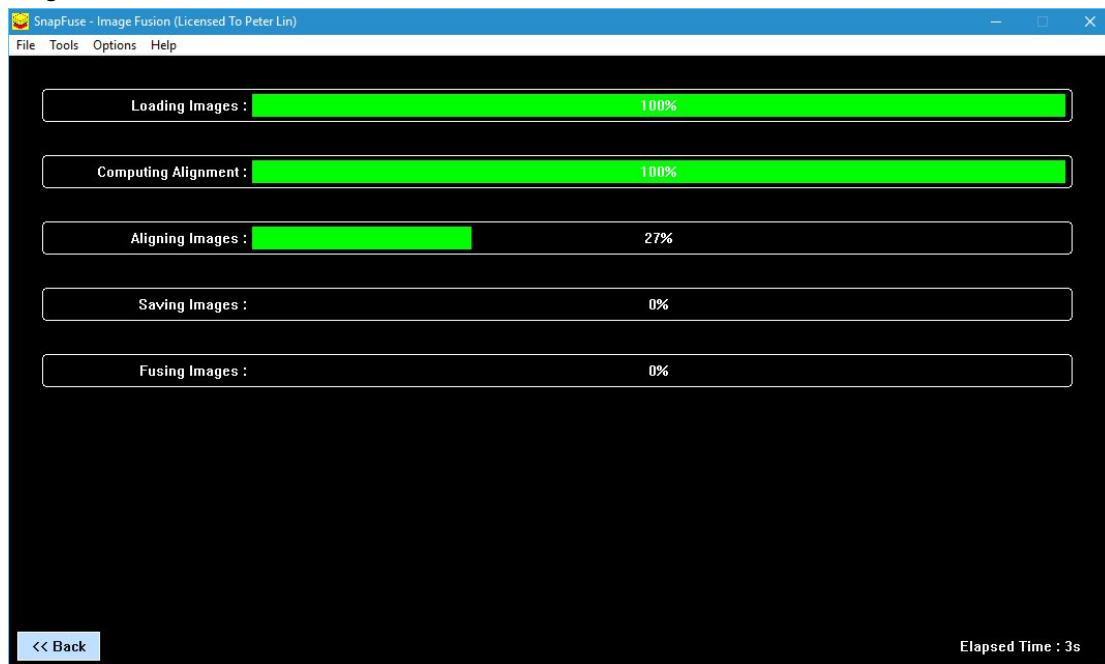
Reversing Image Process Order

The "Fuse" button will start image blending process and takes user to the next view -- Progress View.

On this **Progress View**, the button labeled "Back" will perform cancellation of image blending and takes user back to Parameter View. At the right bottom of this Progress View, Elapsed Time is displayed -- time the process is taking to blend the final image.
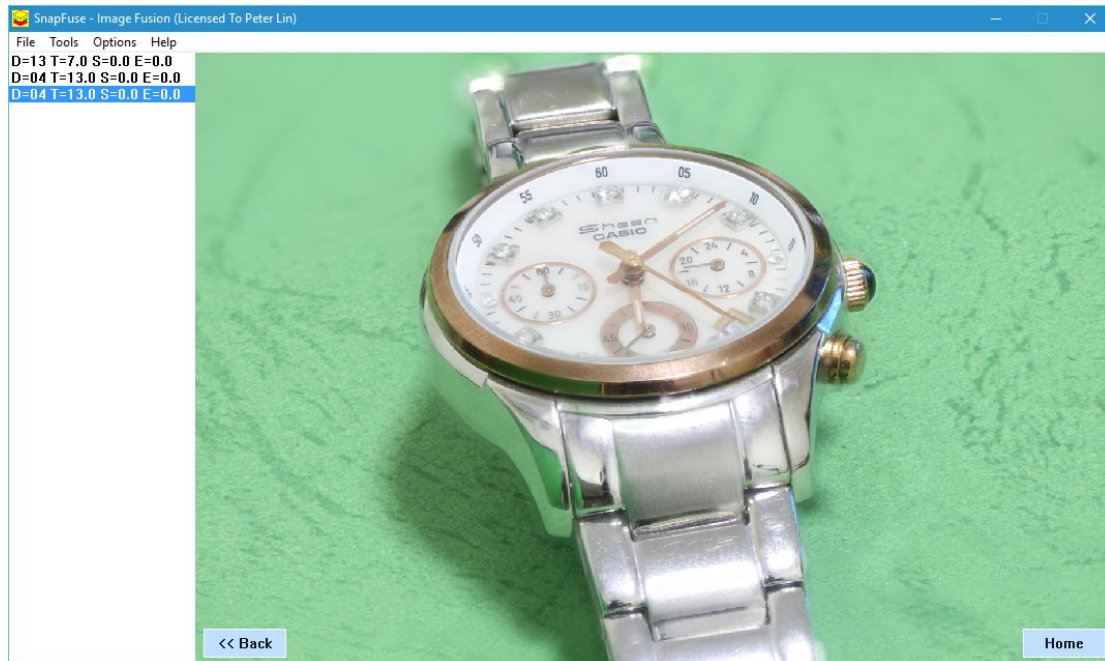
Progress View

Finally, when blending process finishes, **Result View** will appear.

The **Result View** -- In this view, on the left hand side is a list of results. Each entry in the list are named with parameters used to create it. For example, in the picture named "Result View", the highlighted entry is named as "D=04 T=13.0 S=0.0 E=0.0" means that resultant image is created using Detail of 4, Texture of 3, zero Saturation and zero Exposure parameters.

Picking on one entry in the list will bring back the result image. SnapFuse can store up to 16 resulting images so that results under different parameters can be compared.

There are two buttons on Result View. The first one is "**Back**" button, this will take user back to Parameter View and start another blending process with new parameters specified. The second "**Home**" button will take user back to Main View.
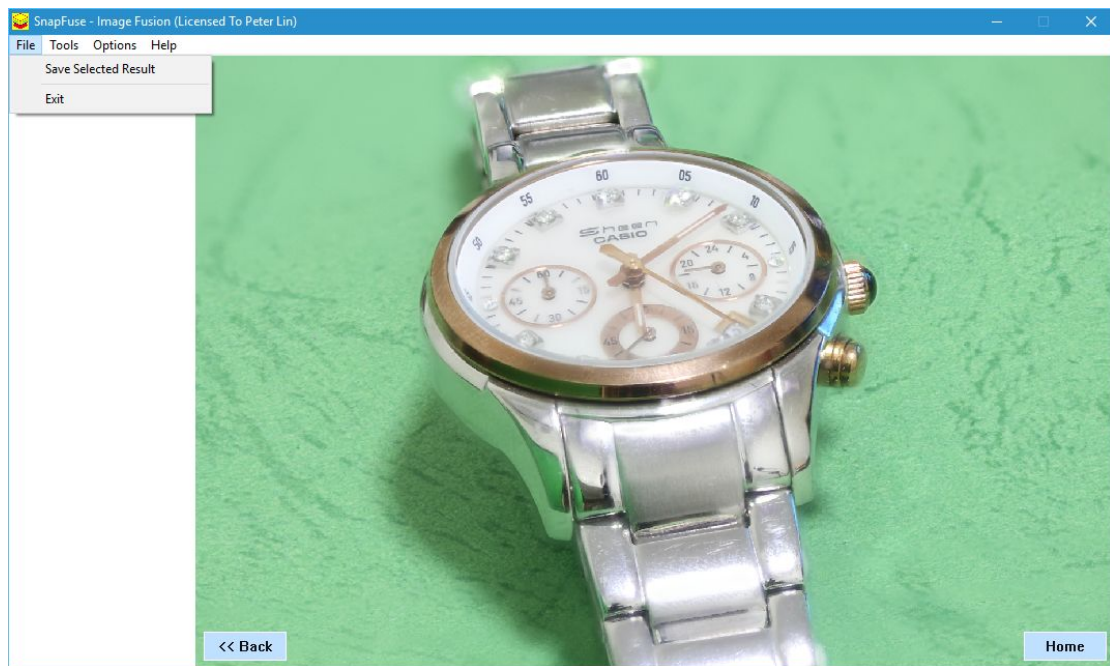
Result View

MENU

There are four top level menus, namely, **File**, **Tools**, **Options**, and **Help**.

File Menu -- there are only two sub-menus under this menu, namely "**Save Selected Result**" and "**Exit**".

"**Save Selected Result**" sub menu will appear disabled for all views except "Result View" where if an resultant entry is highlighted (thus selected), choosing this menu item will save that resultant image to the same folder as image collection with date, time, and parameters as file name and in TIFF format (All output are ONLY in TIFF format).

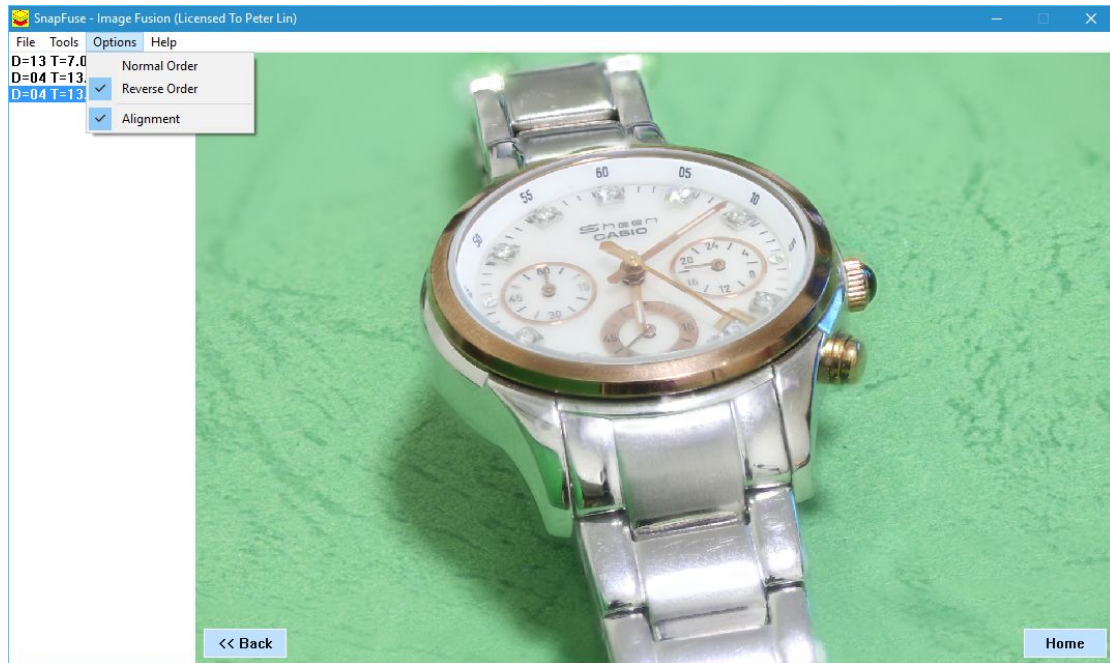"**Exit**" sub menu will exit out the application

File Menu

Tools Menu -- there is only one item under this menu -- MJKZZ Rail. Currently (2016-1-21), this menu item does not do anything yet.

Options Menu -- this menu has three sub menus, namely, "**Normal Order**", "**Reverse Order**", and "**Alignment**". These three options that control one aspect of blending process. When an menu item is selected, a check mark will appear.

"**Normal Order**" and "**Reverse Order**" sub menus are mutually exclusive menu items, selecting one will deselect the other. These two control how images are aligned as discuessed above.

"**Alignment**" sub menu control is alignment process is performed. For example, for some exposure fusion images, all images are captured on a steady tripod and the only change in images are exposure level, image shifts, rotation, shear are kept minimal. In this case, it is not necessary to align images, and in this case this "**Alignment**" sub menu should be unchecked (no check mark on it). For focus stacking, this is almost a necessity because changing focus can result in subject size change in images as well as shifts, rotation, and shear due to mechanical cause (on rail) or for hand held exposure fusion images.

Option Menu

Help Menu -- this menu has three sub menus, they are "**Language**", "**Register**", and "**About . . .**".
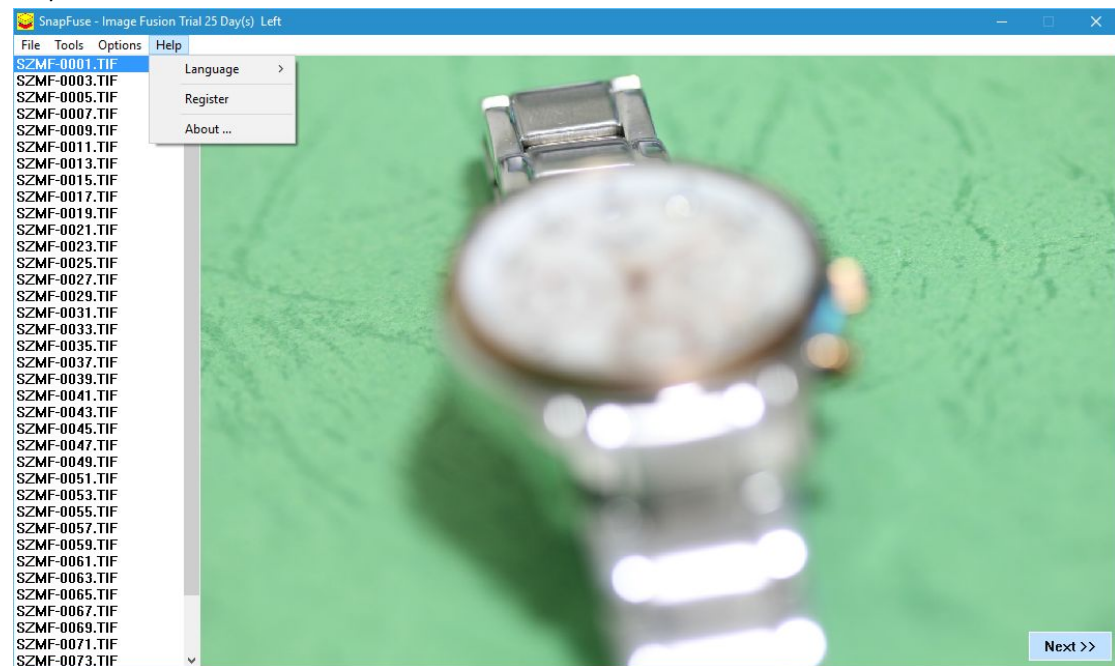
"**Language**" sub menu allows a different language to be selected if supported. SnapFuse has multi-language support and can be customized by user (however, it is better to get translation to MJKZZ to be approved and shipped for future release).

Multiple language support can be performed by user by editing XML file in the folder where SnapFuse is installed (such as "C:\Program Files\PYLIN\SnapFuse\"). Only menu items, button labels can be customized. On the other hand, error messages and application title can not.

"**Register**" sub menu will only appear if SnapFuse running is NOT licensed. Choosing this sub menu will prompt user with a file dialog box where a license file can be selected to register. This sub menu will disappear when a license file is successfully registered.

"**About ...**" sub menu will pop up a "About" dialog box.

Help Menu

Frequently Asked Questions

Q: How long can I use trial version?
A: 30 days

Q: What happens if trial period expires?
A: The output image size will be reduced to 768 for the longest side. For example, if image size is 6000x4000, the output image size will be 768x512. If image size is 4000x6000, the output size will be 512x768. There will be NO water mark on reduced resultant image.

Q: Do all images have to be the same size?
A: Yes, all images must be of same size.

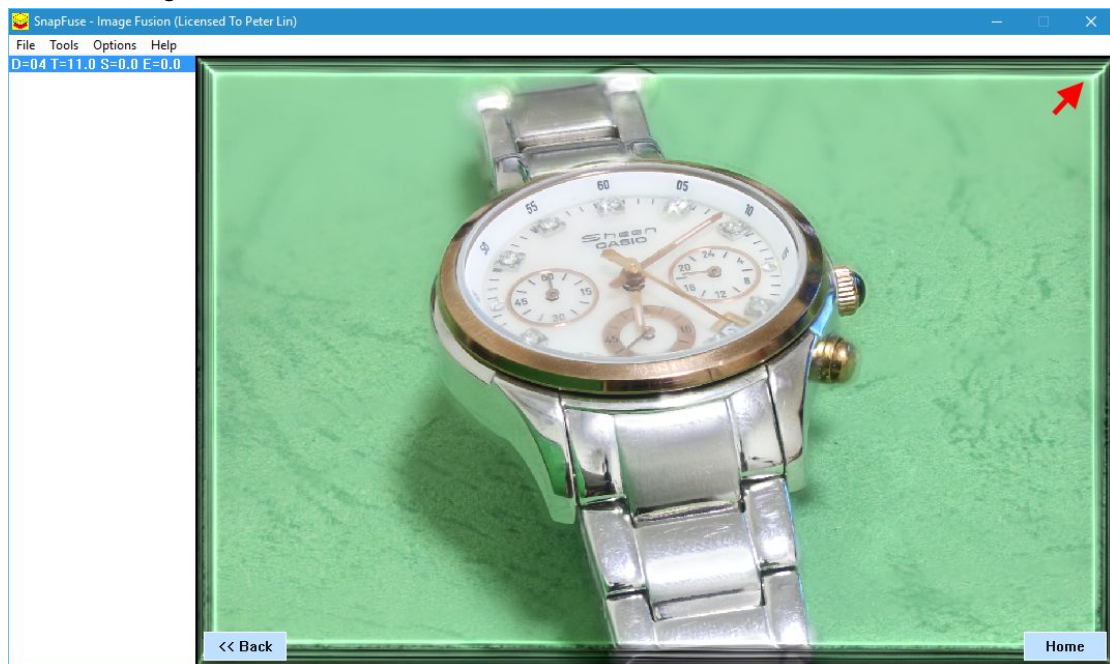**Q:** Do all images have to be in same format? Such as JPG or TIFF
A: No, but they must be of same size.

Q: Does it matter for all images to be in the same sequence as they are captured for focus stacking?
A: Theoretically, no, but in practice, yes. So please pay special attention to this problem when camera file naming wraps around certain number. For example, when image file number reaches 9999 and the next number will be 0000, this will cause some undesired effects on final image.

Q: Why do I get edges around final image like shown below?

Resultant Image With Border Around It

A: This is caused by the subject in the first image (thus the reference image) is smaller than the rest of images. This happens often when capturing a sequence of images for focus stacking -- as subject and camera get closer and closer, the size of subject will get bigger and bigger. Because all images will be aligned and sized against the reference image, other images will be shrank to the same size as the reference image, causing some black border around them. When stacked like that, these black border will appear as shown in the picture. Revering process order will fix this problem if not desired.

Q: Why do I get a black final image when I specify a non-zero Exposure parameter value for focus stacking?
A: For most focus stacking image captures, images might appear not very well exposed, particularly around out of focus areas. When Exposure parameter is not zero, SnapFuse will take "well exposed" into consideration and tend to reject those pixel that is not well exposed and if all pixels at same location in the images collection are considered as not "well exposed", it will result a black pixel. So, for focus stacking, it is important to leave Exposure parameter as zero. This could also happen if all images are not well exposed for Exposure Fusion.

Q: Why do I get "System error due to not enough memory,   disk space, etc" error message ? I only have three images to process?
A: Image fusion process requires a lot of RAM memory for each individual image. So even though there are only three images, processing one of them might exceed

amount of RAM available in the system and therefore the error message. This happens often when running 32bits version of SnapFuse because 32bit application can only access up to 4GB of RAM (and only about 2.4GB are available for SnapFuse), this is true even if OS is 64bits. For 64bits OS, it is better to run 64bit version of SnapFuse.

Q: What is the limit of number of images?
A: It is the image size that can cause out of memory error, not number of images. So you can have as many images as there are, as long as image size does not exceed the limit by memory requirement.

Q: What image size can SnapFuse handle?
A: Image size is limited by amount of accessible RAM available. For 64bits OS with 8GB of RAM, SnapFuse will trade image size with processing speed -- for large images, SnapFuse will simply slow down by limiting number of parallel processing. On a system running 64bit OS with 16GB or more RAM, SnapFuse will take full advantage of that.