

Project One

Image movement correction and SNR maximum

For the Jupiter video taken with an amateur telescope, the Jupiter images are moving from time to time, because of the Earth Rotation. To correct this image motion, you are required to write a LabVIEW code to generate a new video file, in which the video motion is corrected, so that images are locked on a specific position around the center of the image window (for example, if your image size is 1000x1000 pixel, all frame images should be moved to the (500, 500) position), in the new video you created.

Also, based on the movement corrected images, you are required to generate a master image that is the sum of all movement corrected images, so that the master image delivers a good Signal to Noise Ratio (SNR).

Two files will save on the disk: a movement corrected video file, and a master image file.

For this project, you need to use the LabVIEW “Pattern Match” function.

Hint:

You can use the previous video playing example code and modify it for this assignment.

You need to select the Jupiter as the image template, and then do the pattern match to find the x and y coordinate for each frame image, and then move each image from its (x, y) position to the center window position, such as the (500,500), so that you can correct the image motion for each frame image.

You need use:

- 1) “IMAQ Shift” function (image shift function);
- 2) “IMAQ Add” function (add two images each time), to generate a master image. Since each time you can only add 2 images, to avoid image saturation, you need to divide the intensity/signal by 2 for the 2 added images, which can be done by using the “IMAQ Divide” function. To add 2 images in a “for loop”, you need to use the “shift register” in the for loop;
- 3) finally, you need save all these corrected frame images as a new video, and a new master image.