



Stabilizing a Shaking or Vibrating Video with ProAnalyst®

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Abstract

Camera shake, vibrating objects, and tracking the relative motion of two or more objects are common problems faced by many image analysis professionals. The ProAnalyst Image Stabilization toolkit solves these problems by providing the means to stabilize shaking or vibrating video images, or simulating video acquisition by a moving or stationary camera. This process is accomplished by locating and tracking video features that should maintain a stationary position. The shift and rotation necessary to maintain the features in a fixed position can then be computed, allowing stabilization to be performed for any combination of unwanted horizontal, vertical, or rotational motion.

Files Needed for This Tutorial

Click [here](#) to download these files.

- *stabilization.mpj*
- *lowrpm.avi*
- *lowrpm.clb*
- *lowrpm.lut*
- *lowrpm.stb*
- *lowrpmStab.avi*

The ProAnalyst Image Stabilization Toolkit

Many of the features of the Image Stabilization toolkit are based on the same underlying concepts as the 2-D Feature Tracking toolkit. Stabilization requires the definition of a number of high-contrast regions within an image which are then tracked from frame to frame over the course of the video sequence. As with 2-D Tracking, you may define and set regions based on distinct features within an image. The Image Stabilization toolkit also includes a prototype feature extraction tool, the purpose of which is to automatically locate high-contrast regions within the image and define them at its discretion.

Processing the Image for Feature Tracking

Image processing allows you to simplify your image, compensate for poor lighting conditions, and/or improve image contrast for better tracking results. In the following example, you will manipulate the image to provide high contrast for tracking and stabilization. Image processing does not modify the original image; the original can be viewed by clicking the “Raw” tab on the left side of the Measurement window.

Note: For more information about Image Processing, refer to the ProAnalyst User Guide.

1. In ProAnalyst, click on **File > Open Project** and select the *stabilization.mpj* project that you downloaded.
2. Double-click on the *lowrpm.avi* thumbnail to launch the Measurement window.

*Note: The second video in the project, *lowrpmStab.avi*, is an example of a stabilized video provided for reference. During this tutorial, you will produce another stabilized video, *lowrpm_stab.avi*.*

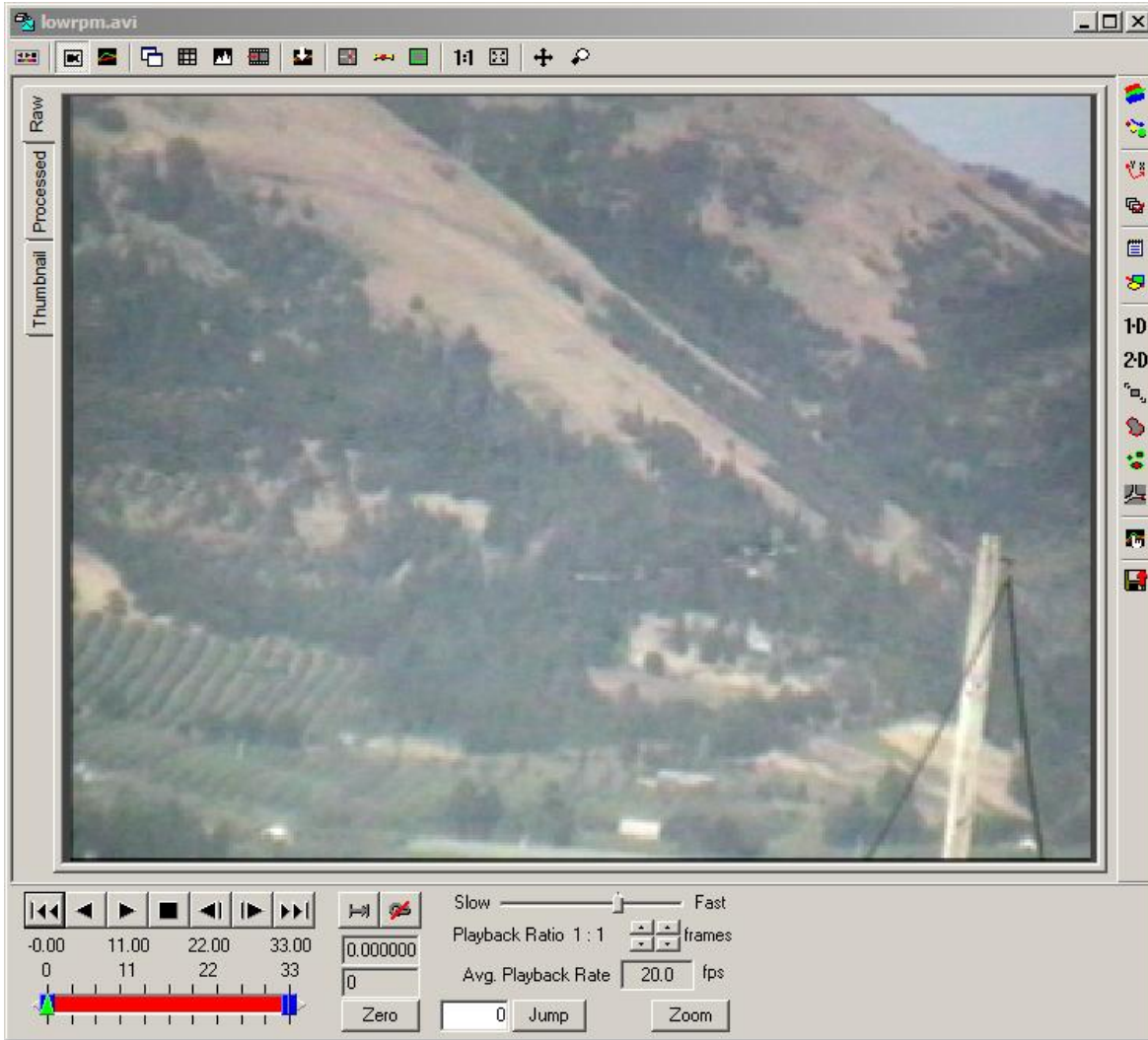



Figure 1. Measurement window

3. Click the **Image Processing**  button on the right side of the window to open the Image Processing control panel.
4. Click the **Display B&W** button.

5. Adjust the **B&W Image Settings** sliders (shown circled in Figure 2) until several features within the image become clearly defined.

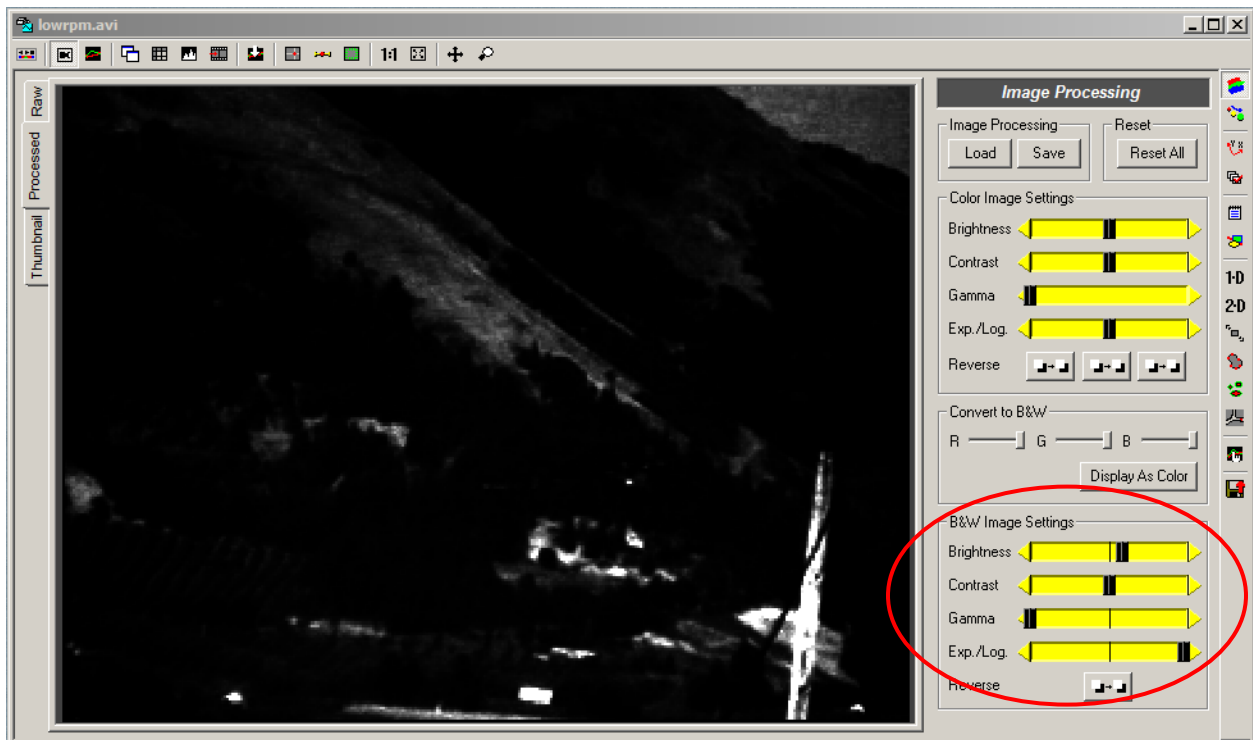



Figure 2. Image adjusted to improve contrast

Stabilizing the Video Sequence

1. Click the **Stabilization**  button on the right side of the Measurement window to open the Image Stabilization control panel.

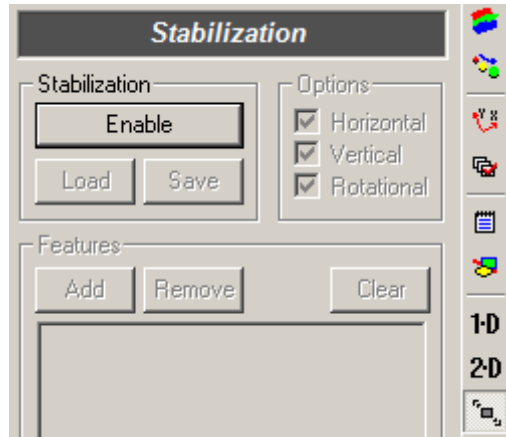


Figure 3. Stabilization Control Panel

2. Click the **Enable** button to activate the control panel. Note that a “Stabilized” tab has been added to the video view tabs on the left. The stabilized video will be available for viewing under this tab after the stabilization procedure has been completed.
3. Add, define, and set three features corresponding to three visually contrasting regions of the image, as shown in Figure 4.

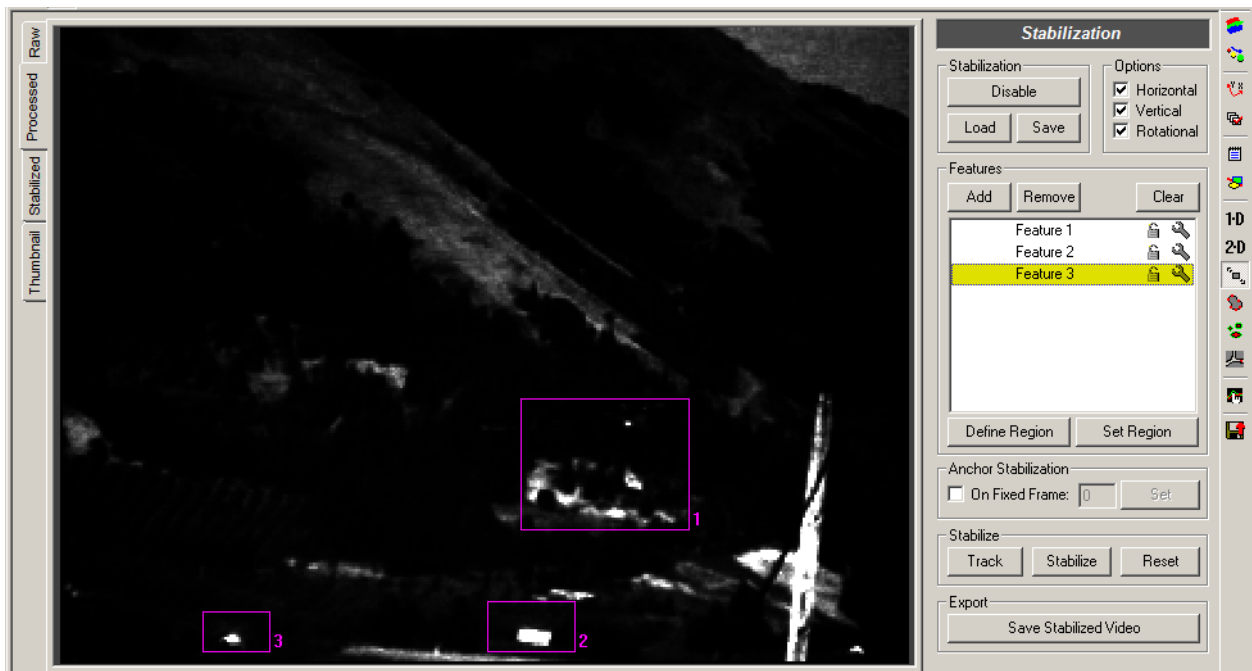



Figure 4. Regions defined for tracking

4. Click the wrench  icon next to Feature 1 in the list to open the Stabilization Feature 1 Track Settings window, shown in Figure 5.
5. Set the **Search Region Multiplier** field to **700**. We set this to a large value because the targets move around in very large steps.
6. Click on the **Apply Settings to All Features** checkbox.
7. Click the **Apply** button followed by the **Close** button.

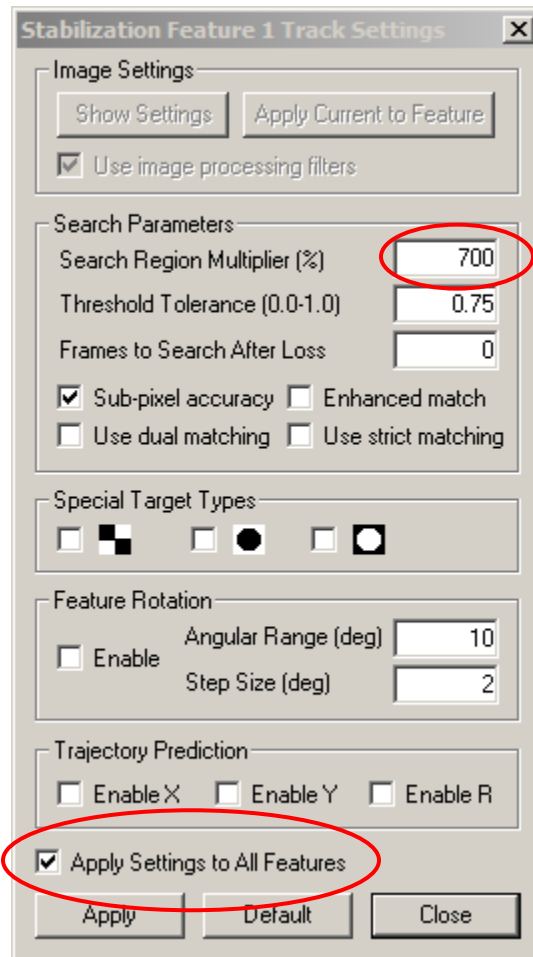


Figure 5. Stabilization Feature 1 Track Settings window

8. Click the **Track** button. If any of your features are lost during tracking, you may redefine them in the frame where they were last properly tracked. Click **Track** again to repeat the process.

9. When feature tracking has been completed successfully, click the **Stabilize** button. The Measurement Window will automatically switch to the “Stabilized” view as shown in Figure 6.

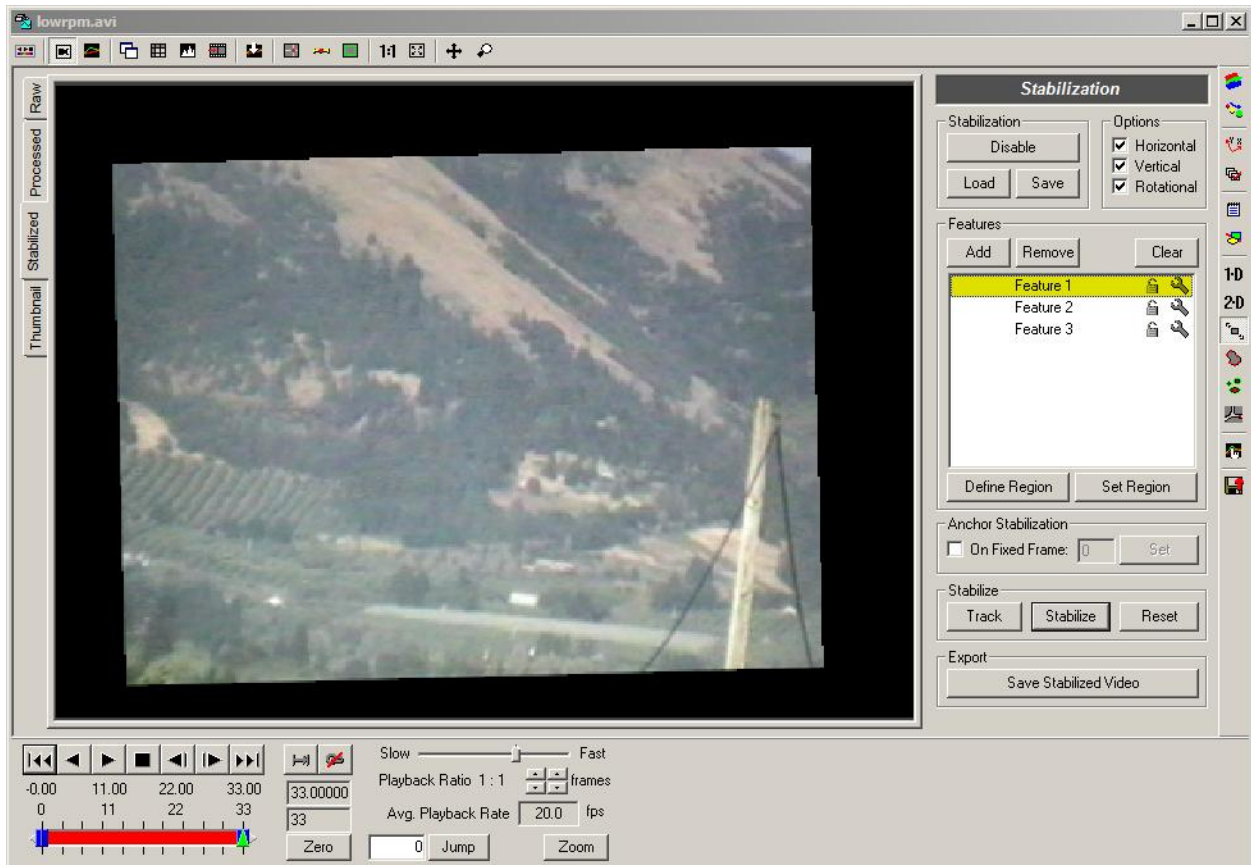




Figure 6. Measurement window, stabilized view

10. Press the **Rewind**  button in the play controls at the bottom of the Measurement window to return to the beginning of the video. Press the **Play**  button to view the stabilized version of your video. You will notice that each stabilized frame will be drawn over the top of the previous frames as shown in Figure 7.

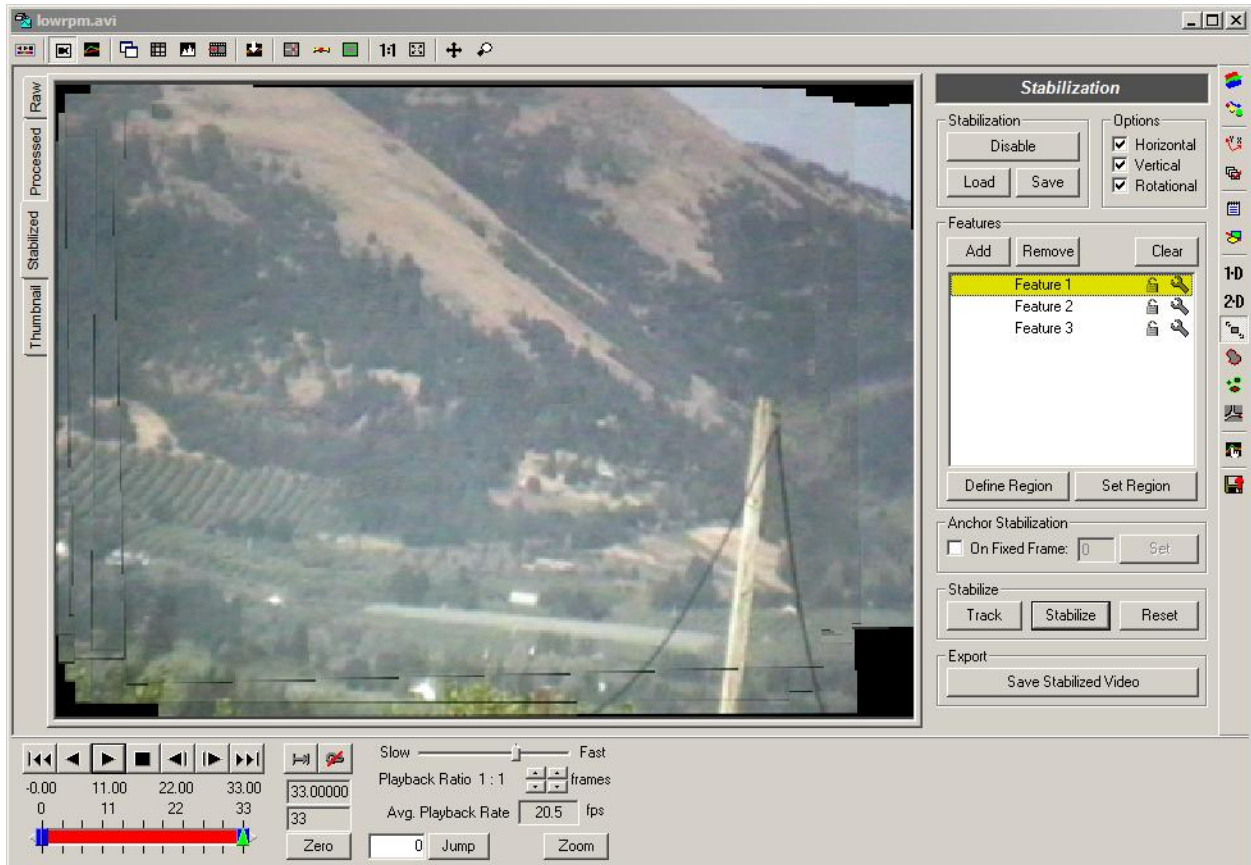


Figure 7. Stabilized video showing multiple frames

Saving the Stabilized Video

Before performing any analysis on the stabilized video, it must first be saved as a new file. You can then add the stabilized video to a new or existing project and continue with your analysis on the stabilized video instead of the original.

1. Click the **Save Stabilized Video** button to open the Save Video dialog box, shown in Figure 8. The default file name will be the name of your video with the suffix “_stab” appended to it. This is not mandatory and may be changed at your discretion.

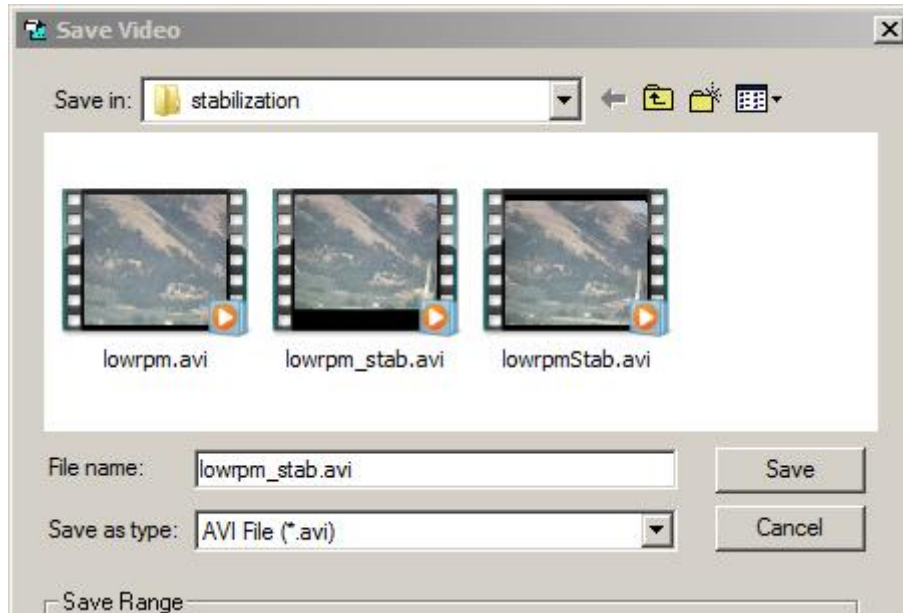


Figure 8. Save Video dialog box

2. After setting any desired save parameters, click the **Save** button to save your video file. The Video Compression window appears, as shown in Figure 9.

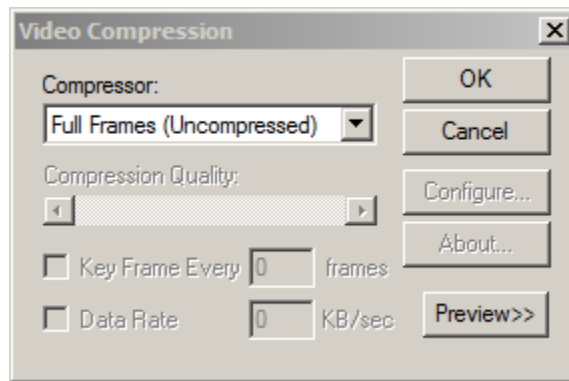


Figure 9. Video Compression window

3. Leave the Compressor selection at Full Frames (Uncompressed) and click **OK**. The stabilized video is saved and displayed on your screen.

Using the Feature Tracking Toolkit for Stabilization

The Feature Tracking (2-D) toolkit can also be used to track objects for use by the Image Stabilization toolkit. Feature Tracking has advanced tracking and interpolation capabilities that are not available with Image Stabilization. Objects can be tracked using the Feature Tracking toolkit and then saved to a feature tracking (.ftk) file. This .ftk file can then be loaded into the Image Stabilization toolkit using the **Load** button.

More Information

Congratulations! You have now completed the tutorial and learned how to use Image Processing to improve contrast and feature tracking. You have also learned how to use the Image Stabilization toolkit to create a new, stabilized version of a video, eliminating unwanted camera motion.

A complete tracked project file is available with this tutorial for reference. Open *stabilization.mpj* in ProAnalyst to view it. For more information on image processing and stabilization, refer to the *ProAnalyst User Guide*.

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