

LABVIEW CAMERA USER VIRTUAL INTERFACE

Order of Operations:

1. Set exposure time
2. Press 'run' on LabVIEW
3. Press 'open' to open up the camera. While the camera is open, the 'Camera Status' button will light up.
4. For sequence acquisition:
 - a. Select 'Frames to Capture'
 - b. Select a 'Path' via the file widget. You should see the file path also appear in 'SavingPath' below after doing so. *If the file path is not also listed in 'SavingPath', the file will not save properly.*
 - c. Press 'Sequence Start' such that the camera starts to sequence. The green light called 'Capturing' will also light up for this time.
 - d. Once the 'Capturing' light is no longer lit, the sequence has finished capturing. Then press 'Sequence Save' to save the sequence to the desired file path. The 'Saving' button will also light up for a moment until the file is saved. The file will save as a single TIFF (with multiple frames) to the desired file location.
5. For live acquisition:
 - a. Change 'Scan Mode', 'Scan Width', 'Scan Direction', 'Trigger In', and 'Trigger Out' as desired.
 - b. Press 'Live Start' to start live imaging. When the camera is live imaging, the 'Live' button will light up.
 - c. Parameters cannot be changed while live imaging. If a parameter needs to be changed, press 'Live Stop' and then change the parameter. Then press 'Live Start' again to continue imaging.
6. To change the ROI:
 - a. Note that the ROI cannot be changed while live imaging. Press 'Live Stop' if live imaging to change ROI.
 - b. Right click on the image and press 'Add ROI'
 - c. 'Get ROI' then tells you the exact dimensions of the ROI you created on the image. If these values are not to satisfaction, they can be manually changed on the interface.
 - d. Press 'Live Start' then to update the ROI.
 - e. 'Full Sensor' resets the ROI to the entire image (3200 x 3200). Again, live imaging cannot be open while changing this parameter.
7. The user should be able to go back and forth between live imaging and sequence acquisition as desired.
8. Once done imaging, press the 'Close' button to turn off the camera and exit the program. *Do not press the red LabVIEW circular button – this will not properly close the camera.*

Organization of the Back-End:

Most of the widgets for the interface are listed at the top. The entire code however lies in a stacked sequence structure. By pressing different widgets on the front-end, an event is called on the back-end within the sequence structure. Thus, most events are fairly modular and independent of one another.

Future Corrections to the VI:

- The ability to manually adjust image brightness and contrast should be implemented
- LabVIEW is extremely fickle with opening and closing the camera. A closer look at the closing mechanism may be useful for correcting this.
- There are a few errors with parameter initialization. For example:
 - Exposure cannot be dynamically adjusted on run-time. This should be an easy fix (by adding a new frame to the stacked sequence structure to update exposure).
 - The file path for sequence acquisition cannot be set before the camera is opened. This should also be a fairly easy fix (but involves some knowledge of the data structures interaction between paths and strings)
- Most other errors are with initializing parameters in the incorrect order. Warning messages should be implemented so that parameters cannot be selected out of order. For example:
 - As of now, if one tries to save a file without first selecting a file path, an error arises and all of LabVIEW must be closed and then reopened. There should be a warning such that a sequence acquisition cannot be taken until after text is written in the file path.
- It's unfortunate that the VI requires both a 'Sequence Start' and 'Sequence Save'. This is because the 'Sequence Start' code doesn't know when it is done executing (and thus cannot trigger any saving afterward). However, this should be fixable: the 'Sequence Save' code can be triggered when the 'Capturing' light turns off.
- As of now, the 'Capturing' light does not work perfectly: it also turns on when live imaging is used. The 'Capturing' light is controlled by a sub-VI. The best way to fix this problem is by finding a way to turn off the 'Capturing' light after the 'Sequence Save' has been triggered (i.e., at the end of the 'Sequence Save' flat sequence structure, which is within the stacked sequence structure)