Instruction for Setting Up SequenceTable

Basic information

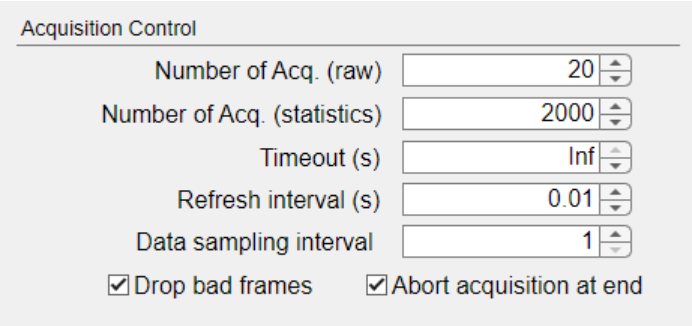
The acquisition and analysis pipeline are mostly defined as a *SequenceTable*.

An example of the table:

Order	Camera	Label	Type	Note
1	Zelux	Lattice	Start+Acquire	
2	Zelux	DMD	Start+Acquire	
3	Zelux	Lattice	Analysis	CalibLatR
4	Zelux	DMD	Analysis	FitCenter
5	Andor19330	Image	Start	
6	Andor19331	Image	Start	
7	Andor19330	Image	Acquire	
8	Andor19331	Image	Acquire	
9	Andor19330	Image	Analysis	FitCenter, CalibLatR
10	Andor19331	Image	Analysis	FitCenter, CalibLatO
11	--inactive--		Analysis	
12	--inactive--		Analysis	

Additional to the SeuqenceTable, there are a few parameters to control the acquisition behaviors.

An example of the parameters:



Configure SequenceTable

A *step* is a single row in the SequenceTable. To define a step, one need to specify 4 varaibles:

- **Camera:** categorical variable, the camera/projector/picomotor driver to use for this step, can be selected from cameras {Andor19330, Andor19331, Zelux}, projectors {DMD} or picomotor driver {Picomotor}
- **Label:** text string, the label of the image, to distinguish two images taken by the same device
    - Format is '<name>_<wavelength>', where name cannot be blank string "". If not specified, wavelength is assumed to be 852 (nm). Example is 'Image', 'Pattern_532', 'Lattice_935'
- **Type:** categorical variable, can be set to {Start, Start+Acquire, Acquire, Analysis, Project, Move}
- **Note:** text, input parameters for the step separated by semicolon where leaving empty means default settings

To define **Type**:

- Start mode starts the acquisition
    - It either triggers the camera internally, or set the camera to be ready for external trigger
- Acquire mode consists of two processes: acquisition and preprocess
    - In acquisition, it acquires a raw image from specified camera with specified label
    - Immediately after acquisition it pre-processes the raw image
- Start+Acquire mode does both Start and Acquire
- Analysis mode performs a series of analysis processes defined by the **Note**
- Project mode only works for projectors to project patterns
- Move mode only works for Picomotor to move the piezo actuators

Note specifies the parameters for the step, which will be different depending on the **Type:**

- Start, the note parameters control the behavior of starting acquisition.
    - Available parameters are defined in class Camera.startAcqusition under /core/camera/Camera.m
- Acquire/Start+Acquire, because it consists of more than one process, the parameters require an identifier to specify which process they are controlling followed by the control parameters
    - For "Acquire", available identifiers are {Acquire, Preprocess}
        - "Acquire", available parameters are defined in class Camera.acquire under /core/camera/Camera.m
        - "Preprocess", available parameters are defined in class Preprocessor.process under /core/preprocess/Preprocessor.m
    - For Start+Acquire, available identifiers are {Start, Acquire, Preprocess}
    - Format is "<identifier>; <parameter1=?>; <parameter2=?>, …; <identifier>; <parameter=?>"
    - Example: "Start; verbose=1; Acquire; min_wait=1; Preprocess; verbose=1"
- Analysis, the parameters need to specify which analysis process to make as identifier followed by the parameters of the specific analysis. Parameters are defined in class AnalysisRegistry under /core/analysis/AnalysisRegistry.m
- Project, the parameters control the projected pattern
- Move, the parameters control the position of piezo actuator

Configure Acquisition Parameters

- **Number of Acq. (raw):** control the storage space for raw images, the raw images generated following this number of full sequence run will be kept in memory.
- **Number of Acq. (statistics)**: control the storage space for analysis results.Because the analysis usually gives only a few numbers, this number can be much larger than "Number of Acq. (raw)" while still taking much smaller storage space.
- **Camera timeout (seconds)**: control the default maximum wait time for acquiring a single image from any camera. If wait time exceeds the max but there is still no new image available, the program will throw a warning and return an empty image.
- **Refresh interval (seconds)**: control the default refresh interval for acquiring a single image from any camera. The camera will check if a new image is available this interval and return the acquired image when it sees the new data.
- **Data sampling interval**: integer, control the saving interval of data acquisition. The app will save the data every this interval. When set to 1, it saves all the data.