The video manual can be found at

https://www.youtube.com/watch?v=8fOYwzjwIAc

In this video we demonstrate eeDAP in microRT mode. This includes the registration steps needed at the beginning. The video shows an example set of generic tasks. The text displayed is generic and can be customized in the input file. New tasks can be created by starting with these generic tasks with a little bit of Matlab programming. The text below is a little different from the video for clarity and to provide more information. The pathologist should be making the evaluations with the microscope not the WSI image.

eeDAP (source and pre-compiled, license-free executable) can be found at <https://github.com/DIDSR/eeDAP/releases>

# Script

0:00 eeDAP microRT mode lets users to evaluate glass slides on the microscope in real-time. Users will register the glass slide to the digital WSI image before running the test. This allows the same locations to be viewed on the microscope and the WSI.

0:17 First open eeDAP and select an input file. (An input file must be created ahead of time. In digital mode it specifies the images in the study, the ROIs, and tasks.) Next you will need to extract the ROIs from the WSI. (The ROIs are pre-extracted to speed up eeDAP).

0:34 After extracting the ROIs select microRT mode and, if necessary, continue to the serial port configuration and select the correct port.

0:47 Then click start the test and the camera preview window will open and the stage will move to the origin (0,0).

0:56 Then the registration window will open with the WSI image will in it. Arrange the camera preview window and the registration window so that you can see both.

1:20 Before beginning low-resolution registration, you should open the input file and check the magnification specified for low-resolution registration. Set the microscope objective to this magnification.

2:07 First you will need to navigate the microscope to a location with a unique feature. After you find a unique feature, focus the microscope and click on the “Take Stage Position 1” button. eeDAP will record the stage position and take a snapshot of the microscope view.

2:30 Next, looking at the WSI image, click on the same unique location. Then click “Take WSI location 1”. This saves the WSI location and creates boxes showing the corresponding patch that will be used for registration. eeDAP then registers the camera image with the WSI patch. If both images that appear show a good registration, click on the button that says “Registration is good”. If not, repeat this process. You may close the registration result showing the pair of images or leave them.

2:56 Repeat these few steps again for two more unique locations. They should be spread out as far as possible in the image.

3:25 After completing low-resolution registration, click on “Load Last Calibration”. This will begin high-resolution registration, which is very similar to low-resolution registration.

3:35 A zoomed out image of the first registration location will now be shown in the registration window.

3:40 Go to the input file and check the magnification specified for high resolution registration. Set the microscope objective to this magnification.

4:01 Click on go to stage position 1, the stage will automatically move to the previously recorded stage location 1.

4:12 Focus, and navigate the microscope to the location of a unique feature. Then click take stage position.

4:31 Click on the same unique location on the WSI, and click on take WSI position one. Check if the registration is good.

4:48 Repeat these couple of steps two more times with two other locations with unique features.

5:23 Camera and eyepiece registration: identify a unique feature in the current field of view (camera image or microscope).

5:35 Looking through the microscope find a very small unique feature navigate the microscope so that the reticle points to the feature as precisely as possible. Then click on the button “feature centered in eyepiece”.

6:02 Then looking at the camera image navigate the microscope so that the reticle gridlines in the camera image points to the feature as precisely as possible. Then click on the button “feature centered in camera”.

6:35 These tasks demonstrate using eeDAP in microRT mode. The pathologist should be making the evaluations with the microscope not the WSI image. Type in your reader ID or name and click next. The stage will move by itself to the first ROI for data collection. When it arrives at the ROI, eeDAP does a fast registration. This will be poor if the microscope is not in focus.

7:03 Focus the microscope and compare the camera image with the WSI patch in the data collection GUI. Make sure the registration is good. The reticle grid will help with this registration confirmation.

7:11 If registration is poor, then click one of the buttons: “Fast Register or “Best register” to fix. You may also need to click the reset button if the registration failed miserably.

7:27 For the slider task, on a scale from 0 to 100, rate the tissue according to the question using the slider or typing in a number.

8:08 For the selecting region task, click on the WSI image to select the location that best answers the question provided. The location selection will be circled in red.

8:55 For the radio one of four task, select the button that best answers the question provided.

9:30 Here is another example of a selecting region task. Users are to select location that best answers the question provided.

10:11 Here is an example of a counting task. Enter the number of cells that best answer the question provided. You can hide or show the reticles at any time.

10:33 At this point the user has completed the study in microRT mode.