3 Patient Studies can be found at the following links:
Yoran, James, HCM

Section A

1. Download the three patient studies, place in a directory called sample_dicoms.
2. Write a python script/function to open all the dicom files contained in sample_dicoms, by giving only the sample_dicoms pathname as the input.
3. Save the Region 0 image to a png file, if the Region 0 is a video save the first frame of video to a png file.
4. Write multiprocessor version that uses 4 workers, and repeat steps 1) and 2)
5. Provide an execution time comparison for the multiprocessor version versus single processor, plotted as a bar chart, and saved as png.
6. Provide the source code used, and Region 0 pngs, and execution time comparison, and state any imported modules you used.

Section B

In this section you are required to provide a descriptive explanation of how you tackle the following problems, but you will get bonus marks for any source code provided.

1. How would you design and train a CNN to carry out automatic segmentation as shown in figure
   1) Discuss the steps involved, and proposed architecture if
      a. Ground truth annotations are available (supervised learning)
      b. Ground truth annotations are not available (unsupervised learning)
2. Given that in most cases the ultrasound captures a sequence on moving frames, discuss what changes/approaches you would to achieve improved performance for 1a and 1b

Please state all assumptions you make, bonus marks for providing source code for any of the solutions you come up with.

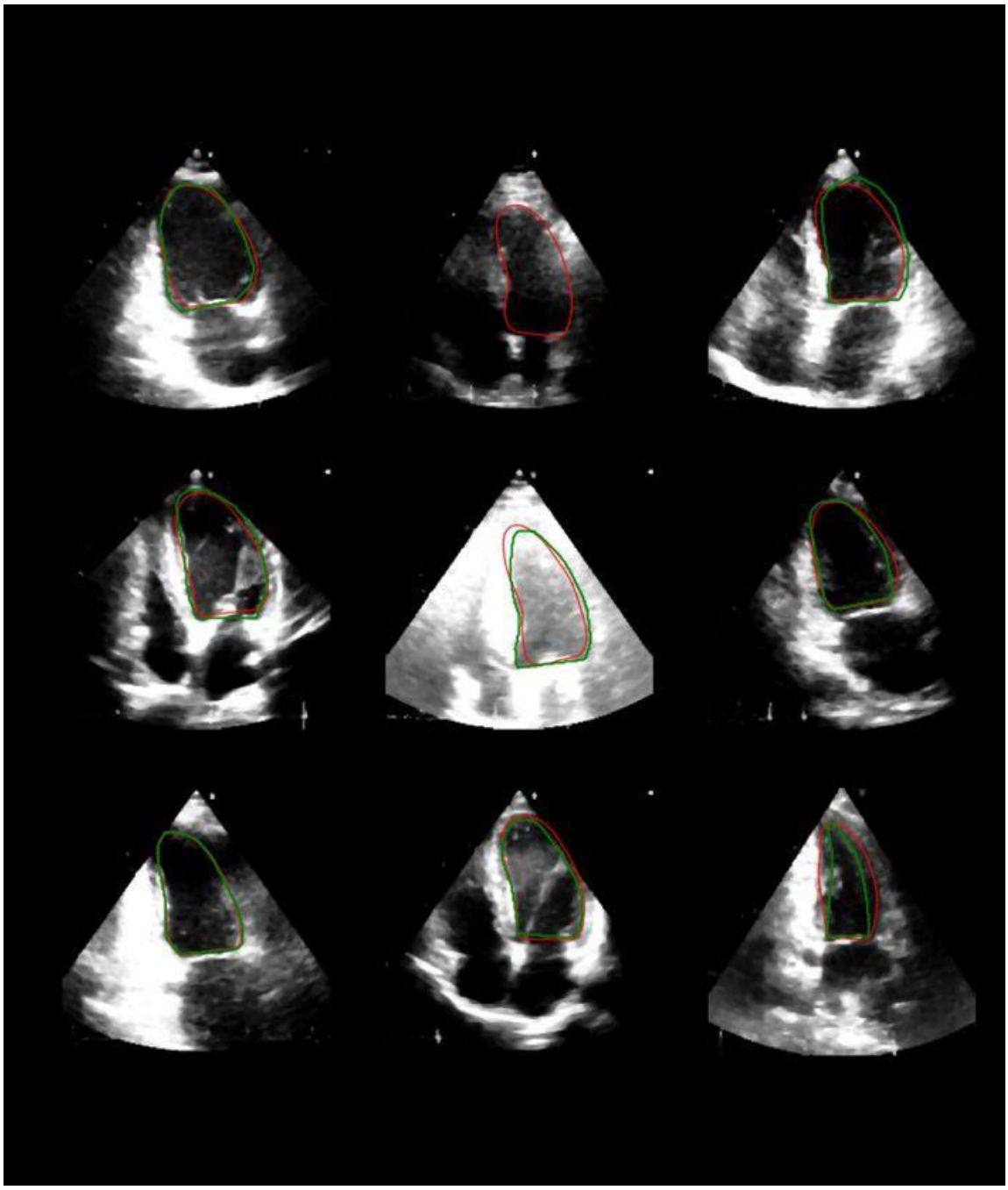

Figure 1) shows a selection of A2C and A4C apical views. The green contour line is the ground truth for the Left Ventricle (LV), and the red line the current segmentation output from the eko.ai segmentation algorithm.