

ELEC4630/7463 Image Processing and Computer Vision

Assignment 2

(Due Date: Thursday, 18th April 2019 at 5:00pm)

1. Use the Hough transform to find the four straight lines of the water feature border in this image and project them back onto the original image. Note that the minarets are tilted out by a few degrees, so they look vertical to the observer and to avoid them crashing into the dome during an earthquake. See if you can estimate the angle of tilt of each tower.

It is also possible to code this using the Radon transform in Matlab, see the tutor. (Image available on Blackboard site). Note there is a Hough Transform function in Matlab, but I would like students also try to implement this transform from first principles and then compare the results.

(5 Marks)



Figure 1 Taj Mahal

2. Design an algorithm to determine the cross-sectional area of the heart in this MRI Image Sequence of a working heart. An example image is given; the other images are on the Blackboard site along with sample segmentations. By examining the cross-sectional area over time, a cardiologist can determine the efficiency of the heart. This is especially important diagnostic information for cardiologists after patients have had heart attacks.

Suggest you examine snakes, morphology and related methods to solve this problem.

See site for book on related work in segmentation.

Sambhunath Biswas and Brian C. Lovell (2007) Bezier and Splines in Image Processing and Machine Vision, Springer

For your report, you should determine area of the heart in each image example, and provide commented code, a description of your methods, and why you chose them. Your algorithm should be able to work on the entire set of images without modification or parameter adjustment. If possible, produce a movie of your segmented image stream and a graph of cross-sectional area versus time.

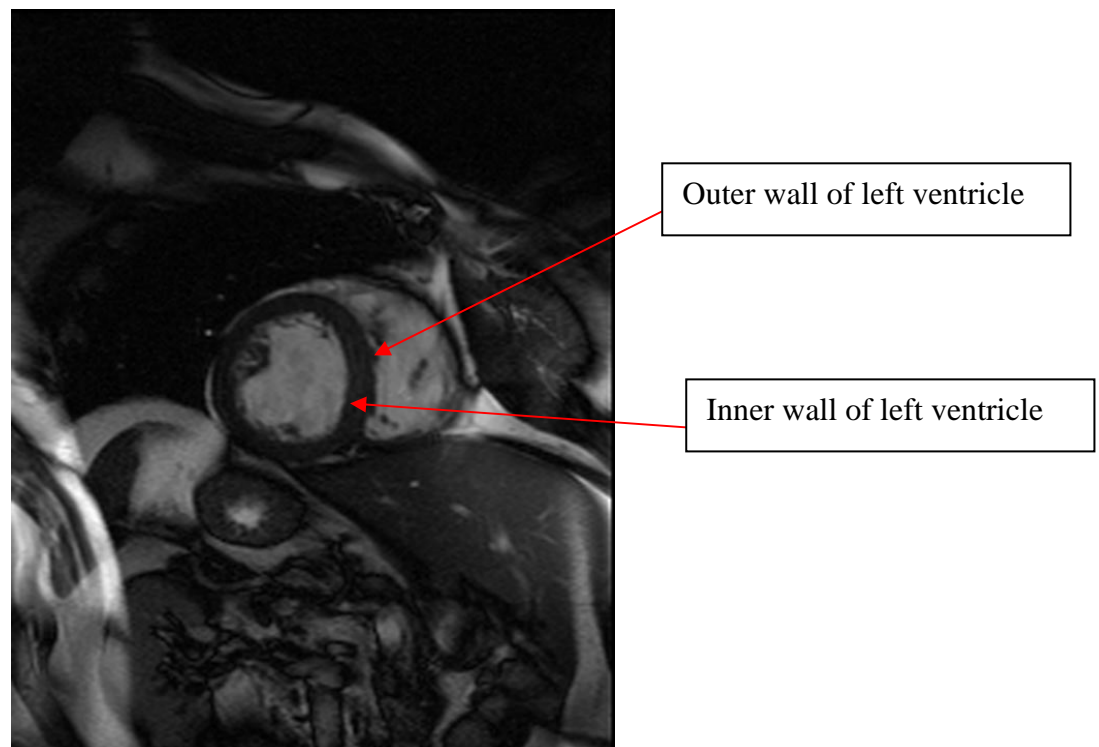


Figure 2 MRI Image of Heart

(15 Marks)

(Total 20 Marks)