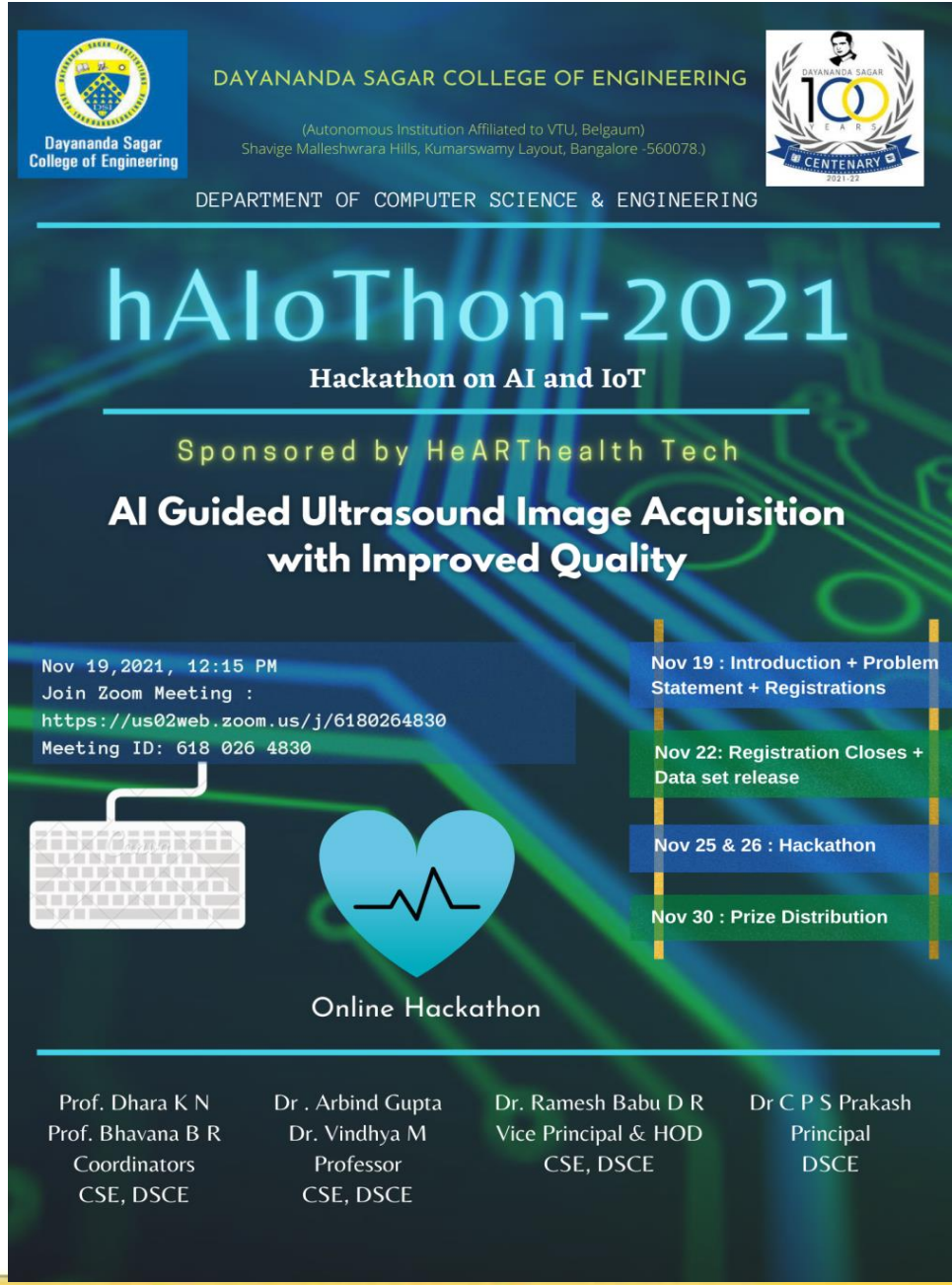
hAIoThon-2021

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

WELCOME YOU ALL

FOR 48 hrs HACKTHON



Team : B

Team Name : OPQUAD

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Problem Statement 1

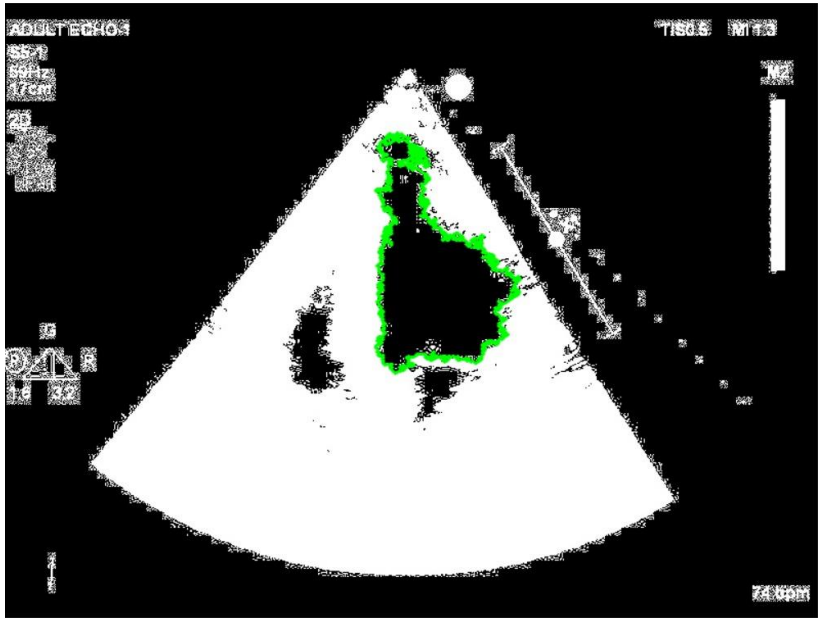
Detection of blood chambers in all frames of an echo video, given the contour of the chamber in the first frame.

- An echo of heart is a video consisting of multiple frames of a beating heart. The video shows one full cycle of a beating heart from diastole (fully expanded) to systole (fully contracted) to diastole again.
- The heart has four chambers but only 2, 3 or 4 chambers may be visible in one video. We want to identify one of the chambers automatically.
- The boundary (contour) of the chamber in the first frame is given. The boundary lies at the point of maximum intensity change (perpendicular to the boundary) around the chamber.
- As the heart expands and contracts, the boundary also should grow and shrink so that points on the contour lie at the point of maximum intensity change. It should also maintain smoothness of the boundary (it should not be zig-zag.
- The problem is to adjust the boundary, given in the first frame, for all subsequent frames in the video by satisfying the criteria given above.
- The expected result is to show the video with the frames superimposed in all the frames.

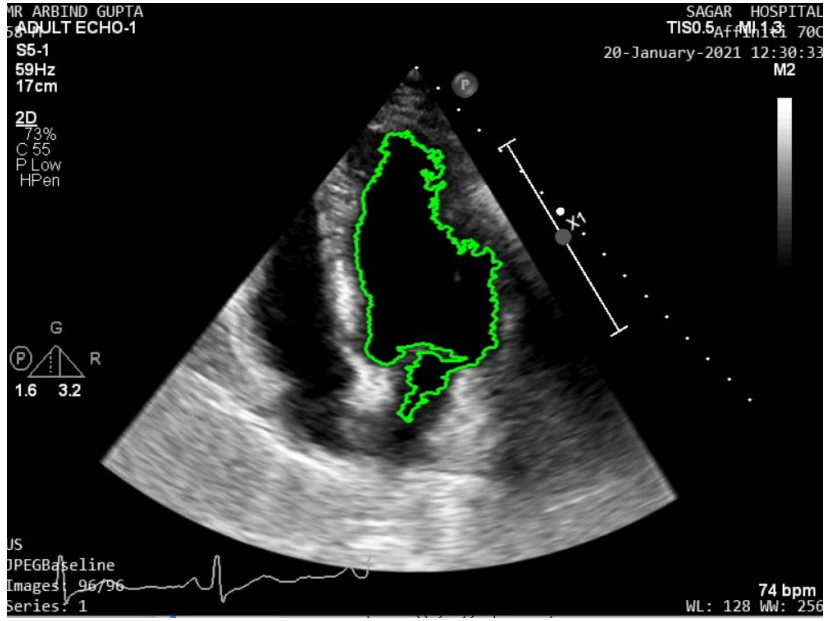
Design: 1. Result with Screenshot

1. **Image processing**
2. **Based on largest Area**
3. **Based on Centroid of the given first frame contour coordinates and largest area**
4. **DeepGaze**

Based on Area:

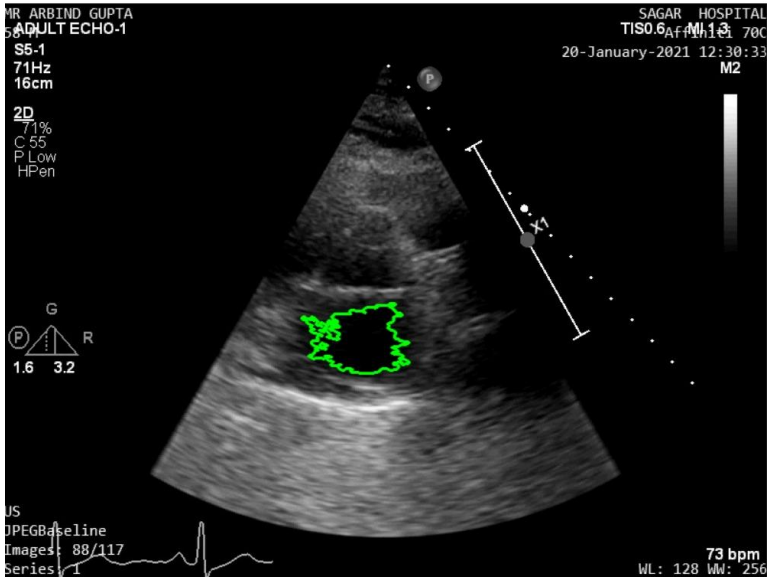


Threshold Image

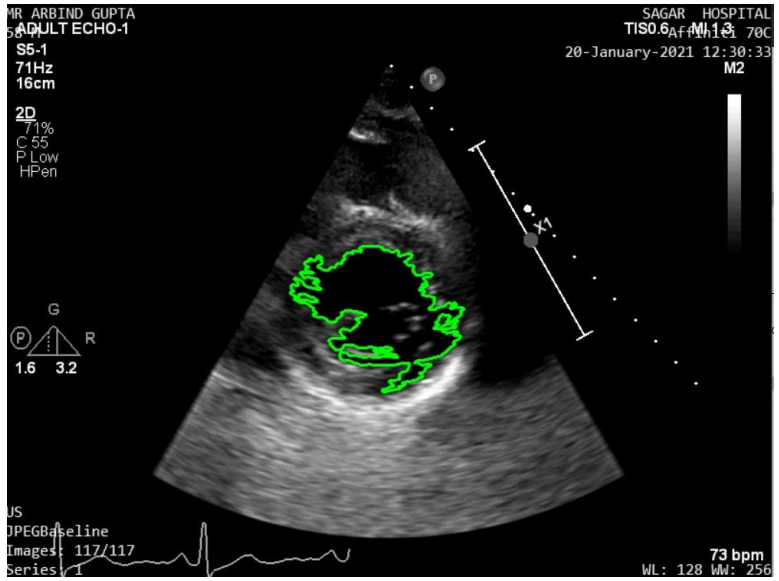


Output Image

Based on Centroid and Area:

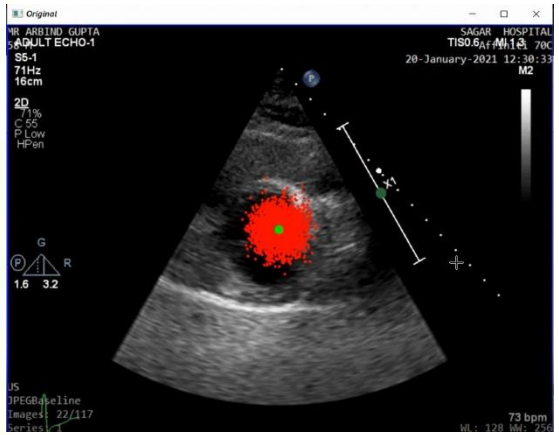


IM_003

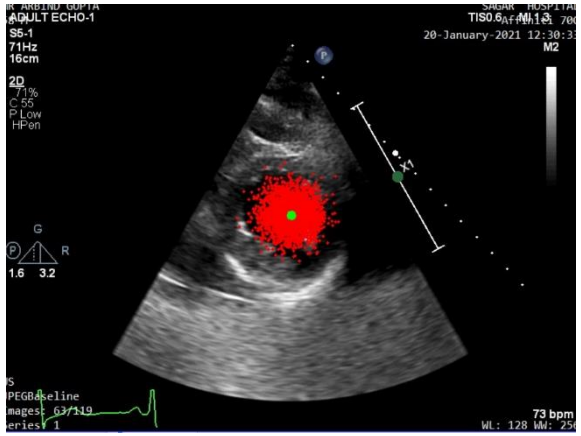


IM_003

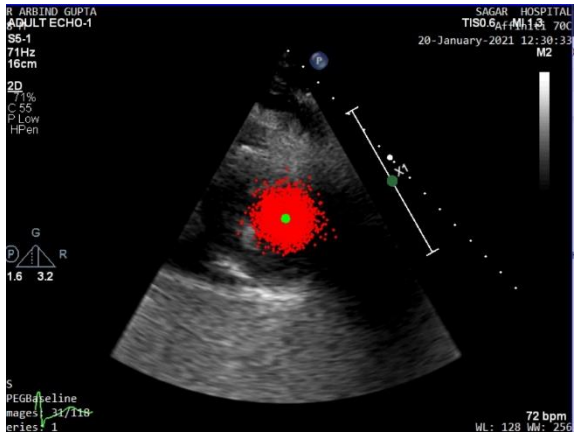
DeepGaze:



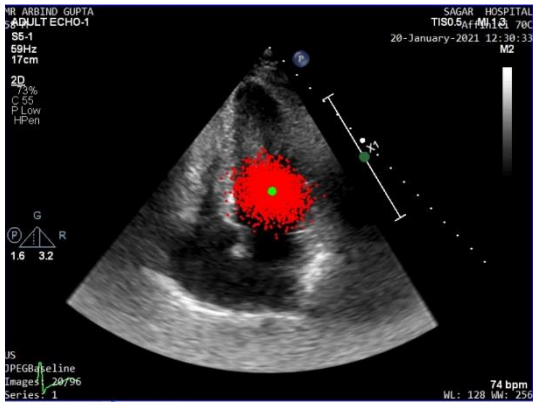
IM_003



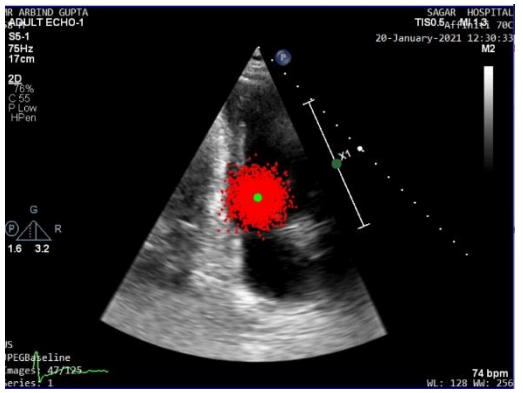
IM_004



IM_005



IM_008



IM_0013

2. Improvement and Future direction

- The image segmentation model can be used to find the other chambers in the heart.
- We can implement Image Segmentation with Distance Transform and Watershed Algorithm.
- Also EcoNet can be implemented which provides significant results.
- Different kinds of filter such as Gaussian filter, Mean Filter, Morphological transformation, etc. can be applied to smoothen the contour plot.