DIP PROJECT

TOPIC: Automatic seed based region growing technique

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ABSTRACT

The aim is to extract tumor region from the liver. This is usually done by region growing technique. The project employs clustering and automatic region growing techniques to do the same. We have tested our algorithm on some images of liver with tumor and it has shown good results. However this algorithm has not been tested on liver with multiple tumors

INTRODUCTION

- This is done by automatic seed based region growing technique. This requires a seed point and a threshold frequency.
- The threshold frequency is determined by using K means clustering.
- The seed point is then found out using the threshold and then the region growing proceeds.

SOFTWARE REQUIREMENTS

- We have used MATLAB to implement the algorithm.

METHODOLOGY

The original paper recommends the below:

- Moving K means clustering algorithm is used to do clustering.
- The threshold frequency determined from this is used during region growing.
- The histogram equalized image is considered from then on.
- ….continued next slide

METHODOLOGY

- The image is scanned from the first pixel and the first pixel whose intensity is greater than this threshold is chosen as the seed point.
- The point is region grown using the conditions mentioned in the next slide.
- Once the seed point stops growing, the next point whose intensity is greater than threshold is chosen .

METHODOLOGY

- This process continues till no more seed points can be grown.
- The conditions to be tested for region growing are:

a. If the gradient of the neighbour pixel is less than 95% of the equalized histogram and its grey level value is more than or equal to the preselected threshold, b.

b. If the gradient of the neighbour pixel is more than or equal to 95% of the equalized histogram and the grey level of the pixel is not more than or equal to one standard deviation away from the region mean.

METHODOLOGY

- The method we have used has the following changes:

1. During clustering, K-means clustering is used.
2. On clustering, we isolate the cluster comprising of the tumor.
3. This image is morphologically eroded to remove thin edges.
4. Pixels belonging to this cluster are isolated.
5. …continued on next slide

METHODOLOGY

- From here on, the seed point selection is the same as in the original algorithm except that the image under consideration is morphologically eroded cluster comprising mostly of the tumor.
- The seed point needs to have intensity greater than the cluster center’s intensity.
- The conditions employed is the same as the original with a change in the first condition, where the pixel under examination needs to have intensity less than the threshold.
- …continued on next slide

METHODOLOGY

- This threshold is the maximum intensity of the pixels in the interested cluster.
- We use different structural elements each time we erode the tumor cluster.
- We mark the outline of the tumor in red.

RESULTS

- The tumor region is successfully isolated and the outline appears in red.
- Each time a new image is fed, we need to find the tumor cluster’s centroid’s intensity, which aids in seed point selection.
- Narrow regions apart from the tumor also appear in red

REFERENCES

- THE POTENTIAL USE OF MODIFIED SEED-BASED REGION GROWING TECHNIQUE FOR AUTOMATIC DETECTION OF BREAST MICROCALCIFICATIONS AND TUMOUR AREAS

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