

BACKGROUND

- In its first stage, a cancer promotes an volume process of vasodilatation at the affected area, increasing blood flow and modifying the local temperature of the body [1]. Previous theoretical and simulation studies in our lab have shown that certain relationships exist between the presence of a tumor and increased localized surface temperature [2, 3].
- Thermography is a noninvasive, non-contact, radiation-free screening procedure in which infrared radiation emitted by the human body can be captured in an image. This makes thermography a promising procedure for detecting suspicious regions in patients of any age, even in the case of dense breasts, where the detection of an abnormality often cannot be accomplished by routine exams.
- There is not much clinical use of thermography, however, because of the current subjective nature of the interpretation of thermograms. Accuracy of diagnosis in objective methods of thermography interpretation depends in part on how well the region of interest is segmented.

In this study a segmentation method facilitated by a graphical user interface (GUI) was developed to automatically extract the region of interest. The GUI flows the user to run the segmentation algorithm of adjust various parameters.

aim of this study is to help reduce the efforts inaccuracies of segmenting these regions along addressing some of the inherent limitations that others face when designing automatic segmentation methods, such as lack of clear edges.

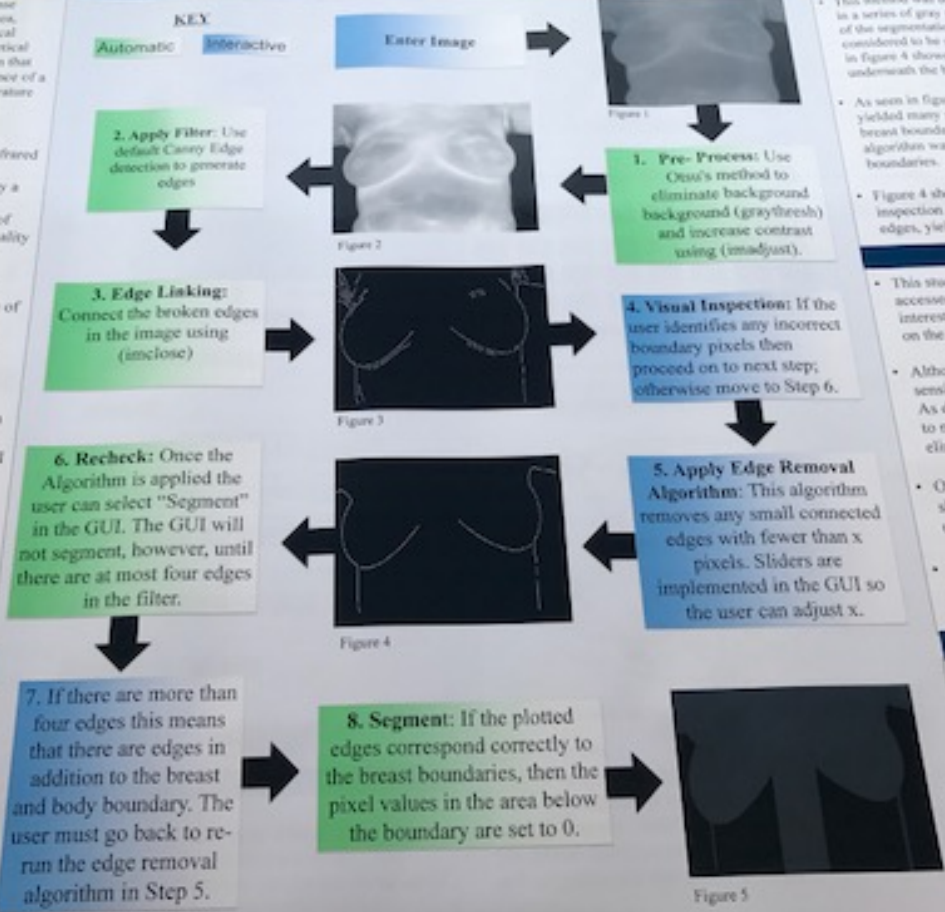
DATA/MATERIALS

set consists of a series of thermal imaging four women volunteers. All confidential it was anonymized prior to review.

l images were acquired using an infrared Imaging Systems, Irvine, Calif: 8-180 pixels, 30mK sensitivity).

thworks, Inc.) was used to write all re segmentation procedure; ed in parentheses.

METHODS



RESULTS

- This method was used to isolate the breast regions in a series of gray scale thermal images. The results of the segmentation and boundary connection were considered to be successful when visual inspection in figure 4 showed complete isolation of the area underneath the breast.
- As seen in figure 3, results from Canny often yielded many small edges that did not belong to the breast boundaries. Therefore an edge-removing algorithm was developed to remove unnecessary boundaries.
- Figure 4 shows the outcome of the algorithm. Visual inspection also showed success in isolating small edges, yielding only body and breast boundaries.

CONCLUSION

- This study proposes a segmentation method, accessed by a custom GUI, to delineate the region interest to assess abnormal temperature differences on the breast surface using thermograms.
- Although the program is interactive, it is not sensitive to the user's judgment for the three. As described in Step 6, a recheck process is implemented to make sure the result has only four edge elements eliminates subjectivity of the segmentation.
- Our results with a small set of breast th show the potential of the proposed method used for breast analysis.
- Future work will focus on improving further limiting the search area and with larger datasets.

REFERENCES

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