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Design and Development of a CAD Tool With Real Time Analysis for Dreadful Diseases

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Abstract

Mammography is used to examine human breast and is used as a diagnostic tool. The advantage of mammography is early detection of masses. CAD helps to detect true positive masses and remove false positives. In order to reduce the increasing work-load and improve the accuracy of interpreting mammograms, a variety of CAD systems, that perform computerized mammographic analysis have been proposed. All of the CAD systems require, as a first stage, the segmentation of each mammogram into its representative anatomical regions, i.e., the breast border and pectoral muscle.

Keywords : *CAD, Real Time Analysis, Dreadful Diseases*

1 INTRODUCTION

Mammography is used to examine human breast and is used as a diagnostic tool. The advantage of mammography is early detection of masses. Mammography remains difficult in some places to detect suspicious region of interest. Region of interest is segmented to analyze abnormalities. The segmented region of interest is then classified to mass or non mass [1]. CAD helps to detect true positive masses and remove false positives. In order to reduce the increasing work-load and improve the accuracy of interpreting mammograms, a variety of CAD systems, that perform computerized mammographic analysis have been proposed. These systems are usually employed as a second reader, with the final decision regarding the presence of a cancer left to the radiologist. Thus, their role in modern medical practice is considered to be significant and important in the early detection of breast cancer. All of the CAD systems require, as a first stage, the segmentation of each mammogram into its representative anatomical regions, i.e., the breast border and pectoral muscle. The breast border extraction is a necessary and cumbersome step for typical CAD systems, as it must identify the breast region independently of the digitization system, the orientation of the breast in the image and the presence of noise, including imaging artifacts.

Objective: The main objective of the research is to refine digital still imaging with thermography and provide real-time acquisition of images using Thermal camera which is done

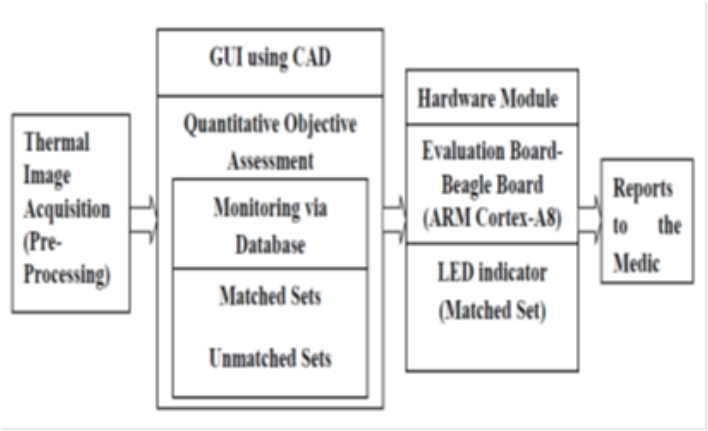

Figure 1: Block diagram of the proposed method

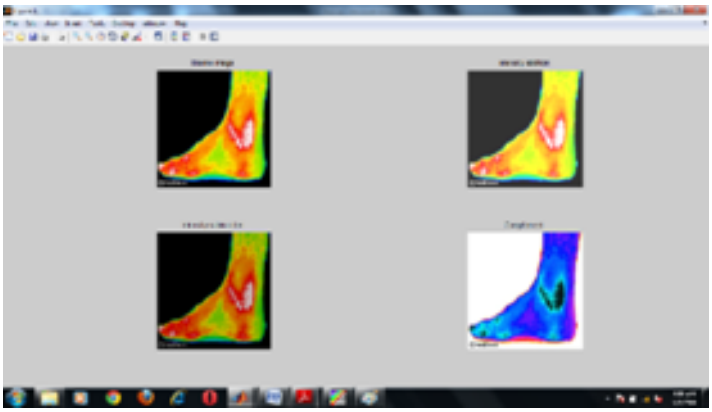

Figure 2: Arithmetic operations on thermal image

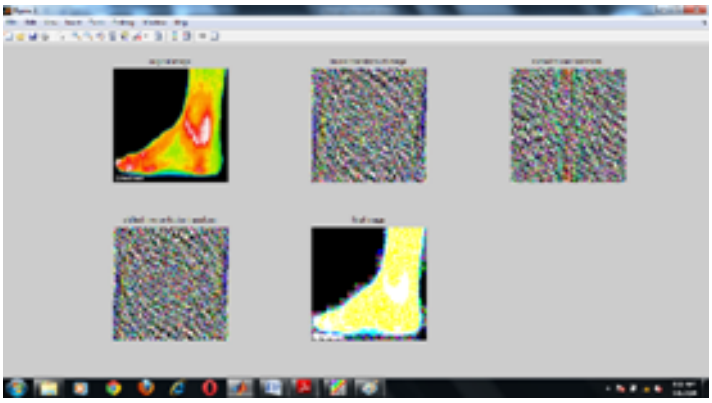

Figure 3: FFT operation

in conjuction with Computer aided diagnosis tool for accurate quantitative and objective analysis.

- The initial stage of the development process involves image acquisition and better understanding of clinical & physiologic mechanisms of various disorders, pain and cancer lesions.
- Thermography as a diagnostic aid for monitoring the therapeutic effect and disease progression.
- A Computer aided diagnosis (CAD) is developed for objective assessment of tumor response to therapy and it provides quantitative parameters in representing the tissue composition of the tumor these results should assist in planning therapy and delayed surgery.
- Performance evaluation of disease diagnosed by Machine Intelligence.

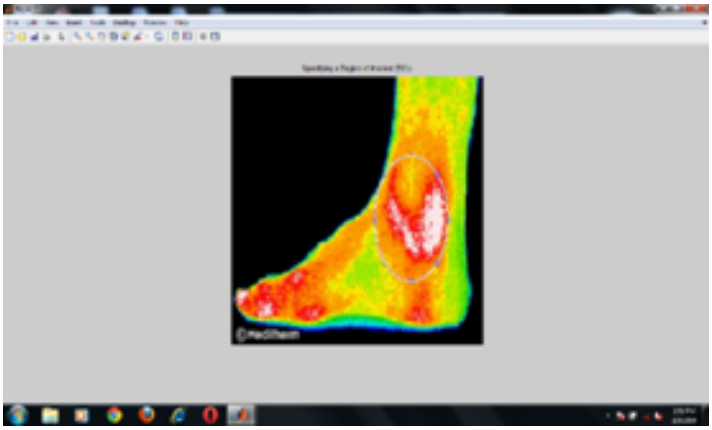

Figure 4: Specifying ROI

Clinical thermography or infrared imaging is based on a careful analysis of skin surface temperatures as a reflection of normal or abnormal human physiology. This Medical research has shown thermography to be helpful in the diagnosis of many applications such as Breast Cancer, Nervous System Disorders, Metabolic Disorders, Repetitive Strain Injuries Headaches, Neck and Back Problems, Pain Syndromes, Arthritis, Vascular Disorders, Soft Tissue Injuries among others

From the historic and simple assessment of temperature by the clinical thermometer, modern infrared technology has opened up new perspectives, especially in the use of thermal imaging to map body surface temperature with a remote sensing camera. Since the 1960s, there is now a greater understanding of thermal physiology and the relationship between skin temperature and blood perfusion. Furthermore, the examination technique, and the advantages of computer-aided digital imaging has greatly improved the reliability of this technology in medicine. Studies in diabetology have shown the value of this new facility and its relevance to clinical assessment of peripheral perfusion and tissue viability. Computer

Aided Diagnosis (CAD) provides techniques for automatic detection of breast cancer. It gives benign/malignant classification. It reduces the number of unnecessary biopsies.

2 LITERATURE SURVEY ON NATIONAL & INTERNATIONAL SCENARIO

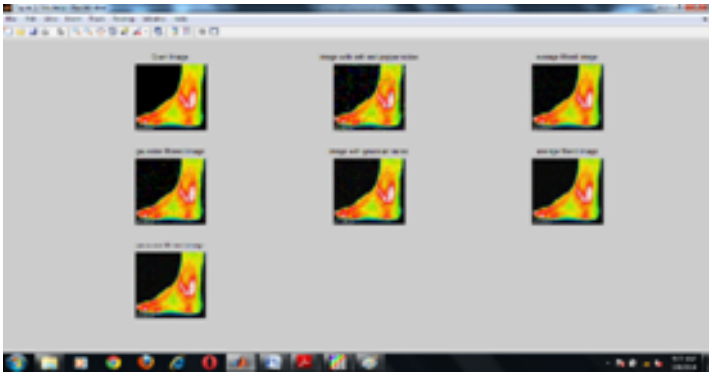

Figure 5: Denoising using filters

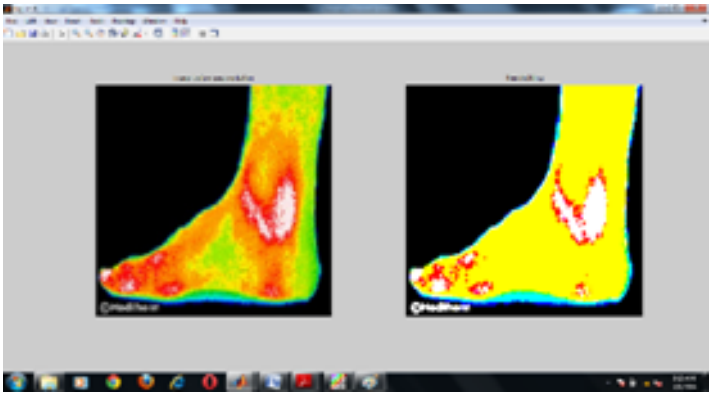

Figure 6: Thresholding

The research on Breast Cancer is on higher note both clinically and technically. Breast cancer is the second leading cause of cancer deaths in women today (after lung cancer) According to WHO, more than 1.2 million people will be diagnosed with breast cancer every year worldwide. Every two minutes a woman in the US is diagnosed with breast cancer and one woman dies from the disease every 13 minutes Breast cancer incidence in women has increased from one in 20 in 1960 to one in seven today. Thermography is best suited for Breast Imaging; Twenty-five percent of women die within the first year after diagnosis. Seventy percent of breast cancers occur in women with no family history of breast cancer. Over ninety percent of women with stage one breast cancer are alive five years later, but only fifty eight percent of breast cancers are diagnosed at this stage. When breast thermography is

the first sign of a developing cancer, there is a 61% increase in survival rate. So there is need of Accurate and consistent analysis in earlier detection of breast cancer. So many educational programs started in India on this issue to create awareness but it is not reaching the masses as many are illiterates and are in rural areas. Now there is an urgent need to bridge the link between diseases and its related complications by making the efforts to make India free from deadly diseases by solving complications from Thermography Images.

3 EXISTING SYSTEM

Magnetic resonance imaging (MRI), computed tomography (CT), digital mammography, and other imaging modalities provide an effective means for noninvasively mapping the anatomy of a subject. Mammography is a low dose x-ray procedure for the visualization of internal structure of breast. Mammography has been proven to be the most reliable method and it is the key screening tool for the early detection of breast cancer. Mammography is highly accurate, but like most medical tests, it is not perfect. On average, mammography will detect about 8090% of the breast cancers in women without symptoms. Mammography is used to examine human breast and is used as a diagnostic tool. The advantage of mammography is early detection of masses. Mammography remains difficult in some places to detect suspicious region of interest. Region of interest is segmented to analyze abnormalities.

4 PROPOSED SYSTEM

For early detection of breast cancer considerable research efforts have been devoted to develop Computer-Aided Detection (CAD) systems, which would be beneficial for detecting breast lesions. CAD alerts radiologists to locate suspicious locations on the images during mammographic reading. CAD helps to detect true positive masses and remove false positives. The steps in breast cancer detection using CAD are , Pre-processing, ROI Segmentation and Feature Extraction Denoising Using Filter Edge Detection, Thresholding, Hough transform The block diagram shown in Figure1 is the proposed method which was implemented using Beagle Board.

5 COMPUTATIONAL EFFICIENCY MEASUREMENTS

The values in Table1 are computed using MIPAV and Astroart software which gives the quantitative data for the thermal image considered.

Using MIPAV:

6 EXPERIMENTAL RESULTS

Following are results obtained using MATLAB R2013a for the thermal image of a diabetic foot.

References

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Table 1: VOI properties of the thermal image.

	Image			Threshold
	VOI			VOIContour_0
	Number of Voxels			24759
	Area			24759
	Perimeter			1059.0563
Line	**Name**	**Mean**	**Standard Deviation**	**Length**
Red	VOIContour_0	247.8607	13.7261	1059.06
Green	VOIContour_0	200.4906	84.46639	1059.06
Blue	VOIContour_0	13.63363	26.92845	1059.06

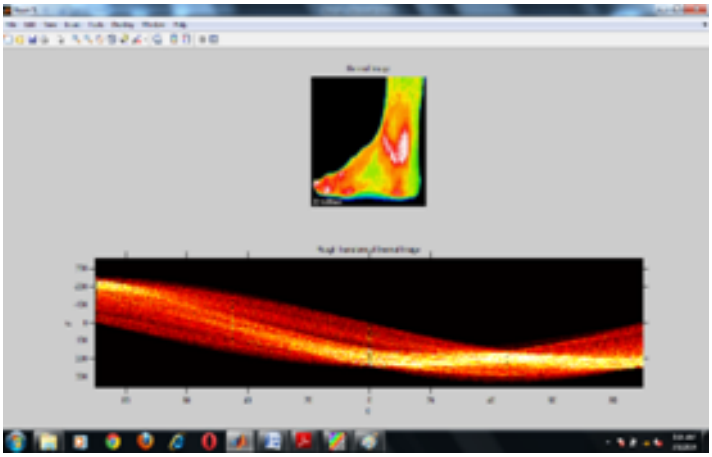

Figure 7: Hough Transform

Figure 8: Cropping

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