

Early Breast Cancer Detection and Screening Using Thermal Imaging

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Introduction

Problem statement

Breast cancer is a global public health problem mostly affecting women of different age groups. The global incidence of breast cancer is over one million new cases each year, and that number is expected to increase 20% by 2020. "In 2017, there were 13,000 breast cancer incidences of women in Ethiopia. Out of this, 53% of the patient leads to death." This data shows how much serious it is. Having inadequate oncology service and cancer center, very small number of breast imaging device and professionals make the problem difficult to control the spread of breast cancer. But when cancer is detected early either initially or as a relapse incident can often treat successfully. Most medical imaging modalities were initially developed with this specific purpose in mind. However, they lack specificity for several reasons and are less than ideal for regular screening of all individual. Moreover, for accessibility and financial reason, most women are not examined more frequently and it create a long gap during which cancer can develop undetected and increase the chance of the women's mortality.

Need statement

Survival of patients with diagnosed breast cancer depends on tumor size, biological characteristics, spread of disease and patient age. But the accessibility of the device which can diagnose breast cancer at early stage which is comfortable to users and easy to use and to interpret the result is very small. Therefore, to eradicate the mortality rate due to breast cancer, there is a need for a early breast cancer detection and screening using thermal imaging device that can detect the presence of cancer in early stage, which is easy to use and can be accessed over the whole health centers. The above figure show that how the system works or the flowchart of analysis the breast image to detect the abnormal one to the normal one (Figures 1-3).

Summary of the Study

Breast cancer is the most frequently diagnosed cancer among women and has highest mortality rate. The disease gets spread and worse over years. Person may not feel the lump or swelling in its early stage. But the rate of survivals will increase if it is detected in early stage. Now day's different medical devices are used to diagnose breast cancer but they observe the anatomical changes not the physiological. In medicine physiology always

prior to observe a small functional changes occur when a disease is in its early stage. Based on this idea and the gap observed in existing solutions we proposed different solution ideas and evaluate them according to the constraints and goals. From the evaluation thermal camera based breast cancer detection and screening device is selected as a final solution. This device works based on the principle of measuring the radiation emitted by a surface to determine its temperature by using a thermal imaging camera as imaging taking device. The captured image will use an input for the system. The system will process the image and

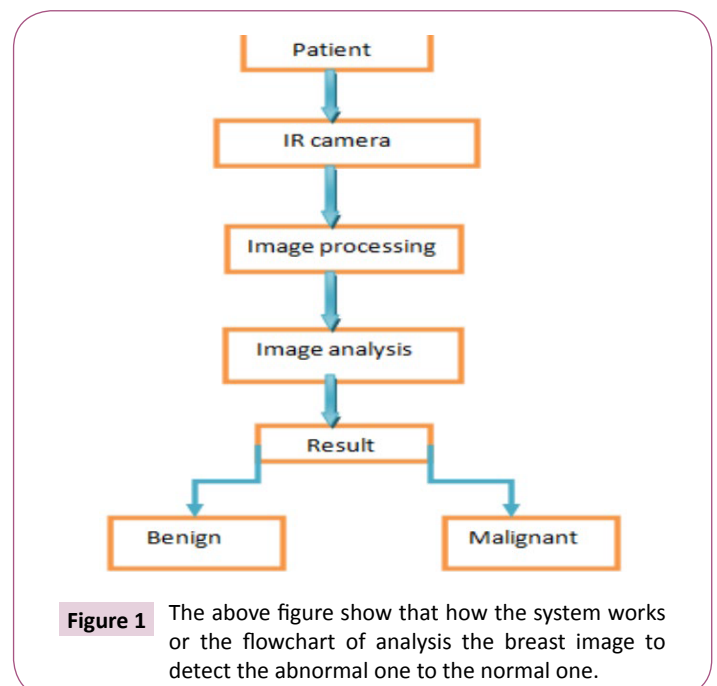


Figure 1 The above figure show that how the system works or the flowchart of analysis the breast image to detect the abnormal one to the normal one.



Figure 2 If cancer cells are not detected at an early stage the following will be happened.



Figure 3 Damage the whole breast spread to other body parts Sever pain and finally death will happened.

classify it as benign or malignant based on the features extracted from the thermal pattern of the image. The system allow physician to store their patient's history on database server, to search, to update and/or delete the history of the patient. We face different challenges while developing this device. For instance financial problem to purchase the material needed, getting patients while we investigate the problem, shortage of

time for testing the device and complexity of procedure to get acceptance for testing the device in hospitals. Generally, our device gives lots of importance in improving women's health by providing best breast cancer diagnosing device that enable to detect the tumor in early stage with high accuracy which is accessible over the health centers, comfortable, safe, easy to use and have high processing speed.