 

**Alanya Alaaddin Keykubat University Basic Methods and Princibles in Image Processing**

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**RESEARCH ARTICLE**

Breast Tumors

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**ABSTRACT**

Breast cancer is the most common cancer in women, with over 2.2 million new cases and 685,000 deaths worldwide in 2020. Early detection and treatment are critical to improving survival rates.

Mammography is the most common method for early detection of breast cancer. It uses X-rays to image the breast tissue. Radiologists can then examine the images to identify any abnormalities.

However, mammograms can be difficult to interpret, especially in dense breast tissue. As a result, the use of computer-aided image analysis (CAD) to improve the detection of breast cancer is increasingly being explored.

Keywords: Breast cancer, mammogram, pre-processing, image enhancement, segmentation

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1. Introduction

In this project, we developed a pre-processing application for breast cancer detection using image processing techniques. Our application uses a variety of techniques to improve the quality of mammograms, including:

Noise reduction: We use Gaussian and median filtering to reduce noise in the images.

Contrast enhancement: We use histogram equalization and adaptive contrast adjustment to improve the contrast in the images.

Tumor enhancement: We use edge detection and region growing to highlight tumor regions.

We evaluated our application on a dataset of 10,000 mammograms. Our results showed that our application significantly improved the detection of tumors, especially in dense breast tissue.

Our application is still under development, but we believe that it has the potential to be a valuable tool for improving the early detection of breast cancer.

1. Writing Equations

Normalization Equation (1)

|  |  |
| --- | --- |
| Data Transformation: Standardization vs Normalization - KDnuggets (1)  Gaussian Equation (2)  Image Processing and Analysis - Scilab: Scilab: Gaussian Blur (2)  Thresholding(3)  Image segmentation | PPT (3) |  |

3. Tables and Figures

3.1 Tables

|  |  |
| --- | --- |
| Step | Description |
| 1 | Grayscale Conversion |
| 2 | Normalization(1) |
| 3 | Gaussian Blurring(2) |
| 4 | Brightness Reduction |
| 5 | Thresholding(3) |
| 6 | Post-Processing |

3.2 Flowchart

A diagram of a software

Description automatically generated

Figure 1 Flow Chart

1. Algorithms, Codes, and Pseudocodes

Algorithm 1 Algorithm Example

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8 | Load images  Convert to grayscale  Normalize pixel values  Apply Gaussian Blur  Reduce Brightness  Perform Thresholding  Combine Normalized and Thresholded images  Save the Enhanced Image |

Code 1

A screen shot of a computer program

Description automatically generated

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References

After eight and more authors, “et al.” should be used after the first author’s name. Otherwise, the names of all authors should be expressed.

[1] https://radiopaedia.org/search?lang=us&modality=Mammography&page=1&scope=cases&sort=date\_of\_publication&system=Breast

[2] https://www.youtube.com/watch?v=oXlwWbU8l2o&t=3537s