

TAMILNADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

DOTe Campus, Chennai-600025

STUDENT PROJECTS SCHEME

1. **Name of the Student (s):** Vijaya Gokul K, Raja Subramanian V

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2. **Name of the Guide :** Dr. B. Lakshmanan

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3. **Project Title:** Improved Deep Learning Method for Breast Mass Detection in Mammography Images

4. **Sector in which your Project**

proposal is to be considered: Computer Science and Engineering

5. **Project Details:**

INTRODUCTION:

Breast cancer is the most common cancer among women, accounting for 24.5% of all new cancer cases in 2021. Early detection is essential for improving survival rates, and mammography is the primary screening tool for breast cancer. However, mammography interpretation is challenging, and even experienced radiologists can miss subtle lesions.

Deep learning has the potential to improve the accuracy of breast cancer detection and segmentation in mammography images. Deep learning models can be trained to learn the features of breast masses and other abnormalities, and to distinguish between benign and malignant lesions. Additionally, deep learning models can be used to segment breast masses, which can help radiologists to better visualize and characterize the lesions.

YOLOv8 and DeepLabv3 are two state-of-the-art deep learning models for object detection and segmentation, respectively. YOLOv8 is a fast and accurate object detector that has been shown to achieve high performance on a variety of tasks, including breast mass detection. DeepLabv3 is a powerful segmentation model that has been shown to achieve high performance on a variety of medical image segmentation tasks, including breast mass segmentation.

OBJECTIVES:

- Develop a deep learning model that can accurately detect and segment breast masses in mammography images.
- Improve the robustness of the model to noise and variability in image quality.
- Achieve better performance than existing methods on a held-out test set.

METHODOLOGY:

The proposed method will be developed using a combination of deep learning techniques, including:

- YOLOv8 used for breast mass detection.
- DeepLabv3 used for breast mass segmentation.

The proposed method uses **CBIS-DDSM** and **INbreast** datasets.

Title	<u>CBIS-DDSM</u> <u>Breast Cancer Image Dataset</u>	<u>INbreast Dataset</u>
Number of Images	10239	410
Image Format	.jpg(JPEG IMAGE)	.dcm (DICOM IMAGE)
Image Size(GB)	6	8
Total No.of Malignant Cases	6100	4139
Total No.of Benign Cases	49	220
Width & Height		
Additional	It includes 1,023 images classified as "normal," meaning that they do not show any signs of breast cancer.	It includes 141 images classified as "normal," meaning that they do not show any signs of breast cancer.

Figure 1: Dataset Description of CBIS-DDSM & INbreast Dataset

The proposed method will be trained on the CBIS-DDSM and INbreast datasets. The training dataset will be divided into three parts: training set, validation set, and test set. The training set will be used to train the model, the validation set will be used to evaluate the performance of the model during training, and the test set will be used to evaluate the performance of the model after training.

The proposed method will be evaluated using a variety of metrics, including accuracy, sensitivity, and specificity for detection, and dice coefficient and mean IoU (Intersection over Union) for segmentation. The performance of the proposed method will be compared to that of existing methods on the test set.

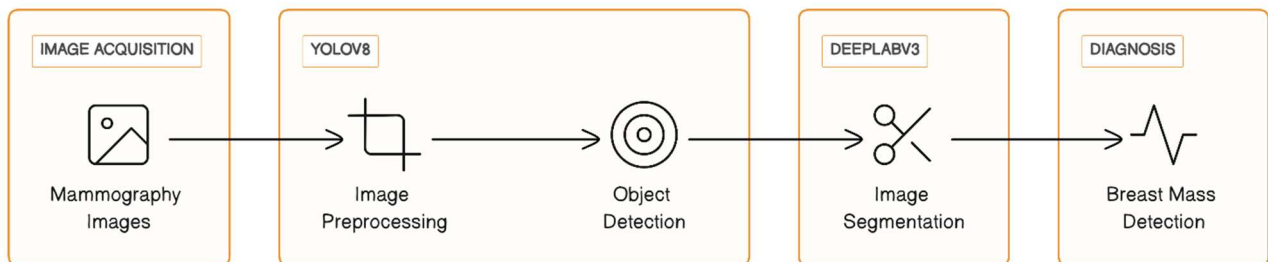


Figure 2: System Design of the Proposed Model

WORK PLAN:

Activity	Months			
	1	2	3	4
Data Collection				
Preparation of Dataset				
Data Preprocessing				
Model Development				
Model Evaluation & Deployment				
Seminar presentation and Report generation				

BUDGET:

S. No	Components Details	Approximate Cost in (Rs.)
1.	IBM	9000
2.		
3.		
4.		
5.		
6.		
Total Amount		13000

DECLARATION

This is to certify that **Mr. Vijaya Gokul K** and **Mr. Raja Subramanian V** is a bonafide final year student of U.G. Engineering course of our college, and it is also certified that two copies of utilization certificate and final report along with seminar paper will be sent to the Council after completion of the project by the end of May 2024.

Student Signature**HoD Signature****Principal Signature**