Department of Computer Science and Engineering
Bangladesh University of Business and Technology (BUBT)

CSE 478: Literature Review Records

Student's Id and Name	**Name:** Fabia Zaman Ekah and **ID:** 19202103225
Project Title	Deep Learning in Healthcare: Breast Cancer Detection and classification using Image Processing and CNN
Supervisor Name & Designation	**Name:** Khan Md. Hasib & **Designation:** Assistant Professor, Department of CSE, BUBT
Course Teacher's Name & Designation	**Name:** Khan Md. Hasib & **Designation:** Assistant Professor, Department of CSE, BUBT

Aspects	**Paper # 4 (Title)**
Title / Question (What is problem statement?)	Applying Deep Learning Methods for Mammography Analysis and Breast Cancer Detection
Objectives / Goal (What is looking for?)	The aim of this study was to explore the use of deep learning methods for analyzing mammograms, and the results of the study demonstrated the importance of proper data preprocessing and augmentation techniques.
Methodology / Theory (How to find the solution?)	The work was divided into some phases. • Medical Imaging Techniques for BC Diagnosis. • Deep Learning Methods for BC Detection and Classification. • Performance Evaluation Metrics
Software Tools (What program/software is used for design, coding and simulation?)	The experiments were executed using Python 3.6 software based on Tensorflow 1.13.1, 16 GB installed RAM, Intel® Core™ i5-8400 CPU @2.80 GHz, and NVIDIA Geforce GTX 1060 6 GB mounted graphic card..
Test / Experiment How to test and characterize the design/prototype?	They divided the dataset into training and testing sets a ratio of 5:1.
Simulation/Test Data (What parameters are determined?)	Dataset was collected from Kaggle.
Result / Conclusion (What was the final result?)	The performance of relatively simple CNN models, such as ResNet18, was almost as good as larger models such as ResNet152 or EfficientNet B0. Furthermore, the performance of the CNN models was found to be comparable to that of the model based on visual transformer architecture.

Obstacles/Challenges (List the methodological obstacles if authors mentioned in the article)	• First, the images were scaled to a resolution of 256 × 256 and 512 × 512 pixels, which may have limited the classification performance. While this choice of image resolution offered the advantage of reducing the need for computing resources during experimentation, it is possible that the performance of the models could be improved by using images with a higher resolution. • Second, only positive examples were used to generate the synthetic images. This approach was taken in order to balance the dataset and prevent bias towards the negative class. However, a new possibility for experimentation could be to use two classes of images, both for positive and negative examples, in order to explore the performance of the models in a more realistic scenario.
Terminology (List the common basic words frequently used in this research field)	mammograms; deep learning; StyleGAN; synthetic image generation; explainable AI.
Review Judgment (Briefly compare the objectives and results of all the articles you reviewed)	• Eroğlu et al. proposed a CNN hybrid system for breast ultrasonography image classification. The system was based on the Alexnet, MobilenetV2, and Resnet50 models, which were used for feature extraction. Further, the features were concatenated, and the mRMR (Minimum Redundancy Maximum Relevance) algorithm was applied for feature selection. Finally, the classification step was performed through SVM and KNN classifiers. • A simplified CNN architecture for feature learning and fine-tuning was proposed by Altan et al. to classify mammography images into normal or malignant. The DDSM repository was used as it contains 2260 images which were fed into the proposed CNN architecture that consists of 18 layers. Considering its simple CNN architecture, the model achieved good performance with an accuracy of 92.84
Review Outcome (Make a decision how to use/refer the obtained knowledge to prepare a separate and new methodology for your own research project)	For my own research I would use some of the mentioned techniques.