Feasible Study of Breast and Lungs Cancer Detection using Machine learning

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Abstract— **The initial-state cancer finding is essential to provide appropriate treatment to the patient and diminish the risk of death due to cancer as the detection of these cancer cells at late stages leads to more suffering and increases the chances of death. The paper provides a chance to study breast and lungs cancer detection methods and different algorithms to diagnose cancer at an earlier stage. Hybrid methods used for lung and breast cancer detection with help of different types of image, test results data set used for depending on size and shape of cell using segmentation and classification. In this paper also explain the basic model of lung and breast cancer block diagram also focus on future aspects of cancer detection and diagnosis methods and challenges.**

Keywords—: **Lung cancer, CT scan, mammogram, Breast and Lung cancer, Deep Learning, Convolutional Neural Network**

I. INTRODUCTION

Cancer is a complex disease, Cancer reason by the unrestrained division of abnormal cells in part of the body and as a result become liable for numerous diseases. Therefore, due to the small size of cancer cells, it is difficult to detect at an early stage. A lot of works have been reported in the area of cancer cell detection and classification. For examples Random Forest algorithm and Bayesian methods, Support Vector Machines, and a some of the unsupervised and semi-supervised method liked by the Logic-Based classifiers and relative analysis of various image PDE (Partial Differential Equation) based segmentation and others to analysis breast image. It is important to find a new robust method to make a diagnosis of cancer at a former stage. The availability of large imaging datasets provides a great opportunity for investigators to segment and classify the cancer cells using deep learning-based convolution neural network methods. Our focus will be on the development of a convolution neural network based approach for the segmentation and Classification of lung and breast cancer cells.

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II. RELATED WORKS

In paper [1] it used left-censored Cox proportional hazards model which impact of mammography on breast cancer mortality. In paper [2] K-medoid clustering is used in syndrome cluster to get the data of breast cancer to evaluate an analysis. In paper [3] identify breast cancer Association Rule Mining and Neural Networks played an important role. In Paper [4] presented a new hybrid technique of Grey Wolf Optimizer including decision tree and some other applied techniques like C4. S PSOC4.S, SVM. In Paper [5] presented a classifier based on non-convex LP-norm minimization and SoC (Sum of Coefficient). In paper [6] machine learning is a helpful approach by investigating somatic mutations to propose cancer site. In paper [7] decision trees and clustering are the methods which used to analyze the issue related to breast cancer through the hybrid analysis method. In paper [8] to collect the units in histopathology images, a learning technique was developed which is known as multiple clustered instances learning. In paper [9] interpretate MRI breast images and accuracy of detection of cancer symptoms and CAD system is really a supportive idea to analyze. In paper [10] segmentation methods use Edge detection and PDE (partial differential equation) based methods for the detection of lung cancer. In paper [11] used patch-level classification with deep learning concept, the segmentation and classification algorithms were evaluated. If lung cancer is suspected, several screening procedures are subjected to the individual before analyzing the presence of malignant tumor cells. Medical imaging techniques are advocated by physicians to diagnose lung cancer. Imaging techniques guide in looking at suspicious regions,

learn to stage of cancer, validating treatments and lookout signs indicating return if cancer cells [12]. In the programmed diagnosis of cancer, identify cells accounts as a beginning yet most significant task, cell segmentation can be visualize as shaping accurate region of cells in close proximity to in image. In the pipeline of auto-mated histopathological image analysis, automated segmentation of cells is regarded as a major hurdle and it continues to be a major focus of research. Cell segmentation combined with ancient cell detection [13] [14]. Pre-processing stage was analyzed; CT is one of the modest methods to detect lung cancer. Adaptive and filter median is suitable for medical CT images. [15].

III. METHODS AND MODELS

We recognize that the possibility of survival increases drastically for the majority of patient groups, if cancer is detected at an early on stage. Existing screening programs like breast, cervical and colorectal cancer have saved a great many lives, but they lack sensitivity. Research is required to enhance our biological understanding of early cancers, to increase our ability to identify them and to look up the technologies used. High-quality research focus on the early detection of cancer is currently being carried out in several locations. Lung cancer is killer diseases. Cancer cells have so many types in size and shape. It is difficult to detect at an early stage.

Defined classification of human cancer, Tumor Marker Test, Complete Blood Count, and image into multiple regions are played important role to detect cancer cell in a microscopic image like the Bayesian methods, Logic-Based classifiers, Support Vector Machines, example the Random Forest algorithm, and a few of the unsupervised, semi-supervised methods used for breast image classification. A comparative analysis of various image segmentation and techniques for the detection of lung cancer are Marker Controlled, Watershed Segmentation, Edge detection, and PDE based segmentation techniques. It is important factor to establish a new robust method to analyze cancer, input lung CT image and tissues present in the input mammogram images of breast cancer.

A. *Pre-processing of images*

In the pre processing stage, the median filter will be used for CT scan images of lung cancer for Adaptive contrast enhancement. The AHE is capable of improving local contrast and bringing out more details in the image. Therefore, contrast-limited adaptive histogram equalization which is a type of AHE will be used to improve the contrast in mammogram images of breast cancer images.

B. Designing of model to identify the presence of lung cancer:

The proposed method detects lung cancer based on chest CT images using the Convolution Neural Network. In the first stage, lung regions are extracted from the CT image and in that region, each slice is segmented to get tumors. The segmented tumor regions are used to train CNN architecture. Then, CNN is used for test the patient images. Figure 1 shows the proposed model. The trained system will able to detect the cancerous presence in the lung CT image.

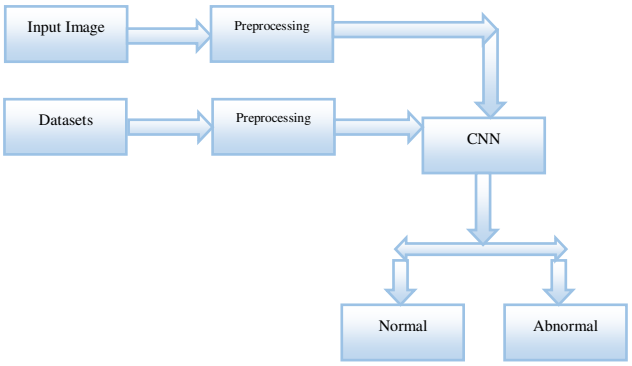

Fig. 1. Block diagram of the proposed lung cancer model

C. *DESIGN OF MODEL TO IDENTIFY THE PRESENCE OF BREAST CANCER*

Figure 2 shows the proposed method that detect breast cancer based on mammogram images using Deep Convolution Neural Network. After the image improvement, image segmentation will be used to separate an image into parts having similar features and properties. The first method will launch the Region of interest pooling by using circular contours. In the second method, the threshold and the region-based methods will be used to resolve the Region of interest pooling. Deep CNN will be used to classify the Region of interest pooling.

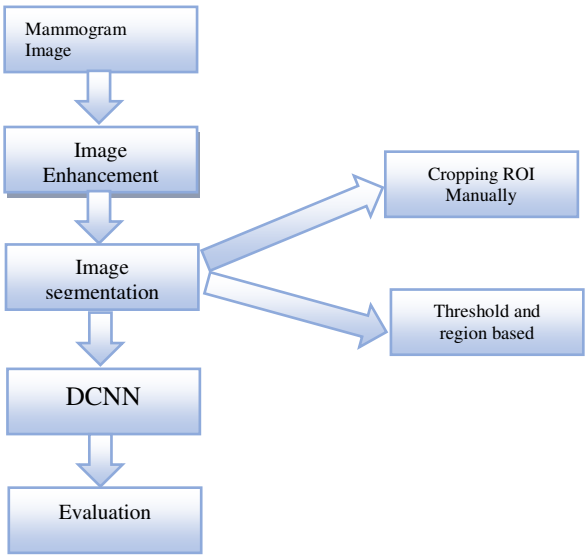

Fig. 2. Block diagram of the proposed breast cancer model

evaluation tools are used to review a classifier like F1 score the confusion matrix, the accuracy, the and the receiver-operating curve the area under the curve. it used confusion matrix for precise table visualize the show of the classifier. An image region is implicit in addition, a result for the detected result can be either correct incorrect.

Voting methods based on the same five classifiers used in this study. Each model is associated with a coefficient (weight), usually proportional to its classification accuracy. This partly amends the problem of inferior models, but it does not eliminate it completely as it still allows them to affect the final decision.

IV. CONCLUSIONS AND FUTURE SCOPE

In the paper we systematic review about breast and lung cancer detection methods on existing methods of machine learning-based diagnostic system which can assist for getting better treatment of the patient in early stage. Machine-learning method has been additional broadly used in cancer prediction; variety of models is based on voting. Deep-learning multimodal method is useful for cancer detection. We also need to develop innovative tools that can detect cancer with high sensitivity and specificity.

TABLE I DIFFERENT METHODOLOGIES & OBJECTIVES OF SOME STATE OF THE ART TECHNIQUES TO DETECT BREAST AND LUNG CANCER.

Author & Year	Title	Methodology & Objective
"B.M.Gayathri 2013"	"Breast cancer diagnosis using machine learning algorithms–a survey"	Machine learning method supports Bayesian inference to gain parsimonious solution for regression and classification. It is useful for detecting optical cancer, ovarian cancer, etc. RVM become much more useful in diagnosing breast cancer
"Konstantina Kourou 2015"	"Machine learning applications in cancer prognosis and prediction"	With the help of Decision Trees, Artificial Neural Networks, Bayesian Networks , Support Vector Machine
"Shikha Agrawal 2015"	"Neural Network Techniques for Cancer Prediction: A Survey"	To find out the accurate prediction and analysis of cancer applied DNA microarray technology and hybridize neural network methods with optimization algorithms like PSO.
Hiba Asri 2016,	"Using Machine Learning Algorithms for Breast Cancer Risk Prediction and Diagnosis"	Classification and data mining methods used and Different machine learning algorithms used : Support Vector Machine, k Nearest Neighbors, Decision Tree (C4.5), Naive Bayes.
Sara Tarek 2016,	"Gene expression based cancer classification"	Cancer classification using data mining methods, machine learning algorithms and statistical methods, K-NN. Diagnosis for different cancer types, feature selection, ensemble classifiers
Mohammad R. Mohebian 2017,	"A Hybrid Computer-aided-diagnosis System for Prediction of Breast Cancer Recurrence (HPBCR) Using Optimized Ensemble Learning"	Computer-aided prognosis and PSO algorithm,system to identify breast cancer recurrence which Involve growing abnormal cells using statistical characteristic selection methods
Neeraj Kumar 2017,	"Convolutional Neural Networks for Prostate Cancer Recurrence Prediction"	Two separate convolutional neural networks. planned approach is based on deep learning, one is convolution neural networks one to detect and other to classify them.
Jeremy R Burt, MD, Neslisah Torosdagli 2018	“Deep learning beyond cats and dogs: recent advances in diagnosing breast cancer with deep neural networks”	breast cancer detection and diagnosis used CAD systems based on deep learning technologies
Ghulam Murtaza,Liyana Shuib 2019	“Deep learning-based breast cancer classification through medical imaging modalities: state of the art and research challenges”	Based on breast cancer classification by using medical imaging multimodalities using artificial deep neural network methods
Tanzila Saba 2020	“Recent advancement in cancer detection using machine learning: Systematic survey of decades, comparisons and challenges”	Objective of paper is to analyze, review, categorize human body cancer detection using machine learning techniques for breast, lung. Cancer diagnosis, cure process is assisted using machine learning and deep learning techniques.

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