Detection of breast tumor in medical images using modified neural network model

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Abstract

It is well versed that "Bioinformatics" is multi disciplinary area for research. It has two conditions biology information and computer science. Computer technology used on biological problems that have various challenges to computer information as identifying images processing, Structured to unstructured, data and analyze, health care, data like as X-ray, MRI, DNA, Breast Cancer, Diabetes. In bio Analysis various special fields of computer information technology can be valid for its knowledge of Machine Learning (Deep Learning), Data mining, image processing, data visualization, Data Reduction, 2-D and 3-D construction. In image processing Breast Screening is a technique to use mammographic images for detects cancerous tumors in the breast whether it is normal. We have developed our model in two parts first model named MBPNN as machine learning architecture to identify breast tumor. In second part cancerous tumor is cropped and processed. At last we have compared our parametric values with other models such as SVM and Distance classifier models. This model is developed using Mat Lab programming. In this model 300 images have been tested. This model identifies the location of tumor and tells us the stage of tumor. All parameters such as minimum, variance, dispersion and many more is presented.

Keywords: Bioinformatics, breast screening, mammographic, variance, dispersion.

Introduction

It is well versed n medical term that uncontrolled tissues are called cancer, which is non communicable. Cells are rearranged and reproduction of cells in body that are uncontrolled and converting malignant tumors inroad in nearby tissues in body. In breast cancer common evidence are new lump, gland, nipple discharge. It can be start gland from all parts of breast that makes milk. Cancer tissues are entered those lymph vessels and start to arise in lymph nodes. It is necessary to understand breast tumors are benign or malignant (non-cancerous breast tumors[1]).

Cancer is rapidly increasing in India. Most common cancer is breast cancer in women's. In mostly part of India, poor life style and late detection of breast cancer is major reason of death. India is a major country where breast cancer is continuous increasing[2]. In medical images, breast cancer Images has been always an area of interest for researchers. In our work we have selected breast cancer images as a dataset for mining and developing knowledge for breast cancer treatment. There are many model used in medical science for medical images data set[3].

In this paper, we introduce first part of our model where we used two techniques first image processing in Mat Lab Second Modified Back propagation Neural Network. Our develop algorithms is based on basic concept of Back propagation neural network[4] (we given brief detail of cancer because without biological knowledge very hard work with machine learning).

Noteworthy contributions in the field of proposed work: Following are two papers which we have taken as base of our work. We have review one hundred papers[3] and these two papers are Keynote of our work.

Benign vs Cancerous Breast Lumbs
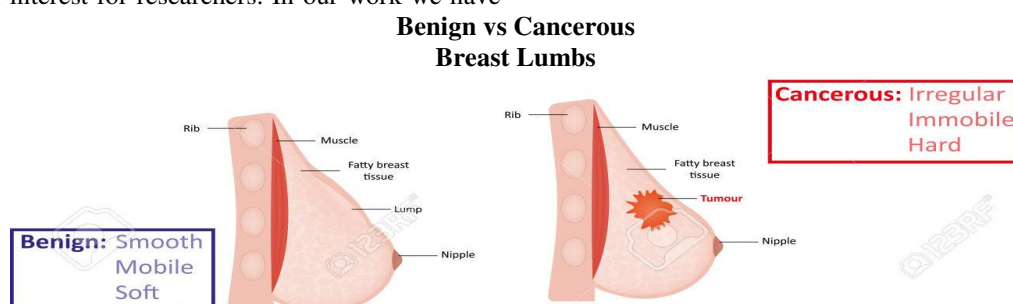
Figure-1: Normal and Cancerous Breast tissues[5].
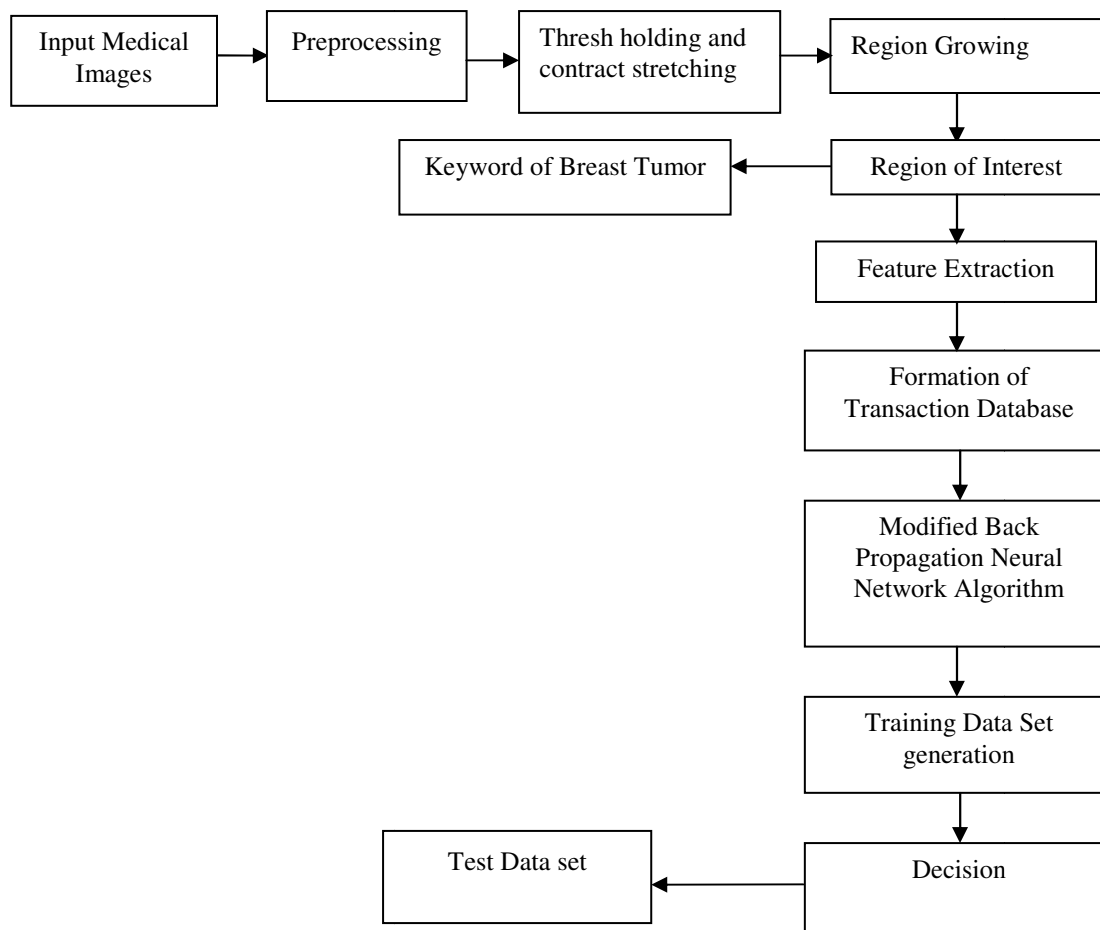
Figure-2: Flow of Control of Proposed model[6].

Methodology

As per the research work the methodology in given in three phases are as follows.

Phases-1: i. Step-1: collecting of medical images as a data set. ii. Step-2: preprossing of medical images removing noisy and enhance for images. iii. Step-3: we will enhance images. iv. Step-4: we will grow the region.

Phases-2: i. Step-5: we will obtain the region of inter (ROT). ii. Step-6: through this region of enter we will get keyword used in breast tumor.

Phases-3: i. Step-7: we get data base which will be used in our modify algorithms. ii. Step-8: Our algorithms will best on the back propagation neural network. iii. Step-9: through this algorithms we will generate data set. iv. Step- 10: Test data set will be match this training dataset and design will be taken[7].

Mammography

Mammography, is one of most popular technique to identify cancer tissues in breast Mammography is a low-dose X- ray processer that can be easy on identify structure of breast tissues different image pre-processing technique applies mammography image them various feature extract from mammography for standard procedure. Black and white area in mammography images compares normal and abnormal lump and notes. Mammography is more accurate than other image scanning technique usually in case of older women's and fatty tissues. That is not common like MRI and Biopsy. Women's breast can change after childbirth[8]. In our proposed work we used 315 mammography images from different hospital from MP which are used for pre-processing but in this paper we include result of 10 images as a input. These are as follow.
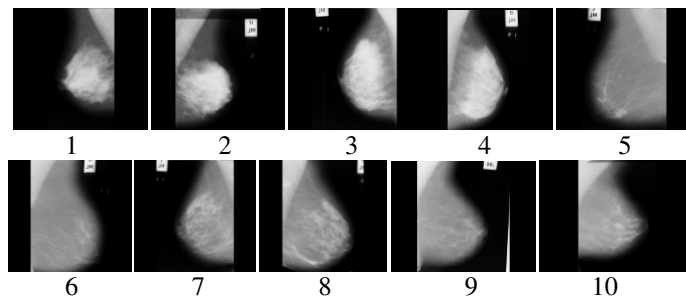
**Figure-3:** Sample Dataset of Digital Images.

Proposed Mammography Pre-processing

The Mammography Pre-Processing contains a set of steps. The main object of pre-processing to filter the image, remove noise and unwanted part from image, enhance, segmentation feature extractions, and improve the quality of the image. Pre-processor technique has been dividing in to six parts. First Input mammography images, second Remove tag from images, third Extract ROI, fourth Enhance to images, fifth Segmentation of images (Pectoral muscle Remove), and sixth Feature Extraction.
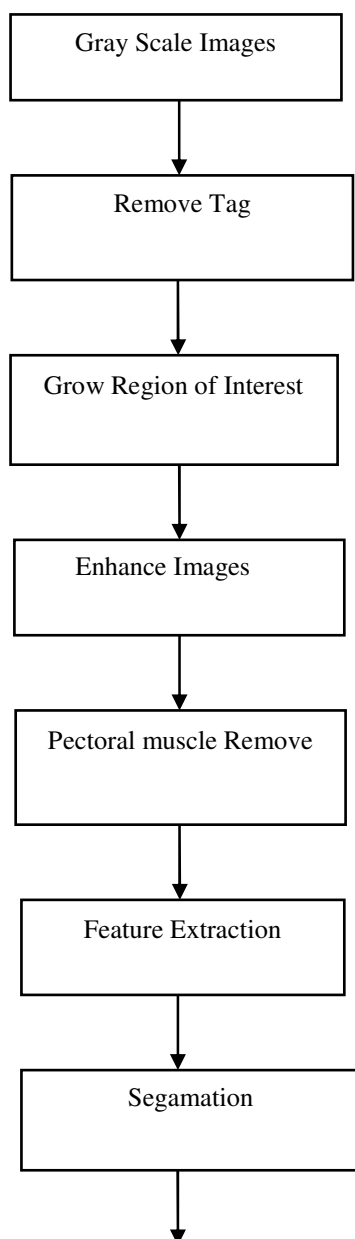
Figure-4: Flow of Control of Mammography Pre-processing.

First we used two-dimensional function (x,y) where gray images at the point. We used mammography image are as digital images, where in this process input and output both are image.
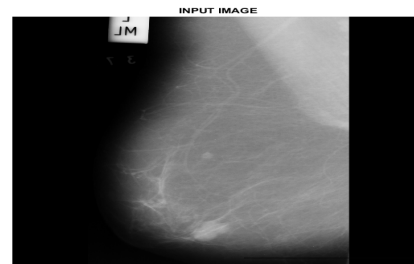
Figure-5: Image of Grey Scale.

Second, Remove tag in this processer we remove tag from images apply thresh holding, median filter and connectivity is dimensional (8) side.

Figure-6: Image of Removal Tag.

Third, the rigion of interest connectivety are 8 side. Find non zero value. We derived mid index value pixel value of gray scale images and analysis the index maxium and minium value.
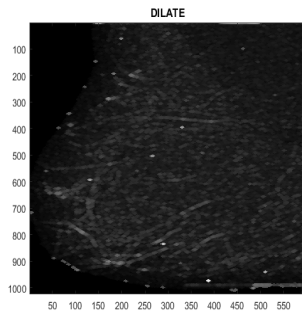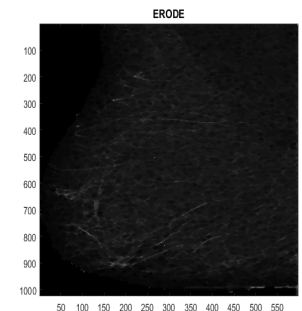
Figure-7: Image of Region Grow.

Fourth enhanced image in this processes we can improve quality of image dilation can bright them surrounding areas in gray scale image in enhance of image used top hat dilate and bottom hat function.
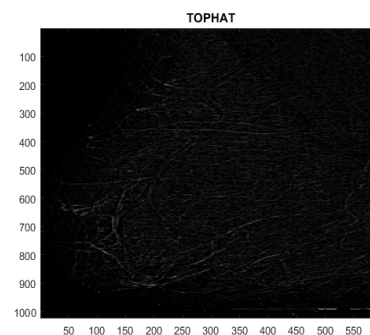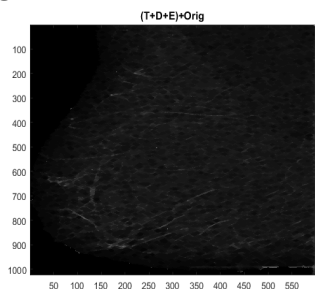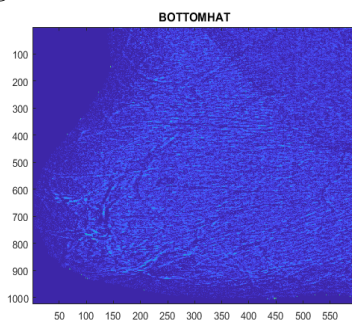
Figure-8: Image of Enhancement.

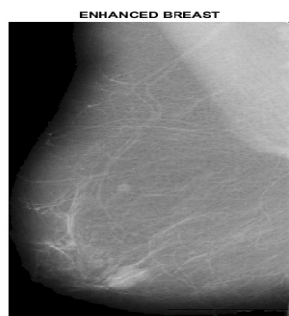**Figure-9:** Pectoral muscle Remove.

Figure-10: First Feature Extraction.

Figure-11: Second Feature Extraction.
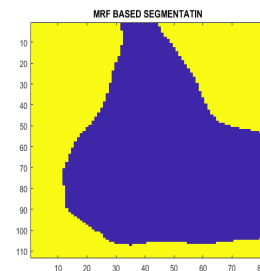

Figure-12: Third Feature Extraction.

Figure-13: Fourth Feature Extraction.

Fifth segmentation of imager: The image govern enhancement for segmentation the pectoral Muscaloval used by medium fitter {5.5} them resize, image Histogram used for correction of pixel distribution.


Figure-14: Fifth Feature Extraction.

Figure-15: Sixth Feature Extraction.

Sixth feature extraction in feature extraction used canny edge detector used image gradient for edge detection. an image gradient is a change is the intensity magnitude function are necessary for reconstruction of an image feature entrance resources required to describe a large set of data we used magnitude and histogram to extract different feature for father processes.
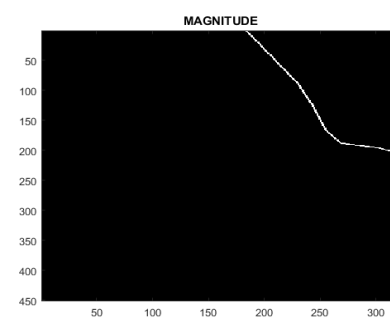
Figure-16: Magnitude of Image.
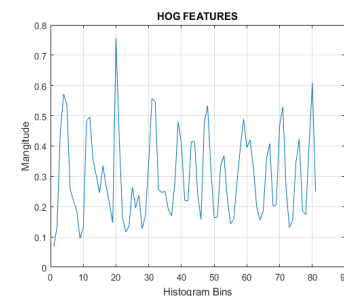
Figure-17: HOG Feature.

Expected Outcomes

We have used Image function of Mat lab tool for our work because Mat lab provide effective Digital Images Processing techniques and an extensive building block of function, calculation, programming, graphics, animation, portability across the platforms. Mat lab is simple most powerful platform to make support to Neural Network[9,10]. In our proposed work, GUI is used which has different buttons for preprocessing of images; Different algorithms of neural network are taken which are compared with our proposed model (MBPNN). Following images represent output of our proposed model.

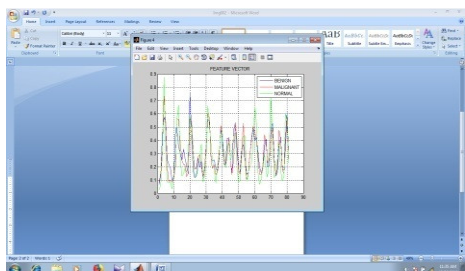**Figure-18:** Locating Tumor.

Figure-19: Output Window 1.

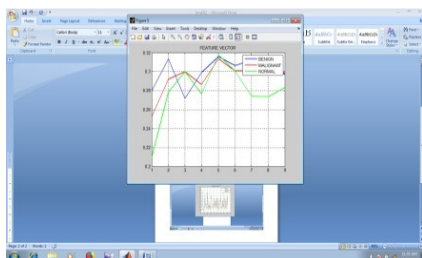**Figure-20:** Output Window 2.
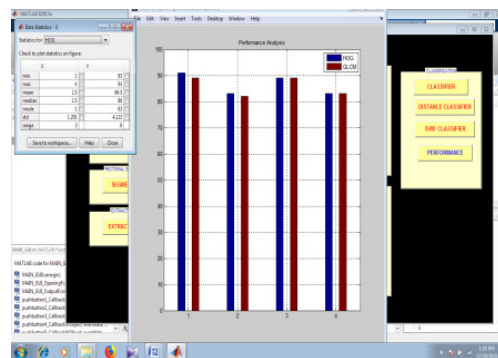

Figure-21: Output Window 3.
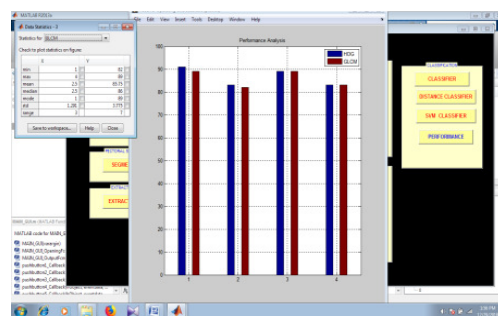

Figure-22: Output Window 4.

Figure-23: Output Window 5.

Performamance Analysis

In this paper, we have used different edge detection image preprocessing techinques and graph based feature vector (with 9*9 and 9/1feature). In this paper we also include graph based performance analysis with HOG and GLCM of traditional Artifical Neural Network (ANN), Support Vector Machine (SVM), KNN is tradition method later some changes were done and Distance Classifier was proposed. In our proposed Modifiy Model accuracy will be approx 91%, sansitivity 90% specifity 92% and traition ANN accuracy will be 88%, sansitivity, 83% specifity 82% and SVM and Distance Clasifier near to the same it accuarcy will be approx 83%. Performnce graphs will show our proposed Model will be given high accuracy than other models.

Conclusion

In this paper, Ann technique is used for medical image analysis. Our technique were present and compare with other technique and In PreProcessing, we have used different preprocessing techniques to remove noise from the images and to make best quality of images for futher work. In our proposed model we have used Neural Network and compare it with traditional Neural Netwrok SVM and Distance classifier. We have also compared its performance analysis feature, vector of HOG and GLM. Literature review have been done in this paper whch gave interesting knowledge of particuler feild. Some authors have repeated same models for different application, however some resercher have been pointing some limition for other models. We have extended our work by adding some feature.

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