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Deep Learning For Early Detection Of Brest Cancer Using Histopatholical Images

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ABSTRACT

Breast Cancer is one of the uncontrollable growth of malignant cells in the chest. The most common treatments used are chemotherapy or hormonal therapy using mammographic images, but the problem with mammographic images is complex and low contrast noisy. Deep Learning can extract high level abstract features from images automatically. Therefore, we have used histopathological images of breast cancer via supervised and unsupervised deep convolutional neural networks. The Pre-Processing process is followed by Image Segmentation where we have implemented Watershed Algorithm. The System has been developed using python Programming Language. In this system, we have used convolutional neural network (CNN) for Classification purpose which is one of the Deep learning techniques.

Keywords- Machine learning, CNN, Breast Cancer Detection

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I. INTRODUCTION

Breast Cancer has become one of the most common types of cancer among women. As per clinical statistics, every 1 out of 8 women is diagnosed with breast cancer in their lifetime. Early detection of breast cancer can offer the best treatment outlook. In order to detect signs of breast cancer, breast tissue from biopsies is stained to enhance the nuclei and cytoplasm for microscopic examination. To correctly detect and to diagnose breast cancer, radiologists face challenges due to the large amount of breast images they have to examine daily and the difficulty of reading the images. Thus, computer-aided detection and diagnosis (CAD) are essential through which a second opinion can be provided to physicians to aid and to support their decisions. Deep learning with Convolutional Neural Networks has emerged to be one of the most powerful machine-learning tools in Image classification, surpassing the accuracy of almost all other traditional classification methods and human ability. Also the convolutional process can simplify an image which contains millions of pixels to a set of small feature maps, which thereby reduces the dimension of input data while retaining the most important differential features.

II. PROBLEM STATEMENT

Breast Cancer is one of the uncontrollable growth of malignant cells in the chest. The most common treatments used are chemotherapy or hormonal therapy using mammographic images, but the problem with mammographic images is complex and low contrast noisy. Deep Learning can extract high level abstract features from images automatically. Therefore, we have used histopathological images of breast cancer via supervised and unsupervised deep convolutional neural networks.

III. LITERATURE SURVEY

[1] Prof. Kamalakannan J, Abinaya Vaidhyanathan , Tamilarasi Thirumal, Kansagara Deep MukeshBhai, Breast cancer is one of the crucially prevailing cancer among women. Early detection and diagnosis of breast cancer can be facilitating with mammography images since they are most cost effective and a good chances of recovery. Classification is an identification technique used to organize the data into categories. Classification algorithm identifies the severity of lymph's present in the breast. The entire study focuses on different classifier techniques which can be used after pre-processing and segmentation process to improve the accuracy result of the image and can be categorized as well. They made a study on suitable techniques for mammogram images such as decision tree, K-nearest Neighbour, Fuzzy KNearest Neighbour, Nave Bayes, Artificial Neural Network, Ensemble and Support vector Machine. For each classification, we consider the factor

such as sensitivity, specificity and accuracy which are chosen according to their suitable scenarios.

[2] Ketan Sharma,Assist. Prof. Bobbin Preet , in this paper Classification of the breast tissues into the benign and classes is a difficult assignment. The experimental results are takes 40 input images from DDSM dataset. They extract the GLCM, GLDM and Geometrical features from the mammogram images. In this paper they apply Convolution Neural Network as a classifier on the mammogram images to enhance the accuracy rate of CAD. Performance of the different classifiers is measured on receiver operating characteristic. In training stage, overall classification accuracy of 73%, with 71.5% sensitivity and 73.5% specificity for dense tissue is achieved by our proposed method along with it, accuracy of 79.23%, 73.25% sensitivity and 74.5% specificity is achieved for fatty tissue. Convolution neural network classifier is used to boost the classification performance. This classifier performs better than previous classifiers in that it shows more accuracy than the other classifiers, the misclassification rate of normal mammograms as abnormal. This approach performs good on overlapping problem.

[3] Abdulkadir Albayrak, Gokhan Bilgin , In this paper Breast cancer is the second leading cause of cancer death in women according to World Health Organization (WHO). Development of computer aided diagnostic (CAD) systems has great importance as a secondary reader system for a correct diagnosis and treatment process. In this paper, a deep learning based feature extraction method by convolutional neural network (CNN) is proposed for automated mitosis detection for cancer diagnosis and grading by histopathological images. The proposed framework is tested on the MITOS data set provided for a contest on mitosis detection in breast cancer histological images released for research purposes in International Conference on Pattern Recognition (ICPR'2014). By using provided histopathological images, cellular structures are initially found by combined clustering based segmentation and blob analysis after preprocessing step. Then, obtained cellular image patches are cropped automatically from the histopathological images for feature extraction stage.

[4] Shintaro Suzuki1 , Xiaoyong Zhang , Noriyasu Homma , Kei Ichiji , Norihiro Sugita, Yusuke Kawasumi , Tadashi Ishibashi , and Makoto Yoshizawa, In recent years, a deep convolutional neural network (DCNN) has attracted great attention due to its outstanding performance in recognition of natural images. However, the DCNN performance for medical image recognition is still uncertain because collecting a large amount of training data is difficult. To solve the problem of the DCNN, they have adopta transfer learning strategy, and demonstrate feasibilities of the DCNN and of the transfer learning strategy for mass detection in mammographic images. They have adopted a DCNN architecture that consists of 8 layers with weight, including 5 convolutional layers, and 3 fully-connected layers in this study .They first trainedDCNN using 1.2 million natural images for classification of 1,000 classes. Then, they modified the last fully-connected layer of the DCNN and subsequently train the DCNN using 1,656 regions of interest in mammographic image for two classes classification: mass and normal. The detection test is conducted on 198 mammographic images including 99 mass images and 99 normal images.

IV. PROPOSED SYSTEM

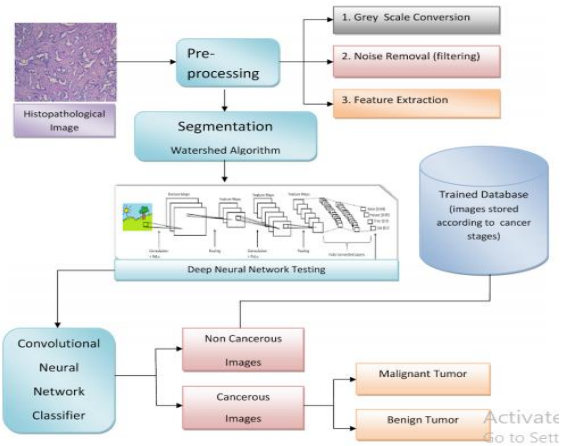

Fig 1. System architecture

The proposed system uses an unsupervised, deep learning based technique which uses Histopathological images in the detection of breast cancer. The images are first pre-processed to remove digitization noise, radio opaque artifacts, background and pectoral muscle which reduce the effectiveness of the deep network in detecting the cancer. The model is easy to apply and generalizes to many other scoring problems. The proposed model has achieved an accuracy in classifying dense Histopathological image.

V. CONCLUSION

The conclusion of this system is to detect cancer, demonstrate its stage and accordingly advise the patient to treat it and follow proper medicines given. It is always preferable to detect and treat cancer at early stage. In the proposed work, an unsupervised deep learning, technique is used in breast cancer detection from Histopathological images. The Histopathological images used in this work are obtained from publicly available database. The field of medical image processing gains its importance in the need of accurate and efficient diagnosis over a short period of time.

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