BREAST CANCER DETECTION USING CONVOLUTIONAL NEURAL NETWORK

A project report submitted to Jawaharlal Nehru Technological University, Kakinada in the partial fulfillment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY

In

ELECTRONICS AND COMMUNICATION ENGINEERING

Submitted by

M. G. GAYATHRI (19815A0415)

K .TIRUMALA (19815A0413)

P. BHAVANI (18811A0423)

Y.V.S.S. NIKHIL (18811A0435)

Under the esteemed guidance of

Mr. K. DHILLI, M.Tech.

Associate professor

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE and Permanently Affiliated to JNTU- KAKINADA, AP)

(An NBA, NAAC Accredited Institution) Tamaram (v), Makavarapalem (m),

Visakhapatnam – 533113

(2018 – 2022)

AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE and Permanently Affiliated to JNTU KAKINADA, AP)
(An NBA, NAAC Accredited Institution) Tamaram (v), Makavarapalem (m),
Visakhapatnam district-531113

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the project work entitled "BREAST CANCER DETECTION USING CONVOLUTIONAL NEURAL NETWORK" is being submitted for the partial fulfilment of requirements for the award of Bachelor of Technology in Electronics & Communication Engineering is an bonafide work done by **M.G.GAYATHRI (19815A0415)** , **K.TIRUMALA (19815A0413)**, **P.BHAVANI (18811A0423)**, **Y.V.S.S.NIKHIL (18811A0435)** under the guidance during year 2018 - 2022 and it has been found suitable for acceptance according to the requirements of the university.

INTERNAL GUIDE

Mr. K. DHILLI, M.Tech.
Associate professor
Department of ECE

HEAD OF THE DEPARTMENT

Dr. E. GOVINDA , Ph.D
Associate professor
Department of ECE

EXTERNAL EXAMINER

ABSTRACT

It is important to detect breast cancer as early as possible. In this manuscript, a new methodology for classifying breast cancer using deep learning and some segmentation techniques are introduced. A new computer aided detection (CAD) system is proposed for classifying benign and malignant mass tumors in breast mammography images. In this CAD system, two segmentation approaches are used. The first approach involves determining the region of interest (ROI) manually, while the second approach uses the technique of threshold and region based. The deep convolutional neural network (DCNN) is used for feature extraction. A well-known DCNN architecture named AlexNet is used and is fine-tuned to classify two classes instead of 1,000 classes. The last fully connected (fc) layer is connected to the support vector machine (SVM) classifier to obtain better accuracy. The results are obtained using the following publicly available datasets (1) the digital database for screening mammography (DDSM); and (2) the Curated Breast Imaging Subset of DDSM (CBIS-DDSM). Training on a large number of data gives high accuracy rate. Nevertheless, the biomedical datasets contain a relatively small number of samples due to limited patient volume. Accordingly, data augmentation is a method for increasing the size of the input data by generating new data from the original input data. There are many forms for the data augmentation; the one used here is the rotation. The accuracy of the new-trained DCNN architecture is 71.01% when cropping the ROI manually from the mammogram. The highest area under the curve (AUC) achieved was 0.88 (88%) for the samples obtained from both segmentation techniques. Moreover, when using the samples obtained from the CBIS-DDSM, the accuracy of the DCNN is increased to 73.6%. Consequently, the SVM accuracy becomes 87.2% with an AUC equaling to 0.94 (94%). This is the highest AUC value compared to previous work using the same conditions.

Keywords: The deep convolutional neural network, The support vector machine, The computer aided detection