iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** X **Month of publication:** October 2019

DOI: http://doi.org/10.22214/ijraset.2019.10107

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue X, Oct 2019- Available at www.ijraset.com

Melanoma and Breast Cancer Detection using Deep Learning Techniques

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Abstract: In this survey paper for the above titled project we will arrange melanoma pictures and breast disease information into benign and malignant. The undertaking is completed utilizing Breast Cancer Wisconsin Dataset and ISBI 2016 challenge in melanoma classification dataset. The breast cancer malignancy characterization is finished utilizing artificial neural system (ANN). Melanoma classification is finished utilizing Convolutional Neural Network (CNN).

I. INTRODUCTION

The portrayal of learning in the neural systems is identified with the idea of association between the neurons, which are the data handling components, and that interface with one another through associations, which speak to the neurotransmitters. Breast disease has been demonstrating to be a significant clinical affliction both in view of its articulated predominance and in light of the fact that it is one of the significant reasons for death in the female populace. As of now, it is one of the most widely recognized neoplasms around the world, and is the most often analyzed harmful tumor in ladies. Melanoma is a kind of malignancy that starts in the shade cells (melanocytes) of the skin. Melanoma malady shows up on the skin as pigmented moles or imprints. It can likewise spread to other body organs. Melanoma can be brought about by the abundance introduction to bright radiation from the sun. The way that melanoma body imprints can be mistaken for ordinary colors of the skin makes it difficult to order the skin shade into kindhearted or dangerous. Having a mechanized calculation to characterize melanoma pictures and breast disease tumors will bolster early determination and help improve malignant growth location execution. For a precise determination, restorative experience is crucial in the symptomatic test investigation, and particularly, to decide the malignant growth organizes. The distinguishing proof of malignant growths relies upon the doctor's translation from data got from the patients through assessments, and right determination in an untimely condition of the disease can help in basic leadership, activity arranging and treatment proficiency.

II. DATASET

A. Breast Cancer Wisconsin (Diagnostic) DataSet

The Breast Cancer Wisconsin (Diagnostic) Dataset is gotten from UCI Machine Learning. This informational index was made by Dr. William H. Wolberg, doctor at the University Of Wisconsin Hospital at Madison, Wisconsin, USA. Highlights are registered from a digitized picture of a fine needle aspirate (FNA) of a breast mass. Nine distinct factors: {Agglomeration of cells, Uniformity of the Cell size, Uniform Cell Shape, Marginal Adhesion, Epithelial Cells, Naked Nuclei, Descondensed Chromatin, Normal Nucleolus, Mitosis} were doled out to every cell test, utilizing standardized numbers in range (1,10) and a known benign and malignant class.[1]

B. ISBI 2016 Challenge in Melenoma Classification Dataset

The dataset is acquired from International Symposium on Biomedical Imaging (ISBI) 2016, challenge in melanoma arrangement facilitated by the International Skin Imaging Collaboration (ISIC). Training data included 900 pictures. A different test dataset of 379 pictures was given to gauge resultant execution of frameworks created with the preparation information. Ground truth for both preparing and test sets was produced by a board of dermoscopic specialists.[2]

III. PROPOSED SOLUTION

The breast cancer classification was carried out using a feed forward Artificial Neural Network (ANN). The structure proposed has input layer with nine neurons and five hidden layers. With three hidden layers in the second input neurons and one hidden layer in the final input neuron. Using activation functions, Rectified Linear Unit (ReLU) in the hidden layers and sigmoid activation function in the final layer.

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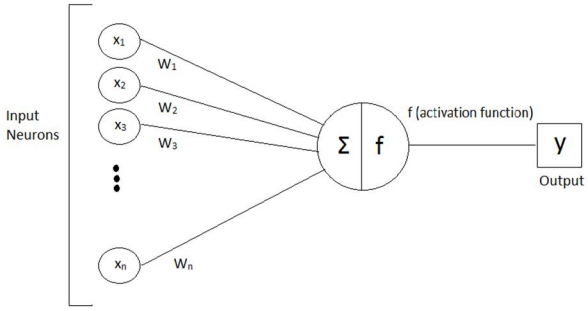

Fig1. Artificial neural netowrk

In Fig1 the neuron showing the input (x_1-x_n) their corresponding weights (w_1 – w_n), a bias (b) and the activation function f applied to the weighted sum of inputs.

The melanoma classification is done using convolutional neural network. A convolutional neural system is a class of deep neural systems, most normally applied to dissecting unstructured data or images. A convolutional neural system comprises of an input and a output layer, just as numerous hidden layers. The enactment capacity is regularly a RELU layer, and is along these lines pursued by extra convolutions, for example, pooling layers, completely associated layers and standardization layers, alluded to as hidden layers in light of the fact that their inputs and outputs are conceal by the activation function and last convolution. The last convolution, thus, regularly includes back propagation so as to all the more precisely weight the final result.

IV. EQUATIONS

The output for consecutive neurons in the ANN is calculated as, $f\left(\sum(w_i x_i + b)\right)$ here b is the bias , x_i are the input neurons and w_i are the weight associated with the inputs. The calculated sum is fed to an activation function f.

V. RESULT

In this module the evaluation of the implemented classification model, quantification and qualification parameters were used to determine the usefulness of the test in detecting the presence of benign and malignant tumors. The result will be finally presented through a web application developed in Flask framework of Python.

VI. CONCLUSION

In this undertaking a strategy for breast malignant growth and melanoma classification dependent on Artificial Neural Network and Convolutional Neural Network is proposed. The technique proposed utilized profound learning structure to group into benign and malignant cancer.

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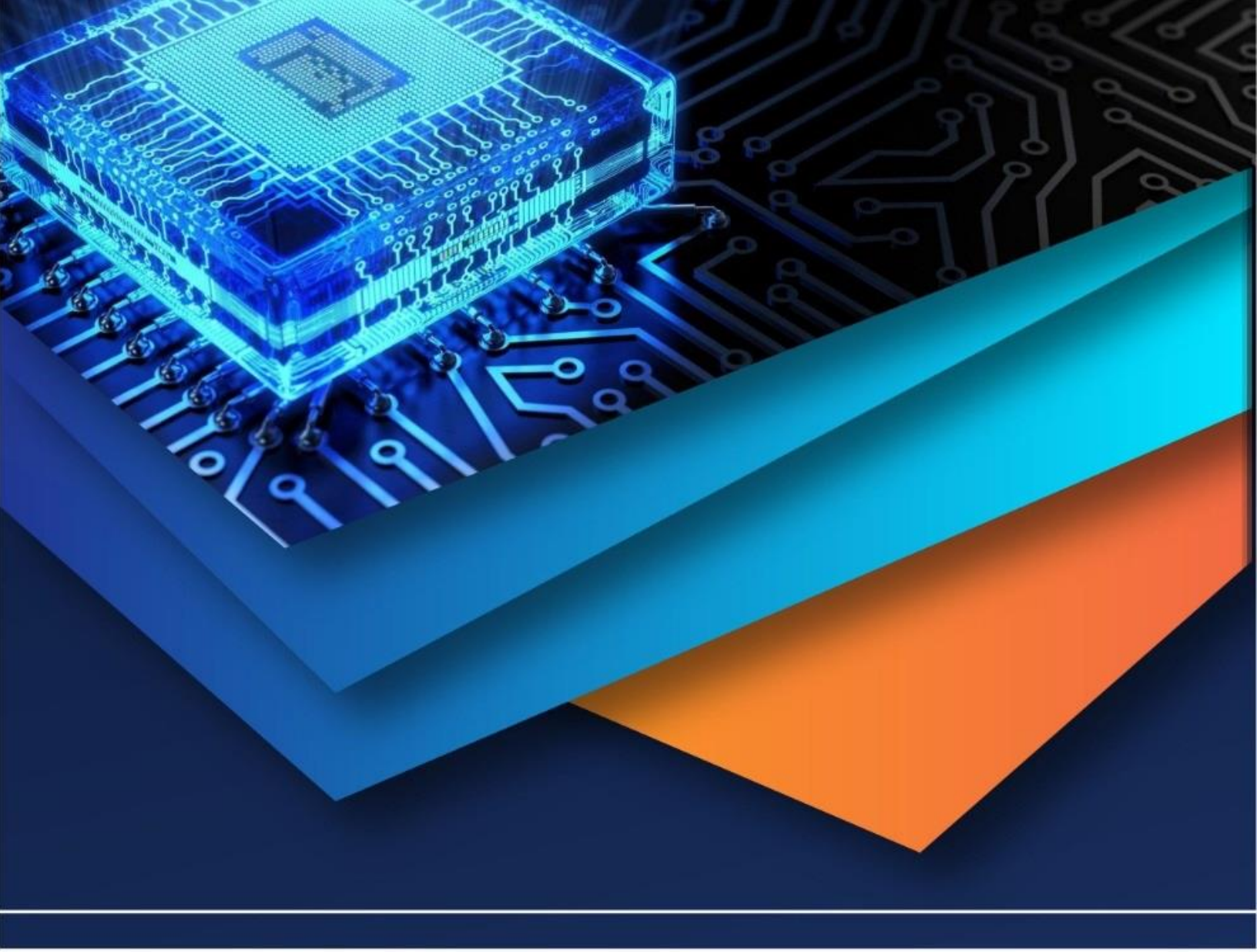

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