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SKIN CANCER DETECTION USING MACHINELEARNINGAND IMAGEPROCESSING

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Abstract:Skincancerisconsideredasoneofthemostdangeroustypesofcancerandthereisadrasticincreaseintherateofdeathsdue to the lack of knowledge on the symptoms and its prevention. In this paper, a dataset which includes two types of cancerouslesionimagesi.e.,melanomaandnevusandalsonon-cancerouslesionimagesarecollected.Thentheseimagesareputthroughpre-processingandsegmentation.Theseprocessedimagesarethenclassifiedasmelanoma,nevusornon-cancerousbyusingthreetypesofdeeplearningalgorithmi.e.,CNN(ConvolutionalNeuralNetwork),RNN(RecurrentNeuralNetwork)and LSTM(LongShort-Term Memory) andtheiraccuracyiscompared.

IndexTerms **-Melanoma, Nevus,ConvolutionalNeuralNetwork,RecurrentNeuralNetwork,LongShort-TermMemory**

I. INTRODUCTION

Human cancer is a complex disease caused primarily by genetic instability and accumulation of multiple molecular alternations.Cancerisoftendiagnosedandtreatedtoolate,whenthecancercellshavealreadyinvadedintootherpartsofthebody.Duetothese problems cancer has overtaken as the leading cause of death for any age group all over the world. Skin cancer is a condition inwhichthereisanabnormalgrowthofmelanocyticcellintheskin.Skincancerisoftenrecognizedbyalesionintheskin.Therareseveral types of skin cancer and in those the most dangerous type is Melanoma. If these types can be identified and treated at itspremature stage then the survival rates of patients can be increased. THUS, early detection at premature stage is necessary so thatonecanpreventthe spreadingof thistypeof cancer.

Inthispaper,weintroduceahybridmethod forskin cancerdetection thatcanbeusedtoexamineanysuspiciousskinlesion.Here,a dataset is trained using image processing steps and these images are tested using different deep learning algorithms. Initially, adataset which consists of images of two types of cancer i.e., melanoma and nevus and also non-cancerous lesion of skin image iscollected from Kaggle and the images are pre-processed. The pre-processing of the images is done by using OTSU thresholdingalgorithm. Then the pre-processed image data is subjected to segmentation process by using K-means clustering algorithm to gettheregionofinterest.Thissegmenteddatasetisthentestedusingdifferenttypesofdeeplearningalgorithmslike CNN(Convolutional Neural Network), RNN (Recurrent Neural Network) and LSTM (Long Short-Term Memory) Neural Network andthe output is predicted whether the image falls under any of the two types of cancerous lesion or non-cancerous lesion using thesethreedeeplearningalgorithms.

II. LITERATURE SURVEY

A. Vijayalakshmi MM, “Melanoma Skin Cancer Detection using Image Processing and Machine Learning”, International Journalof Trend in Scientific Research and Development, volume:3, Issue:4, May-June 2019. The paper focuses on the prediction ofwhether the skin lesion comes under the type malignant or non-malignant. To do so, some pre-processing steps were carried outwhich followed hair removal, shadow removal, glare removal and also segmentation. SVM (Support Vector Machine) which is adeep learning algorithm is used for the classification. The dataset used were from ISIC (International Skin Image Collaboration).Theaccuracy obtained by using thismethod wasobservedas96.06%which isagood accuracy compared to other algorithms.

B. Ahmed Wasif Reza, Samia Islam "Skin Cancer Detection Using Convolutional Neural Network (CNN)", Research Gate,Conference paper:2019 In this paper, the collected dataset images consist of two types of cancer i.e., benign and malignant. Theimages are firstly preprocessed and then by using CNN based approach the dataset is classified to predict whether the image isbenign or malignant lesion. For this model the dataset was collected from Kaggle. Here the accuracy of the model obtained was83%whichputsCNN model at a disadvantage compared toSVM.

C. Praveen Banasode, "A Melanoma Skin Cancer Detection Using Machine Learning Technique: Support Vector Machine" IOPConference Series: Materials Science and Engineering, 2021 Here, the dataset has been taken from ISIC (International Skin ImageCollaboration).Thepaperfocusesondetectingmelanomatypeskincancer.Theyhaveusepreprocessingonthedatasetimageusingbinarythresholdingandtheimageisundergonethroughfeatureextraction.ThedeeplearningalgorithmusedhereisSupportVectorMachine(SVM)forpredictingthefinaloutputandtheaccuracy obtainedduringthe processis96.9%.

III. METHODOLOGY

A. StepICollectingthedataset:Adatasetwhichincludeimagesoftwotypeofskincanceri.e.,melanomaandnevusandalsonon-cancerousimagesarecollectedfromKaggle.

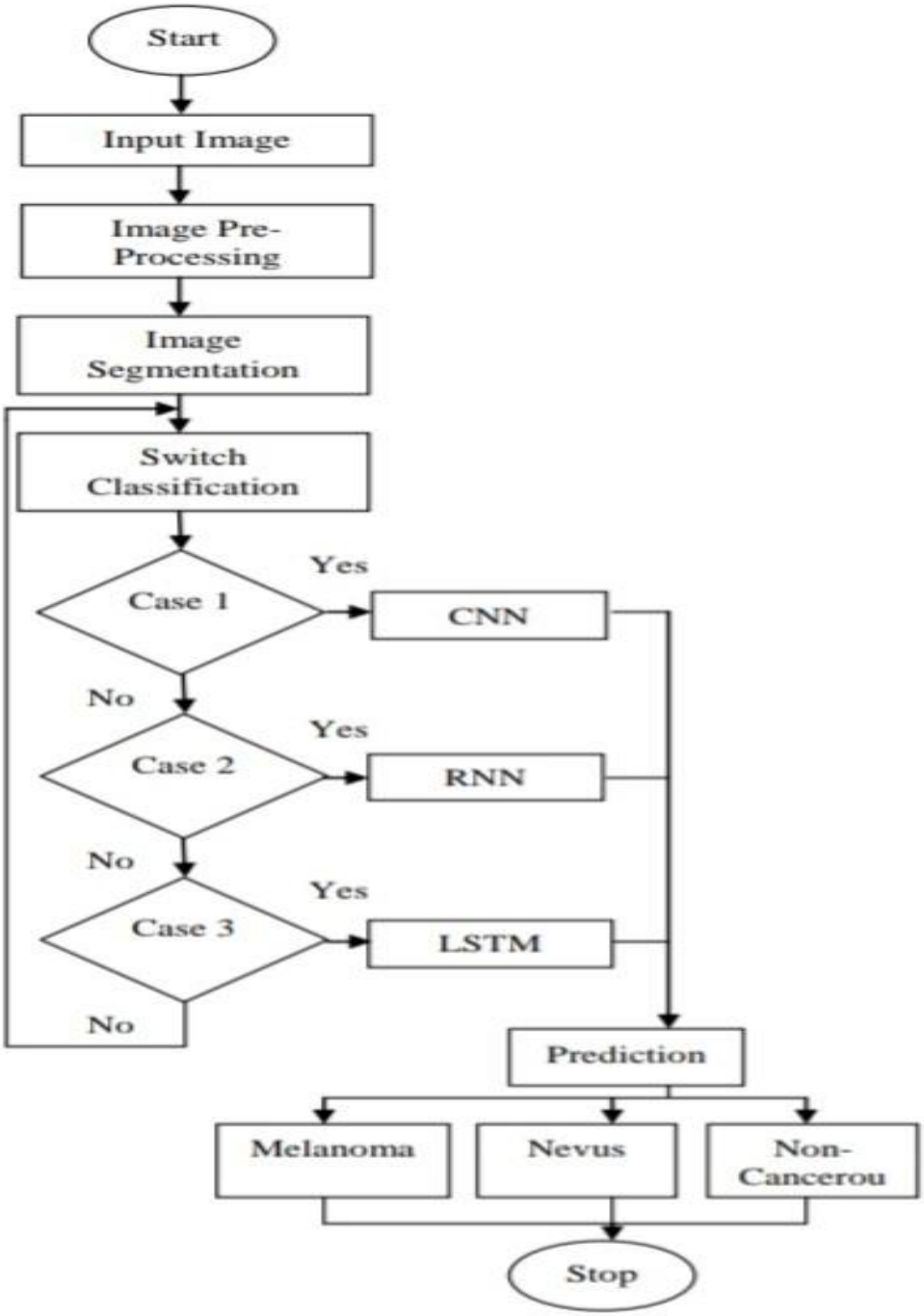

Fig1.Flowchartofthemodel

B. StepII:ImageProcessingInthenextsteptheimagesinthedatasetareputthroughimageprocessingsteps.Firstly,theimagesarepreprocessed.ForthisstepOtsubinarythresholdingalgorithmisused.TheOtsubinarythresholdingalgorithmwillreplacetheimagepixel into white in those regions where saturation is greater than T and into black in the opposite case, where T is the value ofthreshold. Here the area of the skin where the lesion is present is taken as foreground and the area where skin is present is taken asbackground.

Thenextstepofimageprocessingisthesegmentation.HerewehavedonesegmentationbyusingK-meansclusteringalgorithm.K-means clustering is an unsupervised algorithm which is used to segment the interest area from the background. In this case theclustering is done on the basis of color. The lesion is taken as one cluster and the skin region is taken as another cluster. Thus, wewillobtaintheregionofinteresti.e.,onlythelesionpartoftheimage.

C. Step III: Machine Learning Algorithm After obtaining the region of interest of the image the processed images area ready to gothroughclassificationtopredicttheoutput.Thus,forthepredictionweusethreedeeplearningalgorithmsi.e.,CNN,RNNandLSTM. Based on the accuracy parameter of each algorithm, the algorithm will predict whether the input image is non-cancerous or it willcome under melanoma or nevus type of skin cancer. For all the tree algorithm based on its accuracy the best among the three isidentified.

IV. ResultAndDiscussion

a b c

Fig2.(a)Inputimage,(b)Pre-processedimage,(c)Segmentedimage

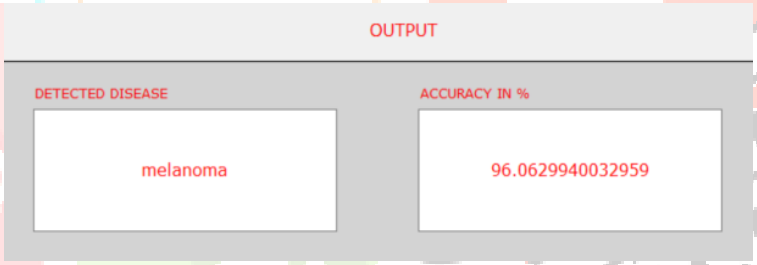

Fig3.PredictedoutputanditsaccuracyforCNN

Here the input image is going through pre-processing andsegmentationsteps. In pre-processingOtsubinarythresholding algorithmisusedwherethebackgroundisconvertedintoblackandtheforegroundwherethelesionispresentisconvertedintowhite.Thenby usingK-meansclusteringalgorithminsegmentation,theregionofinteresti.e.,theskinlesionpartisextracted.Thenbyusingdeeplearningalgorithmslike CNN,RNNandLSTMtheoutputispredicted.

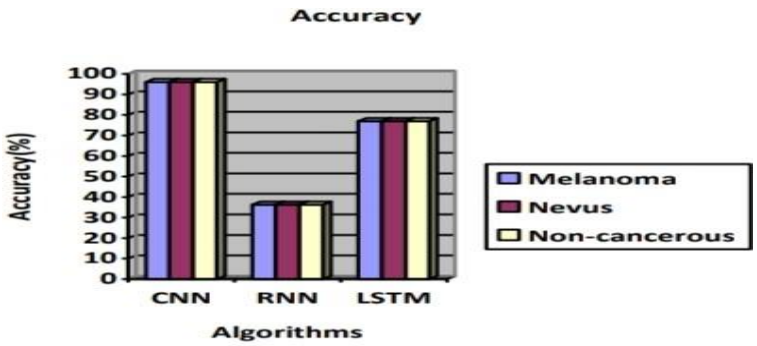

Fig4.AccuracyGraph

V. CONCLUSION

The image after going through pre-processing and segmentation the output is predicted using CNN, RNN and LSTM on whetherthe input image is melanoma, nevus or non-cancerous. By using CNN, we obtained accuracy of 96.06%, by using RNN the accuracyobtained is 36.28% andfor LSTM the total accuracy obtained is 76.99%. Here by using CNN algorithm we obtained the bestaccuracyandbyfarRNNalgorithmgivestheleastaccuracy.

REFERENCES

[1] VijayalakshmiMM,"MelanomaSkinCancerDetectionusingImageProcessingandMachineLearning",InternationalJournalof TrendinScientificResearchandDevelopment, volume:3,Issue:4, May-June2019.

[2] AhmedWasifReza,SamiaIslam"SkinCancerDetectionUsingConvolutionalNeuralNetwork(CNN)",ResearchGate, Conferencepaper:2019

[3] PraveenBanasode,"AMelanomaSkinCancerDetectionUsingMachineLearningTechnique:SupportVectorMachine"IOPConfere nceSeries:Materials ScienceandEngineering,2021

[4] ArslanJavaid,MuhammadSadiq,FarazAkram,"SkinCancerClassificationUsingImageProcessingandMachineLearning", IEEE,2021

[5] MohammadAliKadampur,SulaimanAlRiyaee,"SkinCancerDetection:ApplyingaDeepLearningBasedModelDrivenArchitectur ein CloudforClassifyingDermalCell Images",Informaticsin Medicine,Volume18,2020