Skin Disease Recognition Using Texture Analysis

# ShardaSihore1,KoyalTijare2,RohiniParadhi3,Pratikshameshram4,Shubham Chandankhede5

**Assist.Prof.1SujalShelke**

*WaingangaCollege ofEngineeringandManagement,Nagpur,India,441114*

*Shardasihore7@gmail.com,koyaltijare07@gmail.com,rohiniparadhi12@gmail.com,*

*pratikshasampatmeshram6@gmail.com,chandankhede14@gmail.com*

***Receivedon****: xxxx,20xx,* ***Revisedon****:xxxx,20xx,* ***Publishedon****:xxxx,20xx*

***Abstract***

Dermatologyusing texture analysis is a method thatanalyzes and detects skin diseases only from images, sopeoplewholiveinremoteareasorhavelimitedmobilitycaneasilycuretheseskinproblems.Thedetectionofskindiseasesismainlybasedonthedoctor's experience and the time-consuming results ofskinbiopsy.Thismethodismobile-based,soitisaffordable even in remote areas and is non-invasive tothepatient'sskin.Theproposedsystemisveryuseful

in rural areas where access by dermatologists is limited.Help patients and dermatologists determine the type ofdisease based on the pictures of the affected area at theinitial stage of the skin disease. These results indicatethat the proposed system can help general practitionerseffectivelyandefficientlydiagnoseskinconditions,thereby reducing further complications, Condition andmorbidity.

***Keywords-****Communication,handgestures,gesturelanguage,ArtificialNeuralNetwork(ANN),convolutionalneuralnetwork(CNN)*

## INTRODUCTION

Today, human beings be afflicted by pores and skinillnesses, greater than a hundred twenty five millionhuman beings be afflicted by psoriasis, and withinside the beyond few decades, the pores and skin candevelop rapidly, particularly melanoma, that's themaximumnumerousporesandskincancer.Theoccurrence of dermatophytes is high, particularly inrural areas. Early pores and skin illnesses may beavoided with the aid of using checking the inflamedlocation early and its severity Skin tone and poresand skin tone play an essential position in figuringout pores and skin conditions. The dependable extraremedy for early detection. In this document, theproposedmachineisusedtowithoutproblemsdiagnosenumerouskindswiththeaidofusingstudyingstatisticalparameters.Statisticalevaluationofferswiththeevaluationofrandomstatistics.Therandomdateisaporesandskinsample. disorder Use a preferred database. Thesestatisticshaven'tanymathematicalexpressions,they've positive statistical properties. To examinerandomstatistics,wewanttoinvestigateitsstatistical properties. With the development of thepresent day generation, a huge quantity of clinicalstatisticsisgeneratedeachday,whichincludespreciousandessentialdataapproximatelythepatient.Image-primarilybasedtotallysyntheticintelligenceisturningintoincreasinglymorefamousintreatingpositiveclinicalconditions(particularlyporesandskinconditions).Thediagnostic accuracy of a pc machine in large partreliesuponontheselectionofsuitablefunctions,

the supply of the classifier and statistics set used,and the range of photos on which the version istrained.

ConvolutionalNeuralNetworks(CNN)arenormally used for sample popularity and categorytasks.Tohigherrecognizetheone-of-a-kindpaintings of researchers, we reviewed one-of-a-kindtechniques of classifying pores and skin illnesses.This article is split into 4 parts. Present precedingknowledge; the character of imaging and the usageofconventionalanddeepgettingtoknowtechniques to categorised pores and skin illnesses.The 1/3 element summarizes the conventional orcharacteristicextractiongenerationandCNN-primarilybasedtotallyporesandskindisorderremedy techniques, Identification and category. ThefourthphaseintroducestheevaluationandoutcomesofconventionaltechniquesandCNNprimarilybasedtotallytechniques,andthe5thphaseintroducesthe conclusions.

Theproposedmachineisamixedversionforprevention. And early detection of pores and skincancer, psoriasis and dermatophytosis. Basically, theprognosis of pores and skin illnesses relies upon onnumerouscharacteristics,includingshadeation,shape, texture, etc. There isn't anyt any universallywidelywide-spreadremedyforporesandskinillnesses isearlydetection,that's a

* Developawebinterfaceplatformfordiseaseprediction.
* Itisnot recommendedto usedrugsforthis disease.
* Nomedicalhistorywasconsidered.
* ImplementanaiveBayesclassifier thatclassifiesdiseasesbasedoninput.

**LiteratureReview**

There is a research about bag of features in whichresearchersbringSURF(SpeededUPRobustFeature) inside for improving efficiency of featureextraction,imagerecognitionandclassification.The researchers also used SPM to provide higheraccuracy.Moreover,LIB-SVMwasusedforclassificationofcodebookofhistogram[5].

In [3] the researchers talk about speeded up robustfeatures (SURF) that is a fast method having highaccuracy because of combining steps of matchingwith noveldetectionfor objectrecognition.

In [6] researchers develop an automated system todetect disordered parts in a face. The researchersbased on results conclude that digital images aresufficientfor detectionofabnormal parts[6].

Somestudyregardingskindiseasesinchildrenshows thatmost of experts working in clinic needto know the history of patients beside examination,since describingthe findings is an essential aspectinclinicalassessment [2].

Therearealsocertaindisadvantagesofthecurrentimageprocessingtechniquesusedforskindiseasedetection.Themainproblemwiththemedianfilteris its high computational cost. Also, the softwareimplementationofmedianfilterdoesnotprovideaccurateresults[4]. Theissuewith sharpeningfilteristhatwhenahighpassmaskisappliedtotheimage,therearenegativepixelvaluesintheoutputimage.

Thecurrentpracticesusedbydermatologistsinclude biopsy, scrapings, diascopy, patch testingandprickTestwhichareinvasivemethodsofdetection.Inpatchtestingandpricktest,theallergen is directly applied to the infected area. Theskin might take a long time even several days toreacttothe allergen[1].

The KNN models are not appropriate to use withlarger-size data models, as it may take a significanttime in performing the predictions of the outcome.Inaddition,themodelperformspoorlywhenworkingwithhighdimensionaldatawithinappropriatefeatureinformation,whichmightimpact the performance of the model in accuratepredictions[8],whichhasmadethemodelinappropriatefor theskindiseaseclassification.

The image is classified based on intensity though astatisticalapproach,namelyGrayLevelCo-occurrenceMatrix(GLCM)extractsthefeaturesthatappearintheacquiredimage,usuallythetextured-basedparameters[9].

K-NearestNeighbor(KNN)[7]isthepredominantlyusedclassificationmodelwidelyusedinforecastingandpredictivemodels.Themodelsdonotneedtrainingofthemodel.Moreover,theaccuracyoftheKNNmodelisconsiderably high.

# II.ProposedMethodology



**Fig**.1:BlockDiagramofSkinDisease ClassificationSystem

This section introduces a systematic method foridentifying, extracting and classifying skin diseases.Thissystemhelpstodetectmelanoma,eczemaandpsoriasis.Thestructureofthewholesystemcanbedivided into several modules, including preprocessing,extraction andclassification.

## InputAcquisition:

Image acquisition in image processing is step one withinsidetheworkflowsequenceWheretheenterphotographs are acquired both by taking pictures thephotothrudigitaldigicamoramassingthephotoimmediately from the database. Further processing isn'tfeasibleifthe reisanophoto.

## Preprocessing-

Use preprocessing techniques to remove unnecessarydistortionfromphotostatistics.Thephotolengthwill

be scaled to a single 360X360 ratio to get the correctfeature class result. Then convert the photo from RGBto grayscale. Achieve higher photographic quality. Thehairandvariouspigmentsinthepatterncanberemoved through the filter medium. For example, inorder to achieve theoverallperformance of theskinand pore detection system, some serious problems mustbeovercome.Createbasicstatisticsandstandardizeimages. The next section will explain howto resizephotos.

## Segmentation-

The process of dividing a virtual photo into multiplesegments is called segmentation. This step is necessaryto simplify the photo and make it difficult to identifyandanalyze.Thesegmentationmethodisespeciallyaimedataffectedporesandaffectedskin.Segmentation uses thresholdentropy method.



Fig.2.ExampleofOriginalimageofPsoriasisDatabase

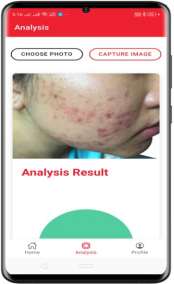


Fig.3.ExampleofresizingimageofPsoriasisDatabase

## FeatureExtraction

Thefirstisaconvolutionalnetwork.(CNN)isacollectionofcompositelayerscontaininglinearandnon-linear processes. These layers are tested together.The basic building blocks of many CNN models are: aconvolutionallayer,agroupinglayer,arectifiednonlinearlinearunit(ReLU)layerconnectedtoageneralmulti-layerneuralnetworkcalledafullyconnected layer, and a lossy layer on the back. CNN isknown for its high performance in image processingtasksandnaturallanguageprocessingapplications.Feature extractionis used to identifyinputpatterns.This is a very difficult step and highly depends on theperformanceoftheclassifier.Co-occurrencematrix(GLCM)isusedforfeatureextractionintextureanalysis. Property i.1) Energy: Returns the sum of thesquares of the elements in the GLCM. For a constantenergyimage,therangeisfrom0to1to1.2)Correlation:Forapositivelycorrelatedimage,therangeisnegative1to13)Contrast:Inthe entireimage,

Theintensitycontrastbetweenapixelanditsneighboringpixelshasthesamemeaning.4)Homogeneity:measuretheclosenessoftheelementdistributionin theGLCMtothediagonalGLCM.



Thevaluerange is0to1.GLCMdiagonal,

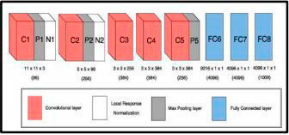


Fig.4.AlexNet blockdiagram

AlexNetisadetailedCNNmodeldevelopedbyKrizhevskiymetal, used to model 2012 Image Net, usedto solve the main visual recognition problem (ILSVRC2012).AlexNetiscomposedoffivelayersoffolds;in

whichaReLUlinelayerisaddedaftereachconvolutional layer. In addition, the first, second, andfifth layers contain the largest grouping layer, as shownin Figure 2. In addition, the two normalization layersafter the first and second convolutional layers overlap.Plus two fully connected layers on the model, followedbyasmoothtoplayer.AlexNetreceivedtrainingon

1.2 million images in more than 1,000 categories. Werecommendextractingfeaturesfrompre-trainedconvolutionalneuralnetworks.Becausethisistheeasiestandmostreliablewaytousepre-builtdeeplearning networkfunctions.

## 4.Classification-

Classification is a computer vision technology. Afterfeatureextraction,theclassificationtaskistouseSupport Vector Machine (SVM) to classify the image.IfSVMmakesmoreuseofthefunctionsextractedfrom the training set, a course can betrained. ...Segment sizes are sorted. In this system, itbasically consists of three levels: input level, hiddenlevelandoutputlevel.Here,theblackpropagationalgorithm (BPN) for the classifier is used for training.The hidden leveland output level adjust thevalue ofthe weight. The various features are classified based oninference errors. In the BPN algorithm, the signal flowis positive.Every time the output signal is comparedwith the desired output, if the output signal does notmatch the output signal generated by the network, anerrorsignalwillbegenerated.Theerrorsignalpropagates back to the input layer, and the weights inthe hidden layer are adjusted so that the error signal isthesame.Atthebeginningoftraining,theentrylayer

and hidden layer are randomly initialized during theBPN algorithm. This process continues until the errorreaches zero.

# III.Result

Fig.6outputaftertrainingofolddataset(12000images)

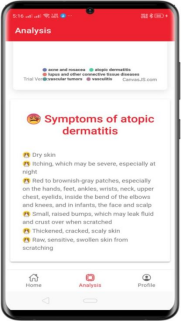


Fig.6Analysisresult

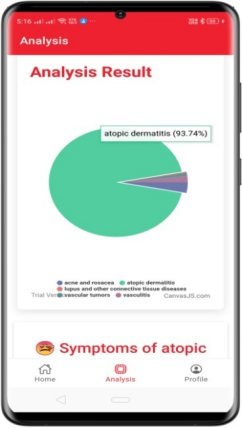


Fig.7Analysisresult

# Conclusion

The skin disease recognition using texture analyses canbe determined usingneural system determination ofskin illness and can be achieved through the variousstepslikeimageacquisition,featureextraction,classification,verymuchcharacterizeddivisionandarrangementmethod.Usingbackpropagation

algorithm, we can diagnosis the multiple skin diseasesas well as classify skin disease. The numerous imagesarerecordedanddeterminationofskindiseasesisusingtextureanalysis.Thecollectedskindiseaseimages are set together gives practical, less demandingand quicker finding for understandable ranges. Thesehelps in identifying the disease earlier and patient canbe treated immediately. This also enhance the generalproductivityandalsoreducesthecomputational time.

# References

[1].D.A.Okuboyejo,O.O.OlugbaraandS.A.Odunaike,”automatingskindiseasediagnosisusingimageclassification,”ProceedingsoftheWorldCongress on Engineering and Computer Science 2013VolIIWCECS2013,23-25October,2013.

[2].S.Arivazhagan,R.N.Shebiah,K.DivyaandM.P.Subadev, “Skin disease classification by extractingindependentcomponents,” Journal of Emerging TrendsinComputingandInformationSciences,vol3,pp1379-1382.,2012.

[3]. Y. P. Gowramma, N. Pavithra, S. B. Manasa, B.P.PeetambariandVimala“Detectionofskindiseaseusingcurvlets,”InternationalJournalof Research inEngineering and Technology, vol. 3(3), pp. 344-348,2014.

[4]. A. Putra and M. T. Rinaldi, “Implementation offuzzyinferencesysteminchildrenskindisease

diagnosisapplication,”The5thInternationalConference on Electrical Engineering and Informatics2015. August 10-11,2015,Bali, Indonesia.

[5]. Al. Abadi, N. K.; Dahir, N. S.; Alkareem, Z. A.(2008): Skin texture recognition using neural network,in Proceedings of the International Arab Conference onInformationTechnology,Tunisia,December16-18,pp.1-4.

[6].Blackledge,J.M.;Dubovitskiy,D.A.(2009):Textureclassificationusingfractalgeometryforthediagnosis of skin cancers, in Proceedings of EG UKTheory and Practice of Computer Graphics, UK, pp. 1-8.

[7]. Bovik, A.C.; Clerk, M. and Geisler, W. S. (1990):Multichanneltextureanalysisusinglocalizedspatialfilters,IEEETransactionsonPatternAnalysis&MachineIntelligence,12(1),pp.55-73.[8].Haralick,

R.M. (1979): Statistical and structural approaches toTexture, Proceedings ofIEEE, 67(5),pp.784-804.

[9].Kopec ,D.; Kabir, M. H.; Reinharth, D.;

Rothschild ,O. and Castiglione ,J. A. (2003): Humanerrors in medical practice: systematic classification andreduction with automated information systems, JournalofMedical Systems,UK,27(4),pp.297-313.

[10]. Lepisto, L. (2003): Retrieval of non-homogeneoustexturesbasedondirectionality,DigitalMultimediaProcessingforMultimediaInteractiveServices, Proceedingsof 4thEuropeanWorkshoponImageAnalysisforMultimediaInteractiveServices,Queen Mary, University of London, UK,pp.107-110.[11].Pentland,A.P.(1984):Fractalbaseddescriptionsofnaturalscences,IEEETransactionsonPatternAnalysis and Machine Intelligence, 6(6), pp. 661-674.[12].Rubegni,P.etal.(2002):AutomatedDiagnosison PigmentedSkinLesions,InternationalJournalonCancer,101,pp.576-580.

[13].Smach,F.et.al.(2006):Designofaneuralnetworkclassifierforfacedetection,JournalofComputer Science,2(3),pp.257-260.

[14].Shyu,C.R.;Kak,A.;Kosaka,A.(1999):

ASSERTaphysicianintheloopCBRSforHRCTimage,databases,Comp.VisionandImageUnderstanding, 75(1),pp.111-132.

[15].Tahmoush,D.;Samet,H.(2007):AWebcollaborationsystemforcontentbasedretrievalofmedicalimages,ProceedingsofSPIEMedicalImaging

– PACS and Medical Informatics, 6516, San Diego,USA.

[16].Tamura,H.;Mori,S.;Yamawaki,T.(1978):Textural Features Corresponding to Visual Perceptions,IEEE Transactions on Systems, Man and Cybernetics,8(6),pp.460-473.

[17]. Xia, S.; Mo, W.; Zhang , Z. (2005): A contentbasedretrievalsystemforendoscopicimages,Journal

ofInformation Technology,11(2),pp.27-32