

Performance Evaluation of Hybrid Color Constancy with Illumination Normalization for Dermoscopy Images

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ABSTRACT: Color constancy has ability to restore the actual colors in given image by evaluating the effect of color light source. Many color constancy techniques has been proposed so far to enhance the color constancy accuracy rate further. But in existing literature no such a technique is found which behaves optimistically in every case. Although the dermoscopy image classification using color constancy has shown effective results over available techniques, but it still suffers from the issue of uneven illuminate, random noise and poor brightness. Therefore to handle this issue a new integrated dermoscopy image classification using color constancy approach is proposed in this paper. The new approach has used illuminate normalization and alpha trimmed median based image noise reduction as post processing of dermoscopy image classification using color constancy to reduce the effect of random noise and poor brightness.

KEYWORDS: color constancy, dermoscopy, illumination, alpha trimmed median filter.

I. INTRODUCTION

DERMOSCOPY

In this segment, the different analytic calculations, which have picked up the biggest enthusiasm among dermoscopy clients, will be quickly inspected. In the initial step, the calculation recognizes whether a sore is melanocytic or non-melanocytic. On the off chance that yes, different calculations might be utilized to recognize kindhearted melanocytic sores from threatening melanoma. Design investigation was the primary dermoscopic strategy exhibited for diagnostics of pigmented skin injuries. This technique has further been adjusted and refined by the International Dermoscopy Society (IDS). The different calculations with the biggest effects are ABCD standard and the 7-point agenda. These strategies were assessed in the 2000 accord net meeting [7], indicating comparable results on affectability formelanoma, yet specificity contrasted marginally for example investigation. Indeed, the ABCD guideline and the 7-direct agenda endeavor toward improve the example investigation strategy by examining just a little sub-set of dermoscopic structures and make a scoring framework. Accordingly, the exactness of these streamlined frameworks are to some degree lower than the full framework, design investigation. For more subtle elements on the dermoscopy of pigmented skin injury [8].

A. Pattern Analysis

Conclusion taking into account design examination requests a basic evaluation of the dermoscopic highlights found in a pigmented skin injury. It gives the underlying meanings of numerous examples, called dermoscopic structures, which have turned out to be basic in the clinical analysis of skin sores. The initial step is to choose whether the injury is melanocytic or non-melanocytic via hunting down the nearness of pigmented structures or the particular elements of non-melanocytic sores. The fundamental objective for the second step is to make an exact differential finding between

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(An ISO 3297: 2007 Certified Organization)

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amiable melanocytic sores and melanomas. The imperative elements in recognizing these two gatherings are the overall general appearance of shading, building request, symmetry of example, and homogeneity, likewise known by the acronym CASH authored. Melanocytic nevi have few hues, a general outline, and symmetrical examples. Interestingly, harmful melanoma frequently has a few hues, design issue, deviated examples, and heterogeneity.. It includes the CASH scores for an aggregate score of 2 to 17. The score of 7 or less is likely kindhearted and the CASH score of 8 or more is suspicious of melanoma [9]

B. The 7-Point Checklist

The dermoscopic seven point agenda is another endeavor to formalize/disentangle design investigation by appointing focuses to particular dermoscopic structures. This agenda comprises of 3 noteworthy components: atypical shade system, dim blue zones and atypical vascular example and in addition 4 minor criteria: streaks, blotches, unpredictable spots and globules and relapse designs. At the point when any of the significant elements is recognized in a melanocytic injury, prompt assistance from wellbeing experts is prescribed. The presence of any minor components is encouraged to be observed frequently. The min or criteria are worth 1 point each while the major are worth two. A last score is ascertained by summing the point estimation of every criteria that is available. On the off chance that the score is ≥ 3 , then the sore is delegated melanoma. As of late, a further rearranged calculation has been created for non-specialists to screen for skin growths. This strategy considers just 3 criteria and is called 3-point. Asymmetry, atypical system and blue-white structures are the three demonstrative criteria of this strategy [10].

C. Color constancy

Shading steadiness is among subjective consistency in addition to a component through the human pigmentation observation programming which ensures that the found shading associated with items remains moderately consistent under different enlightenment conditions. An eco-accommodating apple for instance looks eco-accommodating keeping in mind the end goal to individuals with early afternoon, ought to the primary gear and lighting will be lighting daylight, and what's more at sun, when the guideline enlightenment will be red. This helps us recognize objects. Shading steadiness will be the ability to comprehend hues associated with articles and additionally the shading through the mellow present. Acquiring shape steadiness might be esteemed with tending to for some pc creative and insightful vision applications, for instance for case picture availability, picture variety, shade point acknowledgment other than item checking. Shading steadiness is with the goal that you can comprehend the fairly visit shading for all intents and purposes any subject moreover under different brightenings. Many methods are pixel-based, comprehending another visual therefore which their information fulfill suspicions simply like the normal force from an own planet inside basic moderate are planet scene. Shade Credibility can be limit to see shades of elements, invariant to alongside of normal source. This capacity is for the most part authorized for that Individual Cosmetic Process, despite the fact that exact subtle elements stay dubious [11].

Shading steadiness would be the ability to accomplish a particularly consistent shading for only a hobby what's more under a considerable measure of enlightenments. A few pc techniques are pixel-based, altering a photograph to ensure that its information meet suspicions, for example, run of the mill vitality on the planet under straightforward delicate are world scene. Shading consistency is ability to see tints of focuses, invariant to notwithstanding of delicate source. That limit is typically ensured towards Individual Cosmetic Process, however precise actualities stay unverifiable. Shading change procedures are usual to manage the cost of light conditions. In Individual recognition these sorts of change is known as Color steadiness the extents to acknowledge are locally visit shade for only an item moreover under adjusting brightening. About all process practices are pixel centered, explaining a photograph to guarantee that their data meet presumptions for instance the typical vitality on the world underneath natural normal is colorless, or that unmistakably illuminant, there's a deficient level of evaluated hues inside a true field. Different projects have been wanted to make utilization of components inside spot associated with pixels, for example, bigger discover subordinates or homogeneous shading districts [12].

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These elements are picked great chance with a specific end goal to best describe the illuminant shading and discount this shade on the things inside scene. For instance, bigger discover subsidiaries are utilized great forecast the regular associated with reflectance varieties inside a world can be colorless. However, to the ideal of information, nothing associated with today's techniques account absolutely for reality that additionally at the level of the precise pixels, the consistency of notwithstanding learning ranges. Include contemplating shade control, a technique for measuring shade information unwavering quality. Shading can be a vital cautioning for PC vision notwithstanding picture administration associated topics, similar to capacity extraction, man PC association, and shade look models. Hues influencing pictures are built up by the inborn resources of things and materials, also for the reason that shading on the illuminant. For any hearty shading based procedure, the results on the light should be hindered out. Shade Constancy would be the ability to accomplish the right hues, alone on the illuminant incorporated into the scene. Human stance possesses an all-regular ability to repair huge implications on the delicate asset. In any case, the assignment that is associated with this force is simply not even completely caught on. Unequivocally the same procedure isn't immaterial with a specific end goal to hardware inventive and insightful vision strategies in an unconstrained field [13].

II. COMMERCIAL COMPUTER-AIDED DIAGNOSTIC SYSTEM

Advances in computer science and connected arithmetic are presently permitting the essential innovation of dermoscopy to be stretched out to a more unpredictable application: foreseeing whether watched spots are malignant. A few groups are progressing in the direction of PC helped conclusion of melanoma utilizing diverse scientific and expository methodologies. PC programming can be utilized to document skin pictures and permit remote finding and reporting by a dermatologist (advanced epiluminescence microscopy, teledermoscopy, mole mapping). MoleMap NZ is such a framework which is utilized for chronicling and patient administration. A few frameworks, for example, SIAscope, SolarScan (additionally called MoleTrac) and MelaFind offer shrewd projects to help in conclusion by contrasting the new picture and put away cases with average components of favorable and threatening pigmented skin injuries. Given great pictures of the fitting injury, they might be as precise as a specialist dermatologist [15].

Be that as it may, they are not especially helpful for non-pigmented sores and they can't settle on the choice which injuries ought to be picture. To the best of our insight, nothing from what was just mentioned frameworks depends on the recognition and examination of particular dermoscopic designs which is the standard in clinical determination of injuries. They are assembled in view of the general picture handling methodologies, (for example, shading, surface and other picture insights of the whole sore) and picture recovery strategies that can't discover the dermoscopy structures and their anomalies which are vital elements for the melanoma determination.

A. SolarScan Melanoma Monitoring

SolarScan is a gadget valued for use by individual specialists and created by Australian startup Polartechnics, with help from Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) and the Sydney Melanoma Unit. SolarScan utilizes picture investigation, which has transformed analytic criteria utilized by specialists into characterized choice trees that lead toward or far from a choice to general doctors (GPs) analyze melanoma. The gadget works by catching a picture of a patient's skin spot utilizing an item molded like a hair dryer with an inherent surface magnifying lens. Picture examination programming expels incidental things from the picture like hairs and oil air pockets and investigations the spot's components, for example, its shape and shading. SolarScan then looks at the elements against pictures of melanomas and non-melanomas in a database, giving back a guidance to a GP. A record of the spot's status can be put away in Polartechnics' Body Map programming with the goal that it can be rechecked some other time if fundamental [17].

B. MoleMax

MoleMax (Derma Medical Systems, Vienna, Austria) is a PC based energized light dermo-scope. The spellbound light source is utilized with the hand-held video dermoscope for closeup imaging and does not require any oil drenching or

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contact liquids between the skin and the video head. The MoleMax programming is advantageous for subsequent examinations, as the straightforward overlay highlight plays out an institutionalized correlation of pictures with past information.

Aside from live-video dermoscopy, MoleMax likewise permits absolute body photography and makes an advanced guide of the skin of patients with high-chance components and various pigmented sores. These images can be utilized as a baseline for correlation when suspicious changes are found and for subsequent melanoma screening visits. MoleMax naturally investigations caught dermoscopy pictures giving a score that figures out whether a pigmented skin injury is generous or threatening. The programmed calculation investigations the injury in view of the ABCD variables. In spite of the fact that it is not a last conclusion the danger score depends on an extensive and demonstrated database.

C. SIAscope

The SIAscope (SIA: Spectrophotometric Intracutaneous Analysis) is a mechanized dermoscopy gadget that utilizes 12 wavebands to assess the skin, as opposed to ordinary broadband white light. It is a handheld therapeutic gadget utilized as a part of conjunction with the MoleMate and MoleView scope of programming. Examples of collagen, vascular and melanin circulation are distinguished inside the injury from the spectrophotometric investigation of a skin sore.

- MoleMate is a non-intrusive melanoma screening gadget that has been intended for General Practitioners and skin pros.

- MoleView helps with the administration of patients for skin growth screening. The ABCD (Asymmetry, Border, Color, Dermoscopic structures) tenet is utilized for analysis of skin changes of melanocytic cause. It is utilized to evaluate injury and conveys a response to the inquiry whether it is a mellow change, suspicious or vindictive. As indicated by this manage, the sore is suspicious if visual evaluation of the injury is sure on any of the accompanying elements:

A % sore shape asymmetry and shading asymmetry,

B – outskirts shape and sharpness,

C – nearness of different hues (red, blue, gray, brown, dark, white),

D – measurement of the sore is more noteworthy than 6mm,

1. E – elevation of sore has developed over brief timeframe, or sore has advanced quickly.

III. REMOVING THICK HAIR ARTIFACTS

Injuries are considered as a typical obstacle which can delude the division procedure. To expel the thick hairs in skin tumor pictures, scientists connected different techniques, for example, numerical morphology strategies, curvilinear structure location, an in-painting based strategy approach, robotized programming called DullRazor and Top Hat change consolidated with a bicubic addition approach [19]. The sans hair pictures are procured utilizing the operations. Toward the end of preprocessing venture of skin malignancy recognition framework, the subsequent pictures are discernable from those underlying pictures and just about are prepared to bolster the division stage. Images and almost are ready to feed the segmentation stage.

4. Detecting Features from Dermoscopic images

To gauge and identify sets of elements from dermoscopic pictures, the automated examination of these pictures can be to a great degree valuable and supportive for dermatologists with a specific end goal to encourage their determination.

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In view of pictures acquired by advanced dermoscopy, definitive point is to build up a supported symptomatic framework for the recognizable proof of early stage melanomas. This would empower administered order of melanocytic injuries.

A. Dermoscopy

It is a non-obtrusive analytic procedure for the in vivo perception of pigmented skin sores, which utilizes optical amplification and fluid drenching or spellbound lightning to accomplish better representation of surface and subsurface structures of the skin To build the clinical appropriateness of dermoscopy, a few symptomatic calculations have been proposed amid the most recent decades, being the ABCD principle one of the techniques which turn out to be all the more broadly acknowledged by clinicians.

The ABCD standard depends on the examination of four distinct criteria:

asymmetry (A),

fringe (B),

shading (C) and

differential structures (D).

Every criteria is examined semi-quantitatively and duplicated by a given weight component so as to get the Total Dermoscopy Score.

B. Color Enhancement

It depends on the shading adjustment with HSV model. In this methodology, direct relapse models are built for every channel, which permits programmed alteration of the tint and immersion Melanomas are portrayed by the nearness of six unique hues, specifically, dark, red, light cocoa, dull chestnut, blue-dim and white. For every present shading, wadd .

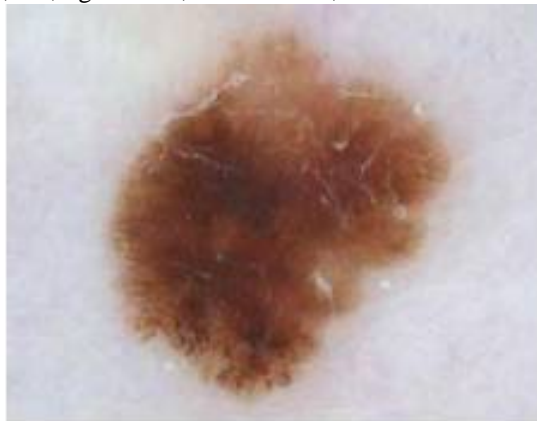


Fig1: Medical Image

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C. Feature extraction

It assumes an essential part which is utilized as a weapon to dissect a picture. Keeping in mind the end goal to accomplish a viable approach to recognize skin disease at an early stage without playing out any pointless skin biopsies, computerized pictures of the melanoma skin sores have been researched this is accomplished by utilizing highlight extraction strategy. Diverse computerized pictures have been dissected in light of unsupervised or programmed divisions division strategies. Highlight extraction depends on the purported ABCD-standard of dermatoscopy ABCD speak to the asymmetry, outskirts structure, shading variety, and dermatoscopic structure alleged distance across of the injury and characterize the premise for a finding by a dermatologist. **D. Segmentation**

It alludes to the dividing of a picture into disjoint areas that are homogeneous as for a picked property, for example, luminance, shading, composition, and so on. The division is the most vital stage for dissecting picture legitimately since it influences the exactness of the consequent strides.

The point of the picture division stage is to remove the injury range from the sound skin. Division techniques can be generally grouped into the accompanying classes:

- i. Histogram thresholding: These techniques include the determination of one or more histogram edge values that different the articles from the foundation.
- ii. Bunching: These techniques include the apportioning of a shading (highlight) space into homogeneous districts utilizing unsupervised grouping calculations.
- iii. Edge-based: These strategies include the recognition of edges between the areas utilizing edge administrators.
- iv. Area based: These strategies include the gathering of pixels into homogeneous areas utilizing district consolidating, locale part, or both.
- v. Morphological: These strategies include the recognition of item shapes from foreordained seeds utilizing the watershed change.
- vi. Model-based: These strategies include the demonstrating of pictures as arbitrary fields whose parameters are resolved utilizing different advancement systems.
- vii. Dynamic shapes (snakes and their variations): These strategies include the identification of item forms utilizing bend development systems.
- viii. Delicate figuring: These strategies include the grouping of pixels utilizing delicate processing systems including neural systems, fluffy rationale, and transformative calculation.

IV. FILTERS

Filtering a image comprises of utilization of a specific change or a calculation to picture information keeping in mind the end goal to adjust certain piece of it. The most widely recognized errand of a channel is to isolate excess data from the pertinent information. By utilizing straightforward channels it is conceivable to hone image obscure picture, change shading, and so on. Applying more mind boggling channels is conceivable to upgrade more essential segments of the picture. A case for this can reinforce particles or recognition edges.

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In image preparing one certain change is most striking, in particular the binarization. It is a point change that is one of the essential operations utilized when preparing any image. This operation taking into account dim scale picture and given limit worth will yields a paired picture, which utilizes just two hues (highly contrasting) to speak to information. To accomplish the double picture an edge should be characterized. This limit is utilized to figure out which purposes of the first picture will be changed over to dark and which to white.

There are numerous current strategies for de-noising a image. The fundamental techniques can be delegated Spatial Filtering and Transform Domain Filtering [28]. Spatial separating, for example, Mean channels, Median channels, Wiener channel, Lee channel, Anisotropic dispersion filter, Total variety channel and so on incorporate neighborhood and a predefined operation which change the dark estimation of every pixel as indicated by the pixel estimations of square neighborhood focused at that pixel [29]. The depiction of more regular spatial channels for expelling commotions and smoothing the picture are in the accompanying [26 and 30-32].

- Mean channels: It works best with Gaussian clamor and could be powerful for salt and pepper commotion. Despite the fact that this filter decreases the clamor, obscure the image and lessen sharp edges.
- Arithmetic mean filter: This is the least complex of mean filter. It can uniform the clamor and functions admirably with Gaussian commotion.
- Geometric mean filter: A sort of channel that can save the subtle element data of a picture superior to the number-crunching mean channel.
- Harmonic mean filter: It functions admirably with salt clamor, and different sorts of commotion, for example, Gaussian commotion, however doesn't function admirably with pepper clamor.
- Contraharmonic mean filter: It can safeguard the edge and evacuate clamor much superior to anything number-crunching mean channel.
- Adaptive channels: This filter works finest when the commotion is steady power ("white") added substance clamor like Speckle commotion.
- Adaptive nearby clamor decrease filter: It can be utilized for irregular commotions.
- Adaptive middle filter: It can save the subtle elements as smoothing non drive clamor such the conventional middle channel is not ready to do Order measurements channels.
- Median channel: This filter in correlation with mean channel is less delicate to the amazing qualities. It effortlessly evacuates the anomaly without harming the sharpness of the picture. It is a viable channel for salt and pepper commotion.
- Max and min filters: This filter is valuable to locate the darkest purposes of a picture.
- Mid-point filter: This channel is the best for irregular circulated clamors, for example, dot commotion.
- Gaussian smoothing filter: This is a valuable filter for smoothing and honing the picture.

The second grouping of de-noising strategies, Transform Domain Filtering, depends on wavelet changes. Wavelet changes is the broadened type of Fourier change which speak to the capacity by wavelets. Wavelets are characterized as scientific capacities which examine information in light of scale or determination. In restorative applications, especially in skin growth images, the most well-known channels connected by specialists to smother commotions in preprocessing

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venture of location frameworks are Median channel, Adaptive Median filter, Mean filter and Gaussian smoothing filter.

A. Alpha Trimmed Median Filter

This filter is a windowed filter with respect to non-straight class. The fundamental thought behind channel is ideal for any component with the sign (picture) take a gander at its neighborhood, dispose of likely the most atypical components notwithstanding ascertain mean worth

A. Alpha Trimmed Median Filter

This filter is a windowed filter regarding non-linear class. The basic idea behind filter is perfect for any element with the signal (image) look at its neighborhood, discard probably the most atypical elements in addition to calculate mean value with all the rest of these.

V. LITERATURE SURVEY

Rajiv Parikh et. al. (2013) [1] PC symptomatic apparatuses empower target judgments by making utilization of quantitative measures. The fundamental three stages are there to accomplish the outcomes i.e. 1) picture handling 2) Feature extraction 3) Classification. Step 1 manage commotion decrease curios expelling, step 2 manages removing assortment of data fro the procedures picture for exact discovery and step 3 manages results that say different sorts of skin injuries. This procedure examined some clinical finding techniques which is being joined with the device for identifying the sort of injury.

Md. Amran et. al. (2013) [2] talked about a successful approach to distinguish skin tumor at an early stage without playing out any superfluous skin biopsies, computerized pictures of melanoma skin injuries have been researched. To accomplish this objective, component extraction is considered as a crucial weapon to examine a picture suitably. In this paper, distinctive computerized pictures have been dissected in view of unsupervised division procedures. Highlight extraction methods are then connected on these divided pictures. After this, an exhaustive dialog has been investigated in view of the acquired results

Joze et al. (2012) [3] talked about a successful approach to distinguish skin tumor at an early stage without playing out any superfluous skin biopsies, computerized pictures of melanoma skin injuries have been researched. To accomplish this objective, component extraction is considered as a crucial weapon to examine a picture suitably. In this paper, distinctive computerized pictures have been dissected in view of unsupervised division procedures. Highlight extraction methods are then connected on these divided pictures. After this, an exhaustive dialog has been investigated in view of the acquired results

Kareem et al. (2012) [4] demonstrates the programmed examination of intestinal sickness parasite (Plasmodium species) in minor pictures of Giemsa recolored thin body movies. The procedure changes a morphological strategy for body cell recognizable proof and utilizes the photo qualities, for example, for occasion quality, histogram, relative estimation and geometry for further examination. Two strategies for article order have been clarified for parasite identification; one in light of relative estimation and morphology and another in light of quality variety.

Shibata et al. (2012) [5] clarified "shade steadiness" is centered around and the specialists attempt to define its rise through the instructive of a simple "hued object direction" undertaking by bolster understanding with a neural system whose inputs are crisp picture signals. In the errand, it must exchange a subject whose shade is chosen haphazardly to the proper area that is diverse relying upon the thing shading. In the ensuing administered comprehension and check, the neural system with new result neurons was experienced to come about the article shade simply under the

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circumstance of no channel, at the same time, when photographs secured by hued channel were the knowledge as check styles in the wake of comprehension, the system yields were exceptionally close to the first thing shading.

Eduardo Monari et al.(2012) [6] displayed another methodology for automated estimation and settlement of territorial lighting in the scene. The arranged methodology takes into consideration treatment of various tender sources on the planet, and to repay backdrop illumination lighting at the same time. Similarly are consistent challenges with high importance to sensible utilization of shading based procedures in video reconnaissance.

Zulkifley et al. (2012) [7] displayed another methodology for automated estimation and settlement of territorial lighting in the scene. The arranged methodology takes into consideration treatment of various tender sources on the planet, and to repay backdrop illumination lighting at the same time. Similarly are consistent challenges with high importance to sensible utilization of shading based procedures in video reconnaissance.

Paul Wighton et. al.(2011) [8] a general model utilizing managed learning and MAP estimation that is equipped for performing numerous normal undertakings in computerized skin sore diagnosis.We apply our model to portion skin sores, distinguish blocking hair, and recognize the dermoscopic structure color system. Quantitative results are exhibited for division and hair location and are focused when contrasted with other particular techniques.

Mahmoud et. al. (2010) [9] presents two half breed procedures for the order of the skin pictures to foresee it if exists. The proposed crossover strategies comprises of three phases, to be specific, element extraction, dimensionality lessening, and arrangement. In the principal stage, we have acquired the components related with pictures utilizing discrete wavelet change. In the second stage, the elements of skin pictures have been diminished utilizing standard part examination to the more key components. In the arrangement stage, two classifiers in view of administered machine learning have been created.

VI. EXPERIMENTAL RESULTS

For For the experimental purposes, different dermoscopy images are taken. The results are designed and implemented by using MATLAB R2013a utilizing image processing toolbox. The Proposed approach is implemented by integrated dermoscopy image classification using color constancy technique utilizing illuminate normalization and alpha trimmed median based filtering. The proposed approach results are better than the existing techniques approach results.

INPUT TMAGE: Figure 2 shows the input color dermoscopy image for experimental purposes. This image shows the effect of existing method as well as proposed method.



Figure 2: Dermoscopy Image

ENHANCED IMAGE: Figure 3 shows the output of existing algorithms. This image shows the output performance of existing algorithms for dermoscopy image classification using color constancy. But results of the existing technique are not effective.

Color constancy has ability to restore the actual colors in given image by evaluating the effect of color light source. Many color constancy techniques has been proposed so far to enhance the color constancy accuracy rate further.

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output image using edge based with 1 order



Figure 3: Existing Enhanced Image

OUTPUT IMAGE: Figure 4 shows the output of proposed algorithms. The new approach will use illuminate normalization and alpha trimmed median based image noise reduction as post processing of dermoscopy image classification using color constancy to reduce the effect of random noise and poor brightness.

PROPOSED



Figure 4: Proposed Enhanced Image



(a) Input image

(b) Existing Result

(c) Proposed Result

VII. PERFORMANCE EVALUATION

This section contains the comparison table and graphs of the existing and proposed techniques. The proposed results are much better than the existing results as shown by following measures:

1. MSE – Mean square error is to compute an error signal by subtracting the test signal from the reference, and then computing the average energy of the error signal. It can be explained as:

$$MSE = \frac{1}{MN} \sum_{i=1}^M \sum_{j=1}^N (f(i,j) - f'(i,j))^2 \quad (1)$$

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The values of Mean square error are shown below in the comparison Table 1

Table 1: Mean square error comparison table

INPUT IMAGES	EXISTING RESULT	PROPOSED RESULT
1.	0.0226	0.0021
2.	0.0465	0.0062
3.	0.0308	0.0034
4.	0.0318	0.0110
5.	0.0556	0.0252
6.	0.0334	0.0062
7.	0.0283	0.0100
8.	0.0330	0.0029
9.	0.0510	0.0042
10.	0.0542	0.0100
11.	0.0284	0.0017
12.	0.0579	0.0099
13.	0.0464	0.0018
14.	0.0542	0.0018
15.	0.0430	0.0053
16.	0.0288	0.0176

Figure 6 has shown the quantized analysis of the mean square error of different images by Existing value in (Blue line) & proposed values in (Red lines). It is very clear from the graph that there is decrease in MSE value of color medical images with the use of proposed method over existing methods. This decrease represents improvement in the contrast of the image.

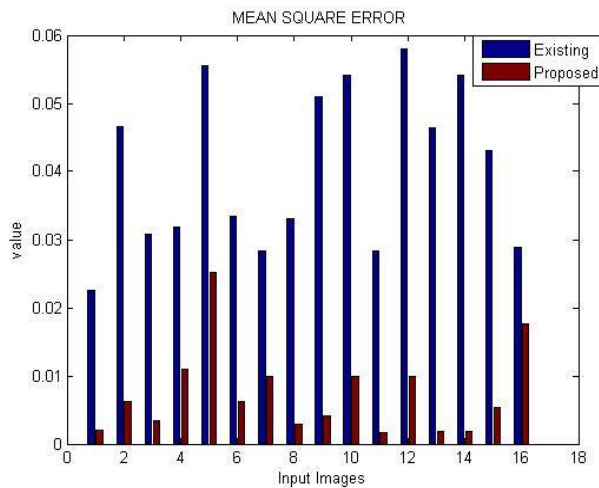


Fig 5: Mean square error graph

2. PSNR - Peak square noise ratio is the ratio between the maximum possible value of the signal and the power of the corrupting noise. It is measured in decibels (db). It can be explained as:

$$PSNR = 10 \cdot \log_{10} \left(\frac{MAX_I^2}{MSE} \right) \quad (2)$$

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The values of Peak signal to noise ratio are shown below in the comparison Table 2.

Table 2: Peak signal to noise ratio comparison table

INPUT IMAGE	EXISTING RESULT	PROPOSED RESULT
1.	64.5881	74.9018
2.	61.4529	70.2084
3.	63.2779	72.7672
4.	63.1035	67.7144
5.	60.6775	64.1221
6.	62.8949	70.2419
7.	63.6086	68.1377
8.	62.9480	73.5336
9.	61.0591	71.9340
10.	60.7916	68.1461
11.	63.5912	75.7074
12.	60.5076	68.1820
13.	61.4622	75.4819
14.	60.7922	75.4980
15.	61.7964	70.8600
16.	63.5299	65.6659

Figure 7 has shown the quantized analysis of the peak signal to noise ratio of different images by Existing value in (Blue line) & proposed values in (Red lines). It is very clear from the graph that there is increase in PSNR value of color medical images with the use of proposed method over existing methods. This increase represents improvement in the contrast of the image.

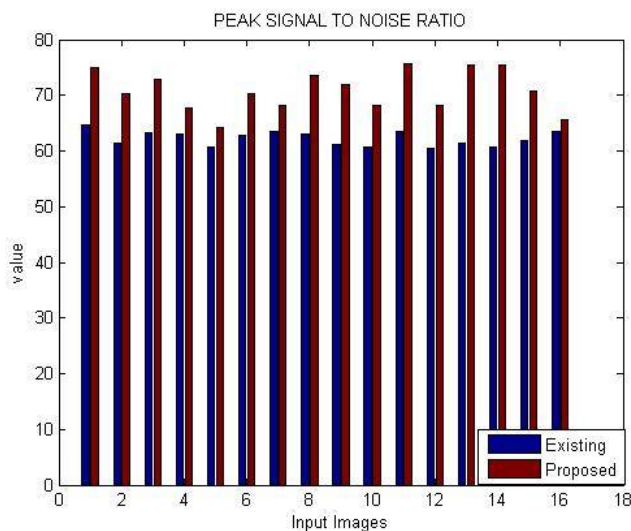


Fig6: Peak signal to noise ratio graph

3. SSIM - Table 3 is showing the quantized analysis of the structured similarity index metric. As structured similarity index metric need to increase therefore the proposed algorithm is showing the better results than the available methods as SSIM has maximum value in every case.

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Table 3: Execution Time comparison table

INPUT IMAGE	EXISTING IMAGE	PROPOSED IMAGE
1.	0.6754	0.9539
2.	0.6118	0.8060
3.	0.6677	0.8734
4.	0.6632	0.7814
5.	0.5764	0.7518
6.	0.6574	0.8637
7.	0.6898	0.8704
8.	0.6424	0.9219
9.	0.5970	0.8493
10.	0.5832	0.7811
11.	0.6707	0.9147
12.	0.5676	0.7495
13.	0.6122	0.9063
14.	0.5825	0.9012
15.	0.6215	0.8455
16.	0.6756	0.9616

Figure 8 has shown the quantized analysis of the different image Structured Similarity index Metric using compressed by Existing approach in (Red line), values after implementing SVD-WDR compression without edge restoration in (Black line), values after implementing SVD-WDR image compression with edge restoration in (blue line), compressed by Proposed Approach (Black Color). In SSIM the values of the proposed approach is maximum for better results to improve the quality of the image.

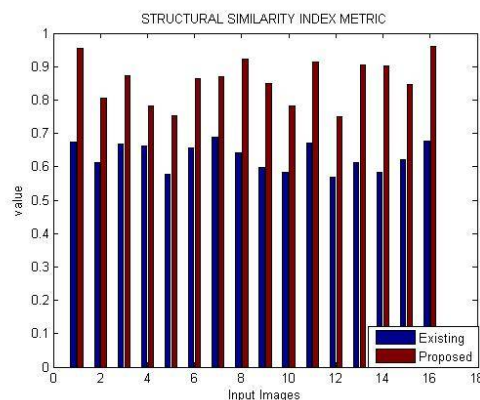


Fig 7: Execution Time graph

VIII. CONCLUSION

The recent techniques for color constancy has been considered for review purpose. The related techniques to color constancy has shown several limitations. The use of illuminate normalization is ignored in dermoscopy image classification but its use may reduce the uneven illuminate issue of color constancy. The color constancy algorithm may introduce low intensity image, so adaptive color enhancement algorithms are required to be integrated with existing techniques. The use of alpha trimmed median based noise reduction is also ignored in the most of existing literature. This paper has evaluated the performance of the existing algorithms for dermoscopy image classification using color constancy. To handle above discussed issues, a improved dermoscopy image classification is proposed and

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

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implemented using color constancy technique by using illuminate normalization. Also integration of proposed image classification is also done with alpha trimmed median filter. The comparative analysis have clearly shown that the proposed technique outperforms over the available methods. In near future we will use some other filters to enhance the results further.

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