Visualizing Of Skin Color Using a Commercial Smart Phone by Multispectral Wiener Estimation

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***Abstract*- Mobile Pervasive Computing has wide application in many fields .My proposed work is one of the applications of mobile pervasive computing engineering in medical field. To identify the morphological nature of cancerous cell by image processing techniques. In our work it deals with the treatment of Skin cancer .Due to the real-time performance requirement a simple model Wiener was adopted instead of more accurate methods based on complex modeling. Our work is a new approach for Skin Cancer detection and analysis for given photograph of patient's cancer affected area which can be used for automatic the diagnosis and therapeutic treatment of skin cancer. Skin cancer can be analyzed and simulated by using MATLAB software and then it is implemented through smart phone.**

***Keywords*- Wiener, Malignant Melanoma, Skin Cancer, Cell Carcinoma.**

I.INTRODUCTION

The increasing demand for the cure cancer led many scientists to develop new strategies for prevention, diagnosis the cancer. Various researches have been taken for cancer treatment. Skin cancer is the most common type of cancer. In every year 50% new cancer are detected. The deadliest form of skin cancer is melanoma, and its incidence has been increasing at an disquieting rate of 3 % per year. [1]If detected at an early stage, skin cancer can be cure easly with simple and economical treatment. Over the past few decades. The incidence of malignant melanoma has increased dramatically disease, malignant melanoma has a near 100%cure rate is detected and eliminated early. Early diagnosis is obviously depending upon patient attention and also accurate assessment by a medical practitioner. MATLAB Image Processing Toolbox can be used for all image analysis.

II. SKIN CANCER

Skin cancer is the cancer is occur in the human skin.. Certain skin cancer is diagnosed in more than 1 million people in the United States per year. The growth of normal cell is called Cancer.. As the cells multiply a mass called a tumor. Tumors of the skin are often referred to lesions. Tumors are cancerous only if they are malignant. This means that they are encroach on and invade neighboring tissues and their uncontrolled growth. Tumors may also travel to remote organs of the bloodstream or inactive system. This process of penetrate and spreading to other organs is known as metastasis. Tumors are surrounding tissues by invading their space and catching the oxygen and nutrients they need to survive and function. [4]

Fig 1.Skin Cancer

2.1 TYPES

There are three common types of skin cancer, they are given below.

***1) Basal Cell Carcinoma*:** BCC is the most common type of skin cancer. It naturally appears as a small raised bump that has a pearly appearance. BCC is most commonly seen on areas of the skin that have received extreme sun exposure.

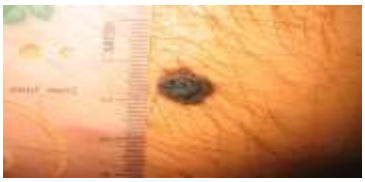

Fig 2.Basal Cell Carcinoma

***2) Squamous Cell Carcinoma*:** SCC is seen on the areas of the body that have been exposed to excessive sun (nose, lower lip, hands, and forehead). Often SCC cancer appears as a firm red bump or ulceration of the skin that does not heal.

Fig 3. Squamous Cell Carcinoma

3) Melanoma: The malignant melanoma is a highly malignant skin cancer, it grows rapidly. Beginning of Melanoma is melanocytes, the skin cells that produce in the dark defensive pigment called melanin. The melanin is responsible for bronzed skin which acting as a halfway protection against sun light. Melanoma is the most serious form of skin cancer. [3]

Fig.4.Melanoma

III.WIENER ESTIMATION

In our work, we propose a method to reconstruct spectral reflectance by using a modified Wiener estimate method. The accuracy of reflectance estimation can be improved from the training samples. For calculating the reflectance characteristics are appropriately weighted. The freshness of the recommended method is mainly in the manner of training sampling selection and autocorrelation matrix structure. The performance of the recommended adaptive Wiener estimation and the traditional methods are compared with different channel numbers and different noise levels.

3.1. FORMULATION OF MULTISPECTRAL IMAGING

The multispectral imaging system consists of digital camera and several narrowband filters, and the response of the camera is reciprocal to the intensity of bright penetrate to the sensors. Let l(ƛ) be the shadowy power distribution of the imaging fulminate, r(ƛ) be the spectral reflectance of the sample being imaged, fc(ƛ) be the spectral movement of the c^{th} ($1 \le c \le C$) channel, and s(ƛ) be the spectral sensitivity of the monochrome camera, then the response vc of the c^{th} medium can be represented as

$$v_i = \int f_i(ƛ)\, S(ƛ)\, E(ƛ)\, \Lambda(ƛ)\, dƛ, \quad i = R, G, B$$

3.2 ARCHITECTURE

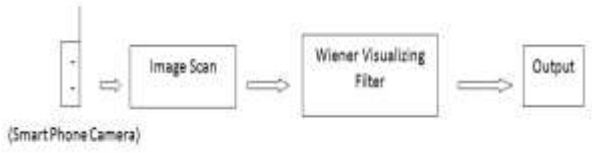

Fig.5.Architecture

In smart phone, the image of the skin color can be scanned and it is analyzed by using Wiener estimation. The Wiener estimation can be simulated in Mat lab. Finally skin color can be analyzed.

3.3EXPERIMENTAL EVALUATION

1. Original Image
2. Removal of hair
3. Image Simulate Blur and noise
4. Restoration of Blurred ,Noisy Image using NSR=0
5. Restoration of Blurred ,Noisy Image using Estimated NSR
6. Restoration of Blurred, Quantized Image using Computed NSR
7. Image Comparison
8. Final Image

IV. RESULTS

Scenario 1: Original Image

The original image of the skin disease is scanned by using smart phone and it is analyzed by Mat lab.

Fig.6. Original Image

Scenario 2: Removal of hair

The hair can be removed from the original image of the skin disease by Mat lab.

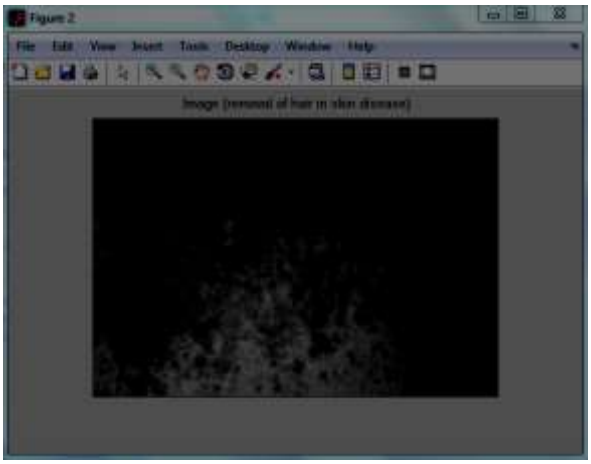

Fig.7.Removal of hair

Scenario 3: Image Simulate Blur and noise

Blurred image of skin disease can be produced using Matlab.

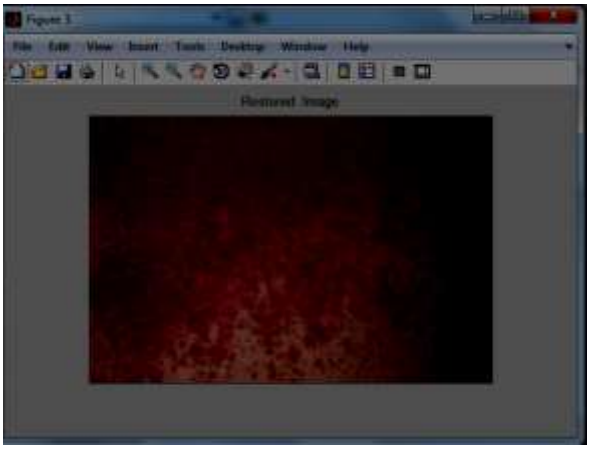

Fig.8.Image Simulate Blur and noise

Scenario 4: Restoration of Blurred, Noisy Image using NSR=0

After the blurred image of the skin we can restore the skin disease in MATLAB.

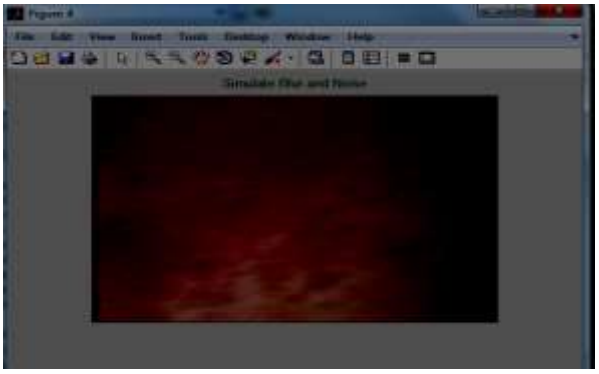

Fig.9. Restoration of Blurred, Noisy Image using NSR=0

Scenario 5: Restoration of Blurred, Noisy Image using Estimated NSR

In the image the noise signal ratio is estimated and the Blurred noise image is restored.

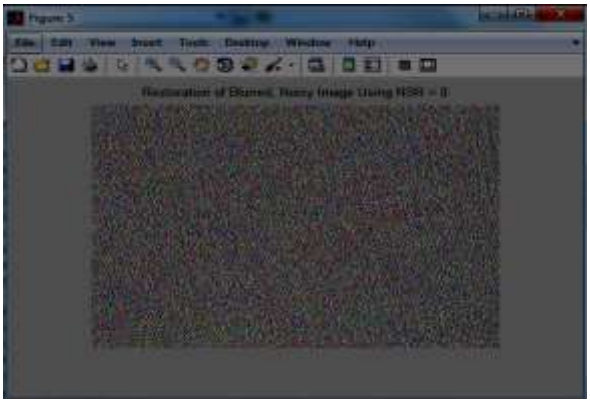

Fig.10. Restoration of Blurred,Noisy Image using Estimated NSR

Scenario 6: Restoration of Blurred, Quantized Image using Computed NSR

For analysis in Mat lab Blurred image of skin disease produced for restoration of blurred, quantized image using computed NSR.

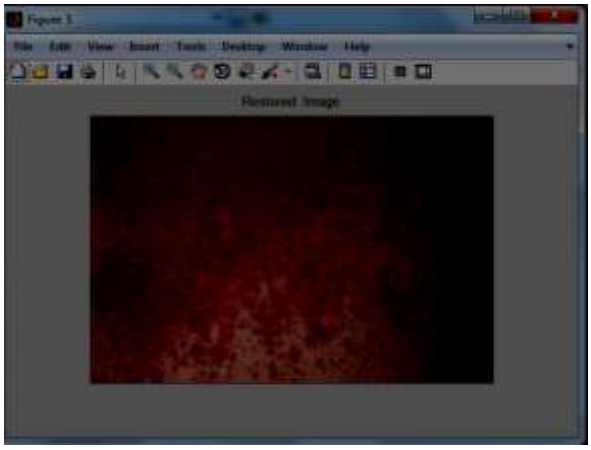

Fig.11. Restoration of Blurred, Quantized Image using Computed NSR

Scenario 7: Image Comparison

In these various skin disease comparison is done using MATLAB Software.

The original image of the skin disease is scanned

Fig.12. Original Image.

The hair can be removed from the original image of the skin disease by Mat lab

Fig.13.Hair Removed.

For inquiry in Mat lab Blurred image of skin disease produced

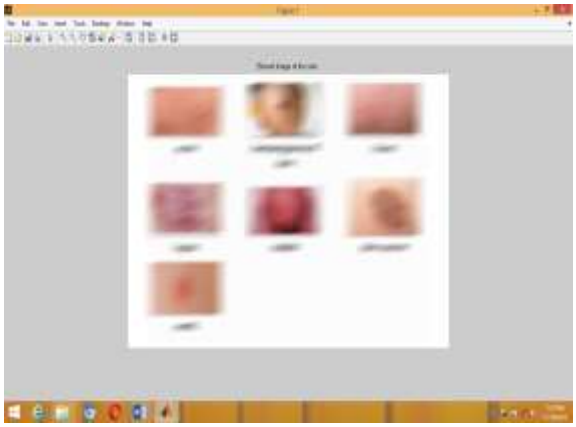

Fig.14.Blurred Image.

The blurred image of the skin we can restore the skin disease in MATLAB

Fig.15.Restoring Image

In the image the noise signal ratio is estimated and the Blurred noise image is restored.

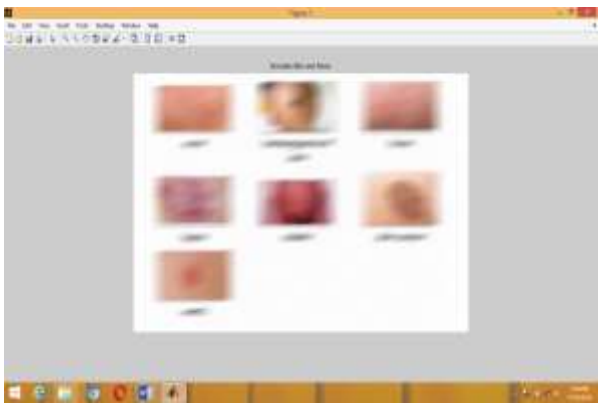

Fig.16.Estimate the Noise Ratio & Blurred Image

when NSR=0, we can neglect the noise and restore the image

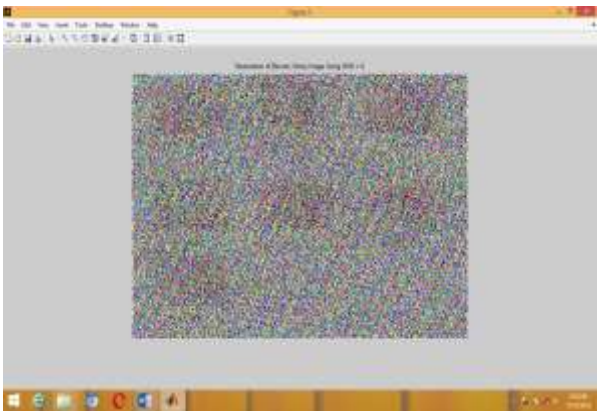

Fig.17. Neglect Noise & Restore Image

The boundary of the skin disease can be analyzed for easy treatment.

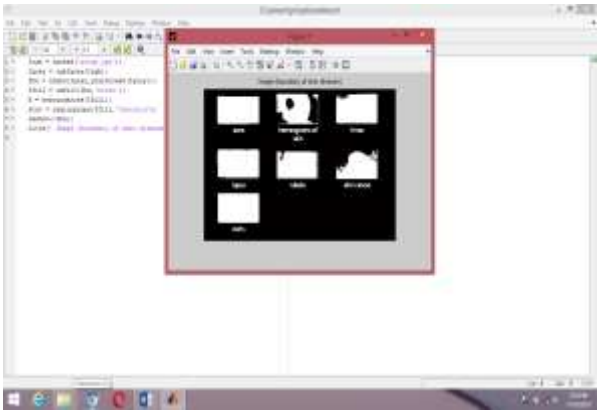

Fig.18.Boundary of Image.

7. CONCLUSION AND FUTURE WORK

The skin cancer cell is studied. The analysis is made with the help of mat lab. The image can be figure out using mat lab software. Most modern smart phones have a built-in RGB camera and they typically have enough computational power to incorporate the presented reflectance spectrum estimation technique. As such, multispectral images were obtained by running the developed Android application based on Wiener estimation. Because of its easy and simple application and its outstanding portability, we expect the proposed skin color visualization system to be of great use in clinical and commercial applications. The conclusion of this paper is the skin cancer is analyzed using mat lab wiener estimation. Skin cancer syndrome can be finding by image processing for patients, to prevent the melanoma in early stage. Finally, we can visualize the Skin Color using a Commercial Smart Phone.

REFERENCES

[1]Indira, D.N.V.S.L.S. and Jyotsna Suprya, P., "Detection & Analysis of Skin Cancer using Wavelet Techniques," International Journal of Computer Science and Information Technologies, Vol. 2(5), pp.1927- 1932, 2011.

[2]D.Sordan,J.Larkin,C.Collins,J.Piggot,"The development of novel flexible electrode arrays for electrochemotherapy of solid tumour tissue", *Proceedings of the 26th annual*

International Conference of the IEEE EMBS, Sep 2004.
[3]DavoraSel,David Cukjati,Danute Batiuskaite,Tomaz Slivnik,"Sequential finite element model of electro permeabilization ",*IEEE Transactions on Biomedical engineering*, vol.52, no 5,May 2005
[4]Damijian Miklavcic ,Selma Corovic, Gorazd Pucihar, Natasa Pavselj," Importance of tumour coverage by sufficiently high local electric field for effective chemotherapy", in *Proc of Biomedical Science*, August 2006.
[5]S.J.Beebe, Jody White, Peter F, Black More ,Yuping Deng ,Kenneth Somers and Karl H.Schoenbach, "Diverse effect of nano second pulsed electric fields on cells and tissues", December 2003.
[6] John F.edd,Liana Horowitz, Raval V.Davalos,"In vivo Results of a New Focal tissue ablation technique:Irreversible Electroporation", *IEEE Transactions on Biomedical engineering*,vol.53,no 5,June 2006.
[7]Karl HSchoenbach, Barbara Hargrave, Ravindra P.Joshi," Bioelectric effects of intense nanosecond pulses ", *IEEE transactions on dielectric and insulation* ,July 2007.
[8]Mukti, H.Sarma,"Towards solid tumour treatment by Irreversible Electroporation : Intrinsic Redistribution of fields and currents in tissue", *Technology in cancer research***,** Aug2007.
[9]Wang Chao ,Chen Hong-Bin, Du Da-li, Xiao Ya-su ,Sun Hong-jun "Electrode Structure Optimum for Impedance Measurement of Intraoperative Breast Cancer Focus", *International Conference on Biomedical engineering*,2008.
[10]Wang Chao ,Chen Hong-bin, Du Da-li, Xiao Ya-su , "Simulation method of electrode structure design for intraoperative margin assessment of breast cancer focus", *Proceedings of the Seventh International Conference on Machine Learning and Cybernetics, Kunming*, 12-15 July 2008.
[11]Selma Corovic, Anze Zupanic, and Damijan Miklavcic," Numerical Modeling and Optimization of Electric Field Distribution in Subcutaneous Tumor Treated With Electrochemotherapy Using Needle Electrodes*", IEEE transactions on plasma science*, vol. 36, no. 4, August 2008 .
[12]Robert E.Neal, Ravi Singh, Heather C.Hatcher, Nancy D.Kock "Treatment of Breast Cancer through the application of irreversible electroporation using a novel minimally invasive single needle electrode", *Breast cancer Res Treat*, Aug 2010.
[13]Agoramurthy.P ,Sundararajan .R," Electric field distribution of human breast tissue" *Annual Report Conference on Electrical Insulation and Dielectric Phenomena*, Oct 2010.
[14]Poornima Agoramurthy, Luca Campana and Raji Sundararajan," Tumor Electric Field Distribution Studies using Various Electrode Configurations ",*Proc. ESA Annual Meeting on Electrostatics*, 2011.
[15]V. Gowri sree, K . Udaya Kumar, R.Sundararajan, "Electric field –Mediated inactivation of Tumour cells ", *ESA Annual Meeting on Electrostatics*, 2009.

BIOGRAPHY

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