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Different Skin Lesion Classification Techniques

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ABSTRACT

Skin cancer is most common group of human maliciousness, which is analyzed visually, with clinical screening and dermoscopic diagnosis, histo-pathological determination and at last biopsy. Melanoma is utmost hazardous and deadliest form of skin cancer. It should be identified and diagnosed at very early stage to cure t completely. To identify melanoma there are many non-invasive techniques available. This paper reviews existing non-invasive techniques used to identify melanoma. Deep convolutional neural networks (CNNs) can be utilized for object classification to obtain highly isolated results. This paper presents review on different available techniques to classify mages into Melanoma and Benign. The regularizer technique acts as binary classifier to separate them between benign or malignant lesions.

Keywords : Classification, Deep convolutional neural network, Skin lesion, Image processing, Novel regularizer technique

I. INTRODUCTION

Now a day's various diseases arise, among them cancer is the most dangerous disease. It can occur to any age group and any part of body. The most important and biggest part of the body s skin which protects the body. Skin cancer starts on upper part of the body. In beginning it looks like ulcer.

The skin has all the promoting features for the tumor because of melanin. When the melanin reduced due to the shortage of iron and blood the melanoma would emerge. It can be detected by any medical professional but the accuracy of analyses is highly questionable. To resolve this problem various automated systems have come into existence. Computer-aided diagnosis (CAD) schemes are an inevitability to detect and assess medical images.

The CAD system helps to detect diseases earlier that lead to early treatment choices, hence perhaps save lives. Efficient detection and treatment are vital. Dermoscopy techniques are evolved to enhance investigative performance of cancer. Automatic detection of skin cancer from dermoscopy image is challenging job. These challenges are first, low differentiation among skin sores and typical skin locale makes it hard to fragment precise sore regions. Second, benign and melanoma are most likely to have more visual likeness, bringing about trouble of separating skin cancer from benign. Variety conditions of skin, for example, shading of skin, normal veins, between patients yield diverse look of skin cancer, as far as shading and surface, and so on.

Malignant cancer normally happens in skin in the event that it is continually presented to daylight, in spite of the fact that disease can be available on piece of body. This disease starts from upper part of skin that is highest layer. This demonstrates the CAD framework has the ability to use the pictures of skin sore without diagnosing some other significant data to

uncover the fundamental analysis. Melanoma is the most widely recognized sort of skin malignant growth found in the people that cause dusky blemishes on moles of skin. Principle explanation behind this skin cancer is variation from norm in the melanocytes which offer hue to skin. This cancer comprises of assured hazard aspects, for example, burn from the sun history, debilitated insusceptible framework, light complexion, innate elements, superfluous presentation to bright light, and the utilization of tanning beds.

If melanoma starts continuously spreading all through outer skin layer prior to diagnosis, then it connects to blood and thee lymph vessels. So probability of curing it in early stage is high than advance stage. So it is necessary to detect it in early stage but it is expensive. Since sores on skin seem to be like each other, it is hard to examine whether lesion is benign or melanoma.

To evaluate the lesion of skin and categorize it by benign or malignant lots of methods evolved such as artificial neural networks, genetic algorithms, CNNs, support vector machines. These techniques have been proven as less painful and cost-effective as compared to traditional medical methods.

Regularization is a technique utilized for controlling classifier complexity. CNN attempt to imitate procedure of image detection by visual cortex in the brain. Feature extraction is utilized for obtaining better results in image classification. Various experts utilized handcrafted characteristic extraction apparatuses for digital image processing prior existence of CNN. Feature is extracted automatically by CNN in training phase

The rest of the paper consists of following sections, Section I introduce the topic, Section II discusses the literature work. Section III gives dataset description and section IV consists of conclusion and the last section involves the references.

II. LITERATURE REVIEW

There are numerous techniques available for skin lesion detection but it gives less classification accuracy. For enhancing the skin lesion detection and classification performance an efficient Color Coverage Correlation based classification approach is presented by K. Muthukumar et al. [1], this method reads the human skin pictures and enhance the quality of image with Gabor Filter and histogram equalization. Then, color quantization is performed on improved image which depends on the intensity values of pixels of various skin region. The image that has been segmented depends on the color quantization. Then that region is identified and the features are extracted from that. By utilizing segmented area and features, method estimated the C3 lesion correlation measure with available patterns of tumors.

Yuexiang Li et al. [2] presented deep learning methods to locate 3 errands declared ISIC 2017, for example segmentation of lesion, feature extraction and categorization. Deep learning system includes fully convolutional leftover systems, which is developed to at the same time make division outcome and coarse characterization outcome. Lesion index calculation unit is proposed for refining categorization outcomes by estimating space heat-map. CNN is also implemented for characteristic extraction. Skin cancer is major skin disease in world-wide extent. Before time recognition of melanoma in images considerably amplifies survival rate of human. Melanoma detection is difficult task because of low differentiation among normal skin and lesion, visual closeness among melanoma and benign.

Adria Romero Lopez et al. [3] focus on issue of skin lesion categorization, such as skin cancer recognition, and presented deep learning based method to resolve issue of categorizing image consist as malignant or benign. Proposed method utilizes VGGNet CNN architecture and utilizes transfer learning paradigm. ISIC Archived images used as dataset.

Danilo Barros Mendes et al. [4] presented significance of automatic classification technique that help skin lesions identification. Skin lesions are obtained due to various causes. This may be due to an irregular increase in skin tissue. Cancer has caused nearly 8.2M deaths, also there is a problem when we study clinical images that may represent a massive miscellany due to cameras and environments. Here author presented a model which is able to classify twelve skin lesions that gain outcomes similar with state of art. Moreover, they discussed studies on model decision making procedure with interpretability methods. Author utilized a ResNet-152 architecture which is trained by 3797 images.

D.A. Gavrilov et al. [5] presented an algorithm for detection of melanoma using artificial deep CNN. This proposed algorithm achieves classification accuracy of melanoma up to 91%. Initially diagnosis of melanoma is done by doctors visually, its accuracy depends on qualification and specialization of doctor. So by combining image processing and machine learning State-of-the art solutions created intelligent schemes based on artificial cnn for enhancing accuracy.

Ebrahim Mohammed Senan et al. [6] present review on categorization of dermoscopy images for detection of skin cancer. Because diagnosis at earliest can enhance patient's survival rate but it is critical task for the dermatologist. Assessing the images and dermoscopy is very vital for dermatologist for making correct decision on treatment. Numerous techniques are studied to utilize computerized approach for detection of melanoma. Numerous dermoscopy image processing methods are studied to go through available clarification to skin diseases and to choose a relevant technique for diagnosis of skin diseases. Numerous techniques in pre-processing, segmentation, extraction and classification method have been reviewed and explained by them. This research will be helpful for scientist, research scholars and medical practitioners.

Simon Schafer and Christian Ludwigs [7] utilize cnn for categorization of skin disease. Classifications of skin diseases is problem in dermatology field. Hence the International Skin Imaging Collaboration has created an open-access archive of dermoscopic images of skin lesions and conducts regular skin disease detection challenges.

Early recognition of skin malignancy is very vital task to empower propelled treatment. There is a developing need of modernized assessment for skin lesions on account of rapid growth of skin cancers. The cutting edge publicly accessible datasets for skin malignant growth regularly joins set number of division ground truth naming as it is hard and costly. The injury limit division is essential to address the sore precisely in dermoscopic pictures. Manu Goyal et al. [8] proposed completely computerized profound learning troupe strategies for exact sore limit division in dermoscopic pictures. They prepared Mask RCNN and DeepLabv3+ techniques on ISIC-2017 division preparing set and checked exhibition of gathering systems on ISIC-2017.

Cancer has a vast impact on society across the world. In [10, 11] Cancer statistics are described which tells us what happens in gigantic get-togethers of people and give a picture in time of the heaviness of melanoma on society. Estimations disclose us number of people are identified with malignant growth and bite the dust consistently, amount of people who are starting at now living after a malady end, the ordinary age at investigation, and amounts of people who are so far alive at given time in the wake of finding.

Skin cancer is most basic sort of malignant growth referenced in [11]. The primary kinds of skin malignant growth are melanoma, basal cell carcinoma, and squamous cell carcinoma. Melanoma is considerably rare compared to different kinds yet

substantially more liable to attack close by tissue and extend to different pieces of body. Mostly malignant growth is brought about by melanoma. Investigate connections study skin disease anticipation, screening, measurements, treatment, inquire about, clinical preliminaries, and that's just the beginning. Here causes, counteraction and treatments described.

Patil Rashmi R. and Sreepathi Bellary [12] reviewed on different techniques existing to identify and classify melanoma skin cancer in to its stages depending on thickness of melanoma. This paper mainly focuses on stages of cancer and existing techniques to classify stages of cancer.

Marwan Ali Albahar [14] proposed a prediction model that categorizes skin lesions into benign and melanoma lesions based on a novel regularizer method. Author uses CNN algorithm for classification which is a binary classifier that distinguish among melanoma and non-melanoma. Proposed model reached accuracy up to 97.49%.

III. SYSTEM ARCHITECTURE

Following figure 1 show system architecture. Initially melanoma image dataset is used as input. After that image preprocessing and image enhancement is performed on input image dataset then the segmentation of the skin lesions from dermoscopic images is performed and at the end classification of images is performed using CNN classifier which classifies the input images into melanoma and non-melanoma.

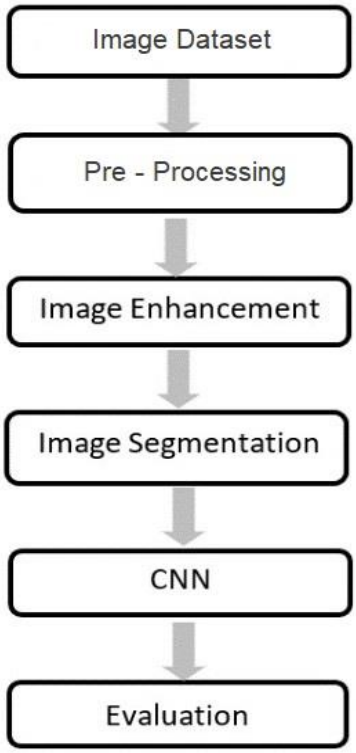

Figure 1. System Architecture

Dataset Description

Dataset used from ISIC archives. It consists images of skin melanoma and non melanoma. There are 23906 images of numerous classes.

IV. CONCLUSION

Detection of skin cancer is challenging task just because of poor detection outcomes and accuracy. Various techniques such as classification and recognition of skin cancer are discussed here, also the survey on prediction model based on new regularizer for enhancing accuracy is performed which uses CNN algorithm for classification.

V. REFERENCES

[1]. K. Muthukumar, P. Gowthaman, M. Venkatachalam, M. Saroja, 1N. Pradheep," C3 Skin Lesion Based Melanoma Disease Detection Approach for Efficient Classification of Medical Images", International Journal of Pure and

Applied Mathematics, Volume 120 No. 5 2018, 1133-1148.

[2]. Yuexiang Li and Linlin Shen, (2018)" Skin Lesion Analysis towards Melanoma Detection Using Deep Learning Network"

[3]. Romero López, Adrià & Giró-i-Nieto, Xavier & Burdick, Jack & Marques, Oge. (2017). Skin Lesion Classification from Dermoscopic Images Using Deep Learning Techniques. 10.2316/P.2017.852-053.

[4]. Mendes, Danilo & Silva, Nilton. (2018). Skin Lesions Classification Using Convolutional Neural Networks in Clinical Images.

[5]. Gavrilov, Dmitriy & Shchelkunov, N. & Melerzanov, Alexander. (2019). DEEP LEARNING BASED SKIN LESIONS DIAGNOSIS. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. XLII-2/W12. 81-85. 10.5194/isprs-archives-XLII-2-W12-81-2019.

[6]. Mohammed, Ebrahim & E., Mukti. (2019). Classification of Dermoscopy Images for Early Detection of Skin Cancer – A Review. International Journal of Computer Applications. 178.

[7]. Simon Schafer and Christian Ludwigs (2018)" Skin Disease Classification Using Convolutional Neural Networks"

[8]. Goyal, Manu & Oakley, Amanda & Bansal, Priyanka & Dancey, Darren & Yap, Moi Hoon. (2019). Skin Lesion Segmentation in Dermoscopic Images with Ensemble Deep Learning Methods. IEEE Access. PP. 1-1.

[9]. Mohra, A.s & Mohamed, Wael & Sherif, Fatma & Lee, Zwe. (2019). Skin Lesion Analysis towards melanoma Detection using Deep Learning Techniques. International Journal of Electronics and Telecommunications. 65. 597-602.

[10]. National Cancer Institute. (2017). Cancer Statistics. Accessed: Dec. 22, 2018.

[11]. National Cancer Institute. (2018). Skin Cancer (Including Melanoma)- Patient Version. Accessed: Dec. 22, 2018.

[12]. Sreepathi Bellary, Patil Rashmi R., "Review: Melanoma Detection & Classification Based on Thickness using Dermascopic Images", International Journal of Control Theory and Applications, vol-10, issue-8, 2017.

[13]. P. Ridell and H. Spett, ``Training set size for skin cancer classi_cation using Google's inception v3,'' Ph.D. dissertation, School Comput. Sci. Commun., KTH Roy. Inst. Technol., Stockholm, Sweden, 2017.

[14]. M. A. Albahar, "Skin Lesion Classification Using Convolutional Neural Network with Novel Regularizer," in IEEE Access, vol. 7, pp. 38306-38313, 2019.

[15]. M. Rehman, S. H. Khan, S. M. D. Rizvi, Z. Abbas, and A. Zafar, ``Classification of skin lesion by interference of segmentation and convolution neural network,'' in Proc. 2nd Int. Conf. Eng. Innov. (ICEI), Jul. 2018, pp. 81_84.

[16]. P. Dubal, S. Bhatt, C. Joglekar, and S. Patil, ``Skin cancer detection and classification,'' in Proc. 6th Int. Conf. Elect. Eng. Inform. (ICEEI), Nov. 2017, pp. 1_6.

[17]. The Skin Cancer Foundation. (2018). Skin Cancer Information. Accessed: Dec. 25, 2018. Online]. Available: https://www.skincancer.org/skin-cancer-information

[18]. E. Waltz, ``Computer diagnoses skin cancers: Deep learning algorithm identifies skin cancers as accurately as dermatologists,'' IEEE Spectr., 2017. Accessed: Dec. 3, 2018.

[19]. National Cancer Institute. What is Cancer? Accessed: Dec. 22, 2018.

[20]. S. Pathan, K. G. Prabhu, and P. C. Siddalingaswamy, ``Techniques and algorithms for computer aided diagnosis of pigmented skin lesions-A review,'' Biomed. Signal Process. Control, vol. 39, pp. 237_262, Jan. 2018.

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