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Skin Lesions Segmentation and Classification

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ABSTRACT

The skin lesion is a region of the skin which has unusual growth or occurrence over the normal skin present around it. A set of two kinds of skin lesion occurs namely benign (non-cancerous) and malignant (cancerous) type. These two types of skin lesion are discussed in the following subsections. Once the dermoscopic images were gathered and pre-processed, the next step lies in the segmentation of the image to extract the target region. The choice of skin lesion segmentation process should be careful because the separation of lesion from the skin needs careful attention where the outcome of the segmentation can greatly influences the feature selection and classification processes too. The proposed model comprises major processes namely pre-processing feature extraction and classification. The dense net segmentation model incorporates the deep learning (DL) features utilizing convolution neural network (CNN) based technique. To further improve the performance of learning rate scheduler using dense net has been applied. At the last, carry out the classification process. The experimental validation of the proposed model takes place using HAM10000 dataset and the experimental outcome defined the superior performance.

Keyword: Skin Lesion, Deep Learning (DL), Convolution Neural Network

INTRODUCTION

A Malignant tumor is a disorder in the human body in which unusual cells divide uncontrollably and destroy body tissue.The Deep learning based skin lesion segmentation and classification model. The skin lesions using seven types of classification in diseases. The presented model involves different stages namely pre-processing, segmentation, image enhancement, feature extraction and classification. The segmentation process is carried out using Dense Net technique. Then, the images get enhanced by removing the hair presented in the segmented lesion region. Afterwards, the features are extracted from the image using Inception Dense Net model and mask (RCNN) for instance segment. For examining the effective outcome of the presented model, a detailed comparative analysis with earlier models takes place. The simulation results exhibited superior performance of the presented model under diverse aspects. The Deep learning using proposed pre-processing model three problems handled in Gaussian filter, contrast images, hair removal in paint. We can using the seven types of disease analysis and classified. The classifier results of different models under the presence of shape feature extraction process. On measuring the results in terms of sensitivity, it is noted that the KNN model failed to show better classification with the sensitivity value of 65.72 which is much lower than the values attained by RF and SVM models. In line with, the RF classifier occupied a moderate classification performance with the sensitivity value of 74.75 which outperforms the KNN model, but not higher than SVM. It is also observed that the SVM model exhibits betterment in classifier results by achieving a maximum sensitivity value of 87.76. Similarly, under the validation of the classifier results in terms of specificity, a lowest specificity value of 58.66 is offered by the KNN model which indicates its ineffective classifier results over other methods. At the same time, the RF model tries to perform well by obtaining a specificity value of 69.19 which is higher than the value attained by CNN.

LITERATURE REVIEW

The classification and diagnosis process comprise a significant procedure of detecting skin lesion. The image processing techniques consist of several models in various dataset. The border detecting process is not a trivial operation which has few limitations and challenging issues (Konstantin Korotkov et al., 2014).

Initially, constraints have been applied to resolve the problems originated by dermatologists is complex in discrimination analysis using algorithms as well as regenerated by human operators in terms of contrast (Tim K Lee and Ela Claridge, 2005), which is invisible for human eyes.

Followed by, problems among the manual and automatic segmentation would be morphological structure of lesion (EmreCelebi et al., 2009). The key purpose of lesion modelling is to appear in dermoscopic images that makes a complex operation by affecting the options of achieving optimal lesion .

PROPOSED SYSTEM

We propose using ISL (Inter-Switch Link) to derive a probabilistic map for automated seeds selection. Which proposed on user-defended conventional methods and using dense net technologies. Gaussian filter, Contrast images, Hair removal inpatients.The advantages of the skin lesions are that it is very easy to handle the process. It is easy to filter this images and using their result. The proposed system followed by preprocessing, segmentation, feature extraction, classification(ELM).The preprocessing perform in filtering images then segmentation perform particular region using mask RCNN technical from instance of segmentation.

DATA SET

A detailed experimental analysis takes place using a benchmark ISIC skin lesion database from https://isic-archive.com/api/v1#/dataset. For validation purposes, a benchmark skin lesion dataset is employed. A set of seven classes exist in the dataset and the details are provided in Table 3.1. Besides, few sample test images are provided. For every image present in the dataset, a corresponding ground truth image is also present.

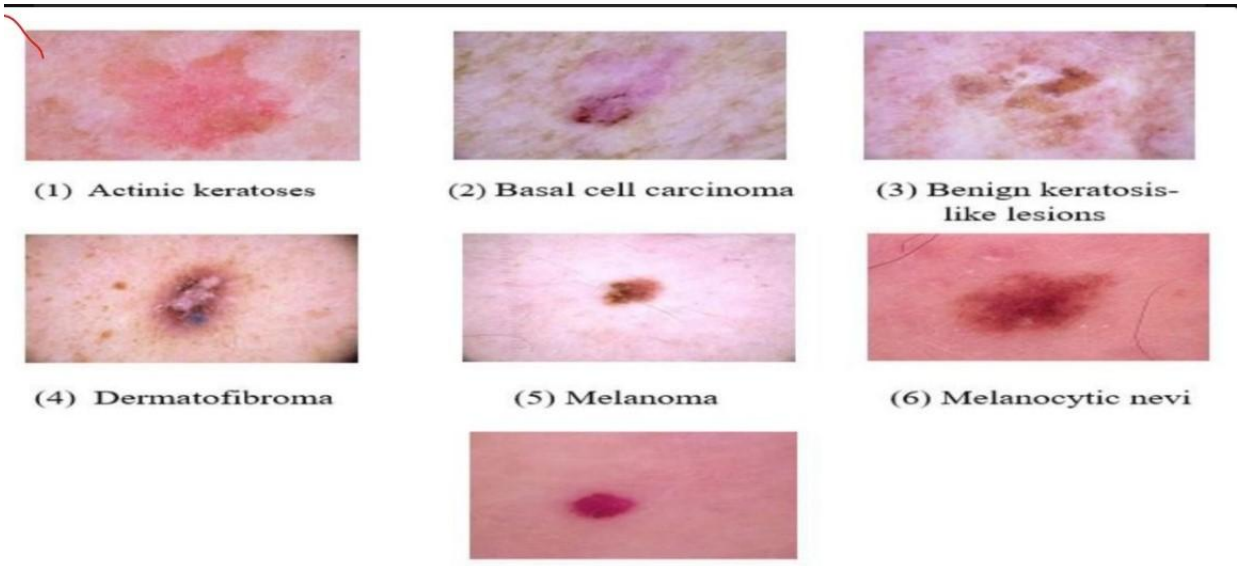


Table 3.1 Dataset Description

S.No	Classes	Number Of Images
1	Angioma	21
2	Nevus	46
3	Lentigo NOS	41
4	Solar Lentigo	68
5	Melanoma	51
6	Seborrheic Keratosis	54
7	BCC	37

MODULES LIST AND DESCRIPTION

1) Pre-processing
2) Segmentation
3) Feature extraction
4) ELM(Classification)

1)PREPROCESSING

The initial step of any image processing technique begins with the process of collecting the images which could be applied to the subsequent processes. Besides, various essential and consistent details from image collection help the professionals to form a baseline direction to perform the required

operation. The input images are preprocessed in two levels. In the first level, images which are in PNG or in any other formats will be transformed to JPEG format for further processing. Afterwards, ROI detection, i.e. lesion area detection process will be executed to detect the lesion region from the input image accurately. The input image database holds input images along with its corresponding ground truth images

2)SEGMENTATION

The main goal of segmentation involves in the portioning of image into tiny areas which is identical with respect to pixel intensity. Segmentation plays a significant role in the field of medical imaging. In order to extract features and estimate the image classification, segmentation is used effectively. The tumour classification is based on the accuracy rate that is obtained while filtering the tumour region. In this work, DIS model is applied for segmenting lesion present in the skin. It is an essential process used for the identification of the Region of Interest (ROI). Numerous skin lesion images makes it very difficult to segment the images. It is considered as the tedious process in any CAD model.

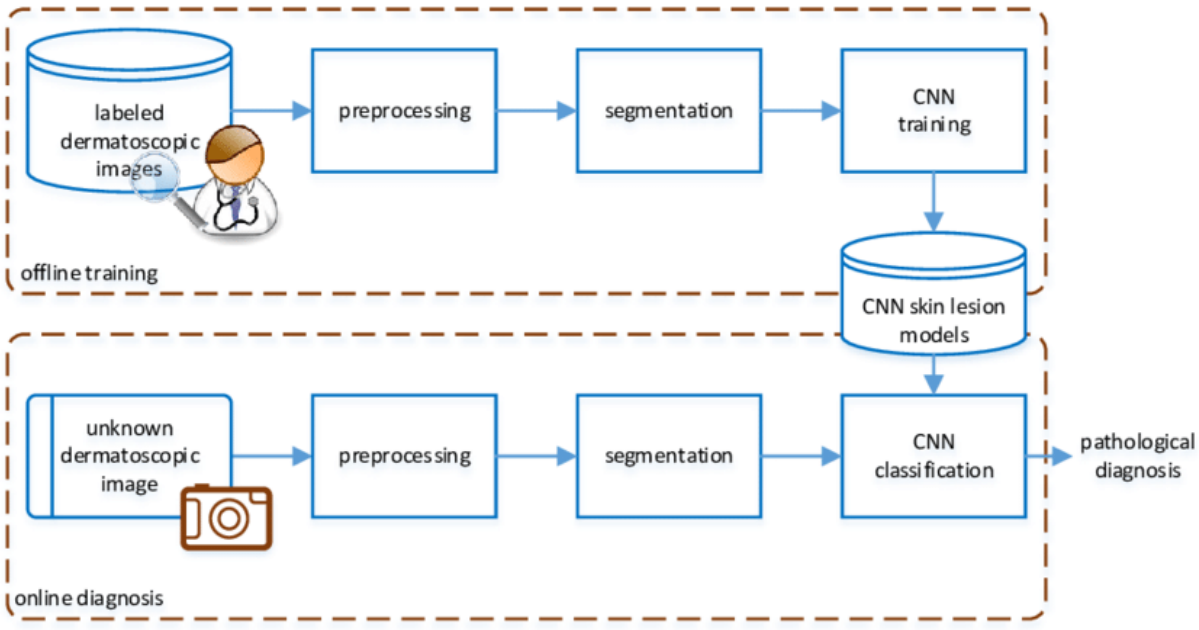
3)FEATURE EXTRACTION

Elimination of hair is a mandatory process in dermoscopy image pre-processing step as it affects the segmentation as well as feature extraction processes. Initially, dermoscopic RGB image is transformed to gray scale. Afterwards, black top-hat transformation named as morphological image processing is applied to the gray scale image. This technique find helpful in detecting thick and dark hairs. After the isolation of ROI, the feature extraction process intends to offer the optimal descriptors for extracting features that differentiate the dataset to two or multiple classes. The most essential process in every image processing technique is feature extraction process which is applied to filter out the important features exist in an image.

4)CLASSIFICATION

The last stage of any CAD model is classification and detection process. Based on the feature extracted and required class count, the classifier will be chosen. The choice of classifier plays an important role to achieve better diagnosis accuracy. The next stage of image processing technique after feature extraction is the process of classification. It is used to classify different kinds of skin lesion images. In previous phase of classification system the diagnostic analysis has the ability of producing an effective resultant image which is induced as input for other procedure. Here, classifying process often occurs by random division of image samples which is derived from training dataset. Usually, training set contains the developed model which is applied by more than one classifier from training dataset. All samples are comprised with extracted features which is obtained from provided images as well as their own value and used for the instance of learning technique.

DATA FLOW DIAGRAM



RESULT AND DISCUSSION

1.ANGIOMA

It comes under the benign type which comprises of small blood vessels. They can appear at any places of the body. Few diverse kinds are spider angiomas and cherry angiomas. The major causes of this benign type are still unknown. The Cherry angiomas occur due to aging factors and do not

have any known importance. The spider angiomas commonly occur in children and pregnant women. In case of the existence of lesion is abundance, it might leads to liver damage. It could not be treated until it is bleeding.

2. NEVUS

It is a non-specific for a perceptible, bounded, chronic lesion of the skin. This word is originated from the Latin word nævus, denoting "birthmark"; nevertheless, a nevus can occur congenital (present at birth) or at any image. Some of the common nevus is moles, birth marking and beauty marks.

3.LENTIGO NOS

A lentigo is tiny, sharp and pigment macule is enveloped by usual type of skin. Several histological investigations identified a hyperplasia of the epidermis as well as improved pigmented basal layer. There are several melanocytes; which might be enhanced in count. However, it does not create a nest structure. Then, pigmentation operation could be different on the basis of colour that is from black to brown. Various types of clinical and etiologic features have been established. The priority of lentigo from alternate melanocytic lesions as well as it is declared as marker for UV failure and systemic infection.

4.SOLAR LENTIGO

Solar lentigo is referred to delicate that does not produce any harming to the dark or light skin. The results could be obtained by exposure to UV rays that lead in localized proliferation of melanocytes as well as accumulating the melanin inside the skin cells which is termed as keratinocytes. A UV lentigo is in the form of flat, quite-circumscribed nature of patches. It may be either in circular or irregular shape, hence the colour is differed from black to dark or brown to white as well as the size varies from a centimetres to some millimetres in diameter. They are often identified as set of same lesions that is exposed to sun, especially for face and knees of hands. It happens in white and black skin; however, it is common in too white skinned people.

5.MELANOMA

It grows rapidly and becomes risky in one or two months. It comes under malignant melanocytic lesion and it might be widening to other parts when untreated. It is the major cause of increased mortality rate due to its nature metastasis. It occurs on the covered areas which are not exposed to sun and it might be blue, red or grey in color ; it is unusual in people with dark skin and it is frequently appears under the fingernails and toe nails, on hand palms, and feet soles.

SCC

6. SCC starts with the squamous cells and it mainly affects the people with dark colored skin, where it is mainly occurs in areas which are not highly exposure to the sun like legs and feet. However, for fair-skinned people, it is found in the area of head, face, ears, and neck. SCC is not as risky as melanoma, however, it might be widen to other parts when untreated .

7.BCC

BCC origins from the basal layer of the skin and a common disease which is a kind of skin lesion. It is common in fair skinned people. Usually, it develops in heads, neck, upper torso and so on. Wherever there is an exposure to sun light leads to BCC. It may be red, pale or pearly in color. Dermatoscopic features like less white structure, blue clods, ulceration, linear serpentine vessels and indistinct border can describe BCC.

CONCLUSION

Skin lesion segmentation plays a significant part in the earlier and precise identification of skin cancer using CAD models. But, the automated automatic segmentation of skin lesions in dermoscopic images is a difficult process due to the constraints of artefacts (hairs, gel bubbles, ruler markers), unclear boundaries, poor and so on. This research work has developed a ML and DL based effective automated segmentation and classification model for skin lesion images. The presented research work involves several subprocesses such as preprocessing, segmentation, feature selection, feature reduction and classification. The research work is presented under a set of four objectives. In the first objective, new segmentation based classification model called KM-PNN model has been successfully developed for dermoscopic images. A wide range of experiments were carried out to examine the superior characteristics of the presented model interms of accuracy, sensitivity and specificity. The outcome of the comparative studies clearly pointed out the superior performance of the proposed models over the compared methods in a significant way. The detailed simulation experiments evidently showed the superior characteristics of the presented model over the compared methods.

FUTURE SOPE

As a part of future scope, the presented model can be extended by the following factors:Develop an Internet of Things (IoT) and cloud based skin lesion diagnosis model to assist professionals and patients in smart healthcare applications. The research work and the future scope presented in this these may bid a new track of research which would catch the attention from many research communities and of course, may offer enhanced set of solution models in the future.

REFERENCES

[1] Abuzaghleh, Buket D Barkana, and Miad Faezipour. Automated skin lesion analysis based on color and shape geometry feature set for melanoma early detection and prevention. In Systems, Applications and Technology Conference (LISAT), 2014 IEEE Long Island, pages 1–6. IEEE, 2014.

[2] Adam Huang, Shun-Yuen Kwan, Wen-Yu Chang, Min-Yin Liu, Min-Hsiu Chi, and Gwo-Shing Chen. A robust hair segmentation and removal approach for clinical images of skin lesions. In 2013 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pages 3315– 3318. IEEE, 2013.

[3] Adam Huang, Wen-Yu Chang, Hsin-Yi Liu, and Gwo-Shing Chen. Capillary detection for clinical images of basal cell carcinoma. In 2012 9th IEEE International Symposium on Biomedical Imaging (ISBI), pages 306–309. IEEE, 2012.

[4] Alejandro F Frangi, Wiro J Niessen, Koen L Vincken, and Max A Viergever. Multiscale vessel enhancement filtering. In International Conference on Medical Image Computing and Computer-Assisted Intervention, pages 130–137. Springer, 1998.

[5] Ali Madooei, Mark S Drew, Maryam Sadeghi, and M Stella Atkins. Automated pre– processing method for dermoscopic images and its application to pigmented skin lesion segmentation. In Color and Imaging Conference, volume 2012, pages 158–163. Society for Imaging Science and Technology, 2012.

[6] Ali, A.-R.A.; Deserno, T.M. A systematic review of automated melanoma detection in dermatoscopic images and its ground truth data. In Medical Imaging 2012: Image Perception, Observer Performance, and Technology Assessment; International Society for Optics and Photonics: Bellingham, WA, USA, 2012; p. 8318.

[7] Al-Masni, M.A.; Al-Antari, M.A.; Choi, M.-T.; Han, S.-M.; Kim, T.-S. Skin lesion segmentation in dermoscopy images via deep full resolution convolutional networks. Comput. Methods Programs Biomed. 2018, 162, 221–231.

[8] Alpaydin (2010), Introduction to Machine Learning pp.1-4.

[9] Aman Kataria (2013) , A Review of Data Classification Using K-Nearest Neighbor Algorithm .

[10] Amelard, Jeffrey Glaister, Alexander Wong, and David A Clausi. Melanoma decision support using lighting-corrected intuitive feature models. In Computer Vision Techniques for the Diagnosis of Skin Cancer, pages 193–219. Springer, 2014.

[11] Andre Esteva, Brett Kuprel, Roberto A Novoa, Justin Ko, Susan M Swetter, Helen M Blau, and Sebastian Thrun. Dermatologist-level classification of skin cancer with deep neural networks. Nature, 542(7639):115, 2017.

[12] André Sobiecki, Andrei Jalba, Daniel Boda, Adriana Diaconeasa, and AlexandruTelea. Gap-sensitive segmentation and restoration of digital images. In TPCG, pages 1–8, 2014.

[13] Asad Safi, Maximilian Baust, Olivier Pauly, Victor Castaneda, Tobias Lasser, Diana Mateus, Nassir Navab, Rüdliger Hein, and MahzadZiai. Computer–aided diagnosis of pigmented skin dermoscopic images. In MICCAI International Workshop on Medical Content-Based Retrieval for Clinical Decision Support, pages 105–115. Springer, 2011.

[14] Barata, M Emre Celebi, and Jorge S Marques. Improving dermoscopy image classification using color constancy. IEEE journal of biomedical and health informatics, 19(3):1146–1152, 2015.

[15] Bi, L.; Kim, J.; Ahn, E.; Kumar, A.; Fulham, M.; Feng, D. Dermoscopic image segmentation via multi-stage fully convolutional networks. IEEE Trans. Biomed. Eng. 2017, 64, 2065–2074.