

AUTOMATED MELANOMA RECOGNITION IN DERMOSCOPY IMAGES USING GLCM AND LBP METHOD

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ABSTRACT

The biggest organ of the body is human skin. Its weight lies between six and nine pounds and surface area is about two square yards. Inner part of body is separated by skin from the outer environment. Melanoma is a type of cancer that mostly starts in pigment cells (melanocytes) in the skin. In order to improve the diagnostic performance of melanoma, dermoscopy technique was developed.

Dermoscopy is a non-invasive skin imaging technique of acquiring a magnified and illuminated image of a region of skin for increased clarity of the spots on the skin. Dermatological diseases are the most prevalent diseases worldwide. Despite being common, its diagnosis is extremely difficult and requires extensive experience in the domain.

We use a dual stage approach which effectively combines Computer Vision on clinically evaluated histopathological attributes to accurately identify the disease. In the first stage, the image of the skin disease is subject to various kinds of pre-processing techniques followed by feature extraction. The second stage involves the use of algorithms to identify diseases based on the histopathological attributes observed on analyzing of the skin

INTRODUCTION

We have three type of skin cancer which one of the important one is Melanoma. The occurrence of Malignant melanoma has been increasing during the last couple of years and because there is no impressible treatment for the worst level of melanoma (advanced melanoma), so earlier prediction of skin cancer can be helpful to go through a required treatment & the lifetime can get more longer.

There are some specific symptoms that commonly considered by dermatologists for diagnosing melanoma skin lesion such as: Asymmetry of the lesion shapes, different color variation, irregular of the borders, and specific diameter. The most risk factor of Melanoma is UV radiation and tanning which get so common among the youngsters. The dermatologist can predict the melanoma with 75% accuracy, which is much lower comparing to Dermoscopy (epiluminescence microscopy) effectiveness. In this regard, a standard digital camera applies using an automated intelligence algorithm to detect the cancerous moles.

For further processing, it's too important to detect the exact border of the skin lesion, which is segmentation part. After acquiring the skin lesion images, this part can help to have a better feature extraction of the exact place and also have a high accuracy for classifying the lesion as benign or malignant. There are so many great segmentation algorithms which can have an uncertain outcome if the preprocessing phase such as illumination, de-noising does not apply on skin

lesion images & Most of them are based on color and texture of the moles. Hence, using image processing techniques & creating new algorithms in segmentation part by extracting lesion border from images can help the dermatologists to achieve a high performance and after diagnosing, we can have an efficient treatment to save the human life.

The objective of the paper is to find better and more efficient ways to automatically detect early malignant melanoma using digital image processing techniques. The drawback of existing system, for non-trivial problems, you generally need a very large network which can be extraordinarily time intensive to evaluate at inference time. Need a large dataset. Because of large dataset, training time is usually significant. In proposed method, totally four parts included.

They are Image Acquisition, Pre-Processing, Segmentation and Classification. Image Acquisition includes importing image to pre-processing. Pre-Processing includes filtering to remove noise. Segmentation part partition disease affected region from whole regions. Finally classifier part classifies what type of disease affected to human by particular dataset image. In our proposed has high accuracy for all kind of skin cancer. The detection of Melanoma cancer in early stage can be helpful to cure it.

All the methods that mentioned in the above are a good way for diagnosing the melanoma but they also have some disadvantaged that should be considered such as: First of all, it takes a lot of time that all these algorithms and parameters to be exploited for each lesion, so it's not a good way to use them for a large scale of different lesions. Secondly, we can't access to dermatologists and specialists in all over the world like rural areas and in these places, please just go to check by a physician that doesn't have more knowledge about dermatology.

Moreover, there is different opinion and idea about assessment of the parameters and having different methods for recognizing the skin lesion. According to all these problems,

we need to research and create automated new algorithms that is more flexible, fast and intelligence to diagnosing the melanoma. To create an automated algorithm for analyzing the dermoscopy images of the skin lesion we have different stage.

MELANOMA (SKIN CANCER)

Skin cancer is one of the most common & the deadliest type of cancer among the white skinned population in Europe, North America and Australia. It is the most common cancer in Canada & in 2014, 76,100 & 6,500 cases are diagnosed of non-melanoma skin cancer and malignant melanoma respectively. Melanoma is a malignant tumor that starts in melanocytes. Melanocytes are a type of cell that makes melanin, which is the pigment that gives your skin and eyes their color. The meaning of malignant is that it can extend, or to other parts of the body. There are three main types of skin cancer, regarding to type of the cell.

The more common skin cancers are the non-melanoma (NMSC), squamous cell carcinoma (SCC) and basal cell carcinoma (BCC), which are the less deadliest skin cancers comparing to the others. SCC is narrow uniform cells on the surface of the skin. It also likes to be more offensive than basal cell carcinoma. It is more likely to spread to fatty tissues under the skin, Lymph nodes or distant parts of the body.

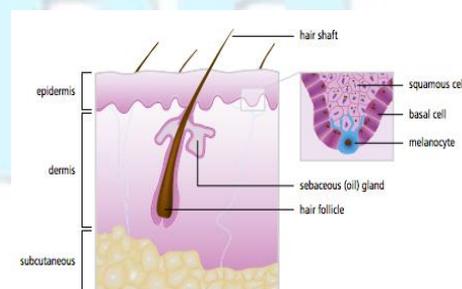


Fig1: skin cancer

DERMOSCOPY

In the past, most of the physician checked the moles by naked eye and clinical experience but these days

dermoscopy could help them to assessment & extract much more information of the lesion which is called dermoscopy that uses epiluminescence microscopy (ELM) images. It can show you the accurate structure or morphologies for analyzing and give us an accurate result than the past techniques, so now a day's most of the dermatologist are using the dermoscopy which is more accurate & give us the best resolution of the lesion for analyzing which has shown in figure. These days, most of the dermatologist are trying to analysis and recognize the moles from the dermoscopy images like ABCD rule and 7-point checklist.



Fig2: Dermoscopy Model

LITERATURE SURVEY

A system for the computerized analysis of images obtained from ELM has been developed to enhance the early recognition of malignant melanoma. As an initial step, the binary mask of the skin lesion is determined by several basic segmentation algorithms together with a fusion strategy. A set of features containing shape and radiometric features as well as local and global parameters is calculated to describe the malignancy of a lesion. Significant features are then selected from this set by application of statistical feature subset selection methods.[1] In this paper, we propose and evaluate six methods for the segmentation of skin lesions in dermoscopy images.

This set includes some state of the art techniques which have been successfully used in many medical imaging problems (gradient vector flow (GVF) and the level set method of Chan et al. [(C-LS)]. It also includes a set of methods developed by the authors which were tailored to this particular application (adaptive thresholding (AT), adaptive snake (AS), EM level set [(EM-LS), and fuzzy-based split and-merge algorithm (FBSM)]. The segmentation methods were applied to 100 dermoscopy images and evaluated with four different metrics, using the segmentation result obtained by an experienced dermatologist as the ground truth.

The best results were obtained by the AS and EM-LS methods, which are semi-supervised methods.[2] This paper proposes an automated non-invasive system for skin cancer (melanoma) detection based on Support Vector Machine classification. The proposed system uses a number of features extracted from the Wavelet or the Curve let decomposition of the grayscale skin lesion images and color features obtained from the original color images. The dataset used include both digital images and Dermoscopy images for skin lesions that are either benign or malignant.

The recognition accuracy obtained by the Support Vector Machine classifier used in this experiment is 87.7.1% for the Wavelet based features and 83.6. 6% for the Curve let based ones. The proposed system also resulted in a sensitivity of 86.4 % for the case of Wavelet and 76.9% for the case of Curve let.[3] Diagnosing an unknown skin lesion is the first step to determine appropriate treatment. We demonstrate that a linear classifier, trained on features extracted from a convolution neural network retrained on natural images, distinguishes among up to ten skin lesions with a higher accuracy than previously published state-of-the-art results on the same dataset.

Further, in contrast to competing works, our approach requires neither lesion segmentations nor complex preprocessing. We gain consistent additional improvements to accuracy using a per image normalization, a fully convolution network to extract multi-scale features, and by pooling over an

augmented feature space.[4] Computational methods play an important role in enhancing the diagnosis of the skin cancer.

Melanoma is the most fatal type of skin cancers that causes significant number of deaths in recent years. In this paper, novel boundary features are introduced based on the color variation of the skin lesion images, acquired with standard cameras. Furthermore, to reach higher performance in melanoma detection, a set of textural and morphological features are associated with proposed features. Multilayer perceptron neural network is used as classifier in this work.[5] This paper proposes an automated non-invasive multi-classifier system for skin cancer (melanoma) detection.

The proposed system fuses the results obtained from three classification systems to enhance the melanoma detection rate. All of the classification systems use Support Vector Machine classifier. However, the image feature sets used in each classification system are different. The features sets used are Wavelets and Color features, Curve let features and Grey Level Co-occurrence Matrices features. The output class labels or class probabilities of the three classification systems are combined using Majority Voting or Averaging Fusion to obtain enhanced classification rates. The dataset used include digital images for benign and malignant skin lesions. [6]

FRAMEWORK ANALYSIS

ISSUE ANALYSIS

The motivation behind the System Analysis is to deliver the concise examination errand and furthermore to set up entire data about the idea, conduct and different imperatives, for example, execution measure and framework advancement. The objective of System Analysis is to totally indicate the specialized points of interest for the primary idea in a compact and unambiguous way.

BUNDLES SELECTED

The bundle chose to create relinquished question discovery is MATLAB and the bundle has further developed highlights. As the framework is to be produced in MATLAB stage with windows Application is favored.

Highlights OF WINDOWS XP PROFESSIONAL

The capacity to end up some portion of a Windows Server area, a gathering of PCs that are remotely overseen by at least one focal server. A modern access control conspires that enables particular authorizations on documents to be allowed to particular clients under ordinary conditions. In any case, clients can utilize instruments other than Windows Explorer (like cacls or File Manager), or restart to Safe Mode to alter get to control records.

Remote Desktop server, which enables a PC to be worked by another Windows XP client over a neighborhood or the Internet. Disconnected Files and Folders, which enable the PC to consequently store a duplicate of documents from another organized PC and work with them while detached from the system. Encoding File System, which scrambles documents put away on the PC's hard drive so they can't be perused by another client, even with physical access to the capacity medium. Incorporated organization highlights, including Group Policies, Automatic Software Installation and Maintenance, Roaming User Profiles, and Remote Installation Service (RIS). Support for two physical focal handling units (CPU). (Since the quantity of CPU centers and Hyper-threading capacities on present day CPUs are thought to be a piece of a solitary physical processor, multi-center CPUs is upheld utilizing XP Home Edition.)Windows Management Instrumentation Console (WMIC): WMIC is a charge line apparatus intended to ease WMI data recovery about a framework by utilizing basic watchwords (assumed names).

ASSETS REQUIRED

In this stage it is important to break down the accessibility of the assets that are required to configuration, create, Implement

and Test the venture. The assets to be investigated are Manpower, Time and the framework Requirements. Groups of two individuals are associated with the whole SDLC life cycle aside from the testing stage. The testing stage is guided by the expert analyzers previously the usage of the item. Time Analyzed to finish the task is roughly four months with 4 hrs on regular routine aside from ends of the week. Framework necessities are broke down and recorded beneath.

FEASIBILITY STUDY

The target of attainability think about isn't just to take care of the issue yet additionally to get a feeling of its degree. Amid the examination, the issue definition was solidified and parts of the issue to be incorporated into the framework are resolved. Thus benefits are assessed with more noteworthy exactness at this stage. The key contemplations are:

- Economic practicality
- Technical practicality
- Operational practicality
- Monetary Feasibility

Monetary achievability examines not just the cost of equipment, programming is incorporated yet additionally the advantages as decreased expenses are considered here. This task, if introduced will positively be valuable since there will be decrease in manual work and increment in the speed of work.

SPECIALIZED FEASIBILITY

Specialized practicality assesses the equipment necessities, programming innovation, accessible work force and so forth. According to the prerequisites it gives adequate memory to hold and process.

OPERATIONAL FEASIBILITY

This is the most imperative advance of the achievability contemplate this investigation predicts the operational capacity

of the framework that is being created. This investigation additionally examines the approach towards which the framework must be produced by which advancement exertion is lessened. Proposed framework is gainful just on the off chance that they can be transformed into data frameworks that will meet the association prerequisites. This framework bolsters in creating great outcomes and decreases manual work. Just by investing energy to assess the practicality, do we diminish the odds from outrageous humiliations at bigger stager of the undertaking. Exertion spend on an achievability examination that outcomes in the cancelation of a proposed venture isn't a squandered exertion.

PRESENTED COMPOSITION

A self-learning model created by us would be a superior entertainer in such manner as the issue we are endeavoring to address is probabilistic in nature and henceforth we require a framework which takes in the fundamental example display in the skin infection which can be construed by the picture and the histopathological inputs. In this task, they propose a novel technique in view of profound CNNs to discover computerized melanoma acknowledgment in dermoscopy pictures, which comprises of two stages: division and arrangement. It flawlessly interface the two stages and shape a mechanized structure without need of manual communication. Contrasted and much shallower partners, the profound CNNs can produce highlights with high separation ability, and consequently enhance the execution of both division and arrangement errands.

WEAKNESSES

Inference time speed. For no paltry issues, you for the most part require a vast system which can be remarkably time serious to assess at induction time.

Need an extensive dataset. Due to expansive dataset, preparing time is normally noteworthy.

PROPOSED SYSTEM

With a specific end goal to enhance the precision of highlight extraction, eight distinctive preprocessing calculations were utilized.

The calculations utilized were changing over to dark scale picture, honing channel, middle channel, smooth channel, paired veil, RGB extraction, histogram and sobel administrator.

The RGB estimations of the pictures is separated before changing over it into a grayscale picture. Honing channel is connected to the grayscale picture keeping in mind the end goal to hone the subtle elements of the tainted area. YCbCr was utilized to remove normal shading code of the contaminated territory from the paired picture.

The number of segments of the skin burden was extricated from the picture utilizing the Euler esteem. For the grouping we will utilize GLCM (Gray Level Co-event Matrix) and LBP (Local Binary Pattern).

A edge restrict was forced on the Euler esteem heuristically, surpassing which was a pointer of essence of a substantial number of punishments. This is a critical recognizing highlight trademark for illnesses.

PREFERENCES

Low computational unpredictability and time intricacy contrasted with existing strategy. High precision for a wide range of skin pictures.

FRAMEWORK IMPLEMENTATION

PROGRAMMING OVERVIEW

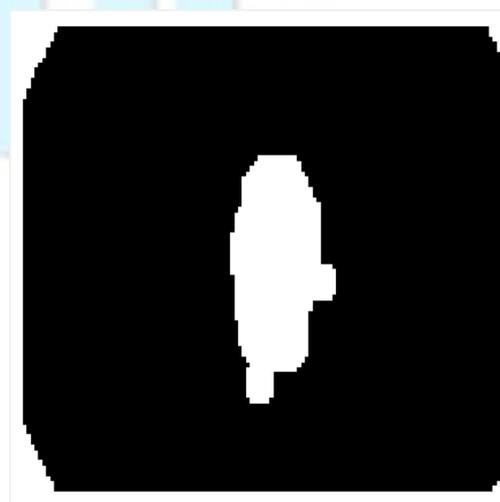
MATLAB is an abnormal state dialect and intelligent condition for numerical calculation, representation, and programming. Utilizing MATLAB, you can break down

information, create calculations, and make models and applications. The dialect, apparatuses, and worked in math capacities empower you to investigate different methodologies and achieve an answer speedier than with spreadsheets or customary programming dialects, for example, C/C++ or Java. You can utilize MATLAB for a scope of uses, including signal preparing and interchanges, picture and video handling, control frameworks, test and estimation, computational back, and computational science. In excess of a million specialists and researchers in industry and the scholarly world utilize MATLAB, the dialect of specialized processing.

INPUT IMAGE



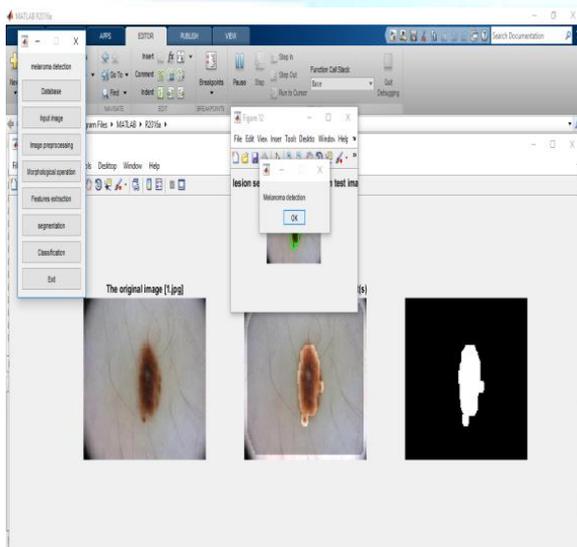
AFTER MORPHOLOGICAL OPERATION



SEGMENTATION



OVERALL OUTPUT



CONCLUSION

This paper introduced different element extraction procedure and division for grouping of dermoscopy pictures into melanoma and non melanoma. Two sorts of highlights have been utilized, shading and surface. For surface highlights, GLCM and LBP have been utilized. Consolidating these highlights enhances the precision of the grouping comes about. Along these lines, our proposed system has possessed the capacity to better characterize dermoscopy pictures into Melanoma and Non-Melanoma gatherings. It will build up the effectiveness of early location of skin growth. This technique

can be utilized between all inclusive communities as it utilizes pictures of skin sore caught by advanced camera.

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