Skin Cancer Detection in DNA Melanoma

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Abstract

One of the world's largest and fastest growing industry is healthcare or medical industry. The advancement of this industry is developed with the innovation of newer technologies and treatment procedure in the base of bio-technology. Every day of the individuals are deteriorating with the advent of several pollutants, cosmetics, and chemicals which are more harmful to their health. The harmfulness in these facts will affect our lifestyle including physical and mental health. One of the major causes of the above condition is skin cancer. So that, the project is mainly concentrate on the identification of skin cancer and detecting it with newer technologies. The detection of this cancer is processed with the combination of machine learning and image processing technologies. The affected area of the skin can be captured as images with the help of derma scope and the detection of that cancer can be proposed manually with several inputs like algorithms The main objective of this project requires minimal involvement from human to develop machine learning algorithm.

Keywords: bio-technology, skin cancer, machine learning

1. Introduction

The most common disease in now days are cancer. So here, the importance of this work is mainly concentrate on skin cancer. This cancer is affecting more individuals with the increased use of familiar cosmetics, pollutions and UV radiations, which damage the DNA of skin cells and weaken the immune systems. So that, the project is developed with the concentration of detecting this cancer manually through the newer technologies. The affected area of the skin can be captured as a image with the help of derma scope which can be detected or nourished with input as algorithms. The main aim or objective of these work need some minimal involvement or intervention from doctors to develop an algorithms which helps to detect this cancer.

1.1 Various stages of Skin Cancer

This cancer can affects people with all skin tones, including those with darker complexions. This disease is discovered with various stages and it is necessary to determine each stages of this cancer in order to treat them. It can be determined by various factors like thickness of tumor, depth of penetration and extend to which melanoma occurs. Generally melanoma will usually come in the skin where the sunlight is not been exposed. Patients with skin cancer are treated based on the determination of stages. The early stage of skin cancer or Melanoma is biased (insular).

Stage 0 tumors are Non-invasive precancerous tissue and it cannot be extended lower down to the skin called epidermis layer which provides barrier to infection. The layer beneath the epidermis in dermis layer, where the **Stage I** tumors occur. These tumors have little different characteristics of slowly-growing. For example: ulcer can be associated with cancer in a form when the surface cells die and are put them at a high risk of spreading it to the other sites in the body by metastasis which beyond to close by lymph hubs.

Stage II tumors are having different characteristics which are limited and bigger as 1mm thick. It can also be explained with the above considered example- Ulceration. It may raise a person's risk by developing "high- chance" melanoma, which is more severe. These may have further stages of **Stage III and IV** which can be spreader or metastasized to different sites of the body. And these stages can also be subdivided depend on the factors of thickness or penetration.

2. Literature Survey

Bumrungkun, P., Chamnongthai, K et.,al., proposed the most common cause of death in thailand is cancer. Either it may be a breast, cervical, liver and lung cancer etc. Among these cancers, every year skin cancer can also be increasing. These can be diagnosed by capturing image of the affected area. We can detect these be considering and analyzing the features of cancer images which is captured with the help of dermoscope. These features may include

asymmetry, border, irregularity, compact index, fractal dimension, edge abruptness, color variation, and diameter etc, by make use of these features we can treat the patients with skin cancer to detect it. It is the most popular technique to analysis or determine the stages of tumors in order to treat patients with cancer. To be successful in these diagnosis, segmentation of image plays a important role which helps to analyze and extract the various complexions in features. Image segmentation needs a vital role for automatic skin cancer detection system. So, we proposed the image segmentation scheme in this paper which is based on the SVM (Support Vector Machine) and also snake active contour. SVM helps to develop or finding the abrupt parameters for algorithms which in order to treat the cancer [1].

Suleiman Mustafa; Akio Kimura et.,al., proposed the promising tool for skin cancer detection which is recently significant are Millimeter-wave near fields, it was probably grab the attention for treating the cancer. The process of these device is complicated so that it is expensive in nature. Although, the fabrication process of these device is complicated and expensive - the device performance is very much suitable to attain the conventional waveguides. These fabrications issues can be overcome or ignored by the design appeared in these device which is named as SIW(Substrate Integrated Waveguide). The blunt-ended surgical instrument called probe is excited by using a transition between the microstrip to SIW and in order to increase the intensity of the electric field on skin surface, we just need to tapered it. The placing of probe needs a operation which may depends upon the resonance frequency shifts and in need of dielectric properties based on the skin. It is capable of being detecting the early stage of thick or bigger tumors to smaller in diameter of 0.2 mm which is located in skin tissues (even the tissues may be thicker or thinner), we can treat them [2].

Ali Youssef ;Domenico D. Bloisi et.,al., proposed Skin cancer is turned as a life threatening disease in now a days, which in risk may lead to human death. The skin cancer will come due to the abnormal growth if skin cells when it is been exposed to normal sunlight. Due to the mutation errors caused in the DNA of skin the cancer in skin takes place. This type of mutations which is been occurred is the exact and major reasons in the development of skin cancer. Melanoma can affect people of all skin tones due to darker complexions, most widely it is due to exposure of UV radiations to the skin and may be some genetic factors. It is consider as the first stage of skin cancer which can be biased completely in the early stage of tumor, because it lies on the first layer of the skin called epidermis. it can be appear as black or brown colored lesions.. The traditional method of detecting the skin cancer is to remove the cancerous tissue from the body, which is named as **Biopsy.** Even though it is traditional, these method has a some risk like painful and invasive because it requires laboratory testing which consumed more time. Therefore, the above issues in traditional method of diagnosis need some computer aided diagnosis, in which the skin cancer can be easily identified and cured in its early stages. These diagnosis method need dermoscope to capture the images of the affected area of the skin. T briefly explains the preprocessing image and the segmentation part. The skin image is used to determine the stages of cancer and to analyze the feature to diagnose that tumor cells. After preprocessing image, the suffered or damaged tissue(lesion) can be segmented to find and analyze the unique features which helps to treat or extract the tissue easily from the skin. After the segmentation image we need some extraction to differentiate the normal skin and melanoma skin type so that we are using the SVM(Support Vector Machine). Thus the proportion of SVM in these diagnosis system including the linear kernal gives efficient precision and accuracy to these detection [3].

V S. Sabeera, P. Vamsi Krishna et.,al., proposed the accuracy in image of Non-invasive precancerous tissue requires a characterization in precise dermal tissue. The waveguide in electric field intense needs a study related to imaging techniques of microwave and millimeter-wave, which indicate significant different in dielectric properties to create a transition between the normal and malignant tissues. These affected tissues are having a high water content when compared to normal tissues. It can be formed as tumors which invade neighboring tissue and organs through blood and lymph systems. In this project, we can able to derive the features of healthy tissues by defining or calculating the formula for treating the dielectric based properties to malignant and Basal Cell Carcinoma(BCC) tissues. The significant difference is 20% can be derived as 10 GHz between malignant and healthy tissues, whereas it is 11% in BCC. This efficient surveys shows the possibility to use the above mentioned techniques is substantial for treating non-invasive skin cancer detection [4].

Pratik Dubal, Sankirtan Bhatt, Chaitanya Joglekar et.,al., proposed three types of melanoma : 1) Basal Cell Carcinoma (BCC), 2) Squamish CC, and 3) Melanoma. Among these, melanoma is very effective one which can be cured in its early stages. The stages of these can be explained as IV stages. It can be cured easily in early stages, where these affected tissues are not entered beneath the first layer called epidermis. To find the early stage of skin cancer is high challenging among doctors as lot of deep study is needed. So in order to detect this precoming stage various ideas have been followed. To find out this early stage we need to know about the normal and abnormal features of skin cancer. MED-NODE helps us to develop the system for treating melanoma skin cancer for dataset digital image processing. The dataset contains raw images which are processed first. Then the extraction part is applied to make active interest in use of contour segmentation. The feature of ABCD rule is applied in dermoscopy such as Asymmetry, Border, and Diameter. To predict the early stage of melanoma the doctors should have a good experience in finding out and also o keen knowledge in

the computer design of skin cancer. Even when diagnosing this early stage of skin cancer many researchers come with the following problems 1) there will be always low contrast between lesions and skin, 2) many times we come across visual similarity between affected and non-affected area, etc. Here we will be using filtering techniques in order to differentiate cancer cells from the given input skin image. This helps us to find out any type of skin cancer and their emergency situation from the given input image. Making a clear analysis of this will help the doctor to find out the skin cancer in the affected and non affected areas. This will help in the future to avoid any side effects caused [5].

Ekta Singhal et.,al., proposed a common clinical feature of BCC is translucency which aspects as a jelly and it is the most common skin cancer. This method helps n finding out the basal cell carcinoma which is been found out by using high quality of 93%. This estimation method will be high useful n detecting the early stage of skin cancer. For this analysis we have introduced a new scheme clinical BCC images using Stacked Sparse Auto-encoder (SSAE). The proposed method achieves 93 % of accuracy in detecting the early stage of skin cancer [6].

3. Implementation of Skin Cancer

Melanoma is one of the dangerous kind of this cancer. However, the combinations of both machine learning and image processing helps to diagnose these cancers; dermoscopy is also critical in melanoma therapy for early detection of tumors. Well-trained dermatologists also be dominant and processing more for this diagnostic accuracy. Many these issues can be solved by making effort pn concentrating or focusing for the development of newer technologies like automatic image analysis systems. The work in this project may report some novel strategy based on the segmentation of cancerous tissue. The accurate diagnosis of detecting melanoma by computerized systems performs a major role in this attempt. Segmentation of lesions are automatically processed in the captured images is a challenging task for it.

1) We present a new DNN i.e., deep neural network which is competitive for tumor in accurate diagnosis method.
2) Another method for DNN based detection is full tumor segmentation method which are proposed to pictured in images.

The reason for machine learning technology is to exploits flexible and high capacity to the DNN. These DNN is based on the technique of inception network (Google inception v3 network) originally used in Lenet. It was a successful convolutional neural network for identifying patterns in images.

4. Conclusion

Based on the factors of accuracy and precision of different neural networks are approached here for demonstrating the project with the diagnosis of skin cancer. The classification task and implementation of both the Neural Network (NN) and supporting machine demonstrate the model segmentation of breast cancer with an approach of treating skin cancer as either biased or malignant. We can compare efficiently both the NN and SVM based on the accuracy and precision, which can also be implemented in this paper. So that, we can say NN technique in more efficient than SVM in detecting skin cancer.

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