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Automated Skin Disease Identification Using Deep Learning Algorithm

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Abstract

Skin diseases are common diseases that may be caused due to allergies, viruses, bacteria, fungal infections, etc. Though there's a rapid advancement in medical technology to diagnose skin disease quickly and accurately it is still limited due to its cost. But analyzing and predicting the disease using a deep learning approach has come in handy. This project is mainly proposed by CNN. In this approach three image recognition architectures are used, namely Inception V3 for image recognition, InceptionResnet V2 is a CNN that is used in training more than a million images from the image net database and MobileNet is used for embedded vision applications with certain modifications to predict the skin diseases based on maximum voting from the three networks. The main objective is to get maximum accuracy in predicting skin disease.

Keywords

CNN, Inception V2, Inception V3, MobileNET

1. Introduction

Dermatology has become one of the most complicated branches of science due to

the complexity of the procedures involved in diagnosing diseases. Most skin diseases are very fatal if they are not treated at an initial stage also if the remedies are not apt for those skin problems then it makes it even worse. As laboratory procedures take a lot of time, this paper gives an alternative approach to this problem, enabling users to predict skin disease using deep learning algorithms.

A) Image Recognition

1) Input: This method proposes an image processing method to detect skin diseases. It takes a digital image of an affected area of the skin through the camera as input. Our approach is simple, fast, and does not require expensive equipment. Once the input is taken through the web camera it will be processed using image recognition architectures. They are:

- Inception V3
- Inception RV2
- MobileNet

2) Confusion Matrix: It gives the prediction results on a classification problem. The confusion matrix mentions the type of errors that were made by the classifier. It is this breakdown it overcomes the limitation of using classification accuracy alone.

a) Inception V3: Confusion Matrix for Inception V3 describes the accuracy of the algorithm. Inception V3 is a CNN it assists in analyzing images and detecting an object.

b) Inception ResnetV2: Inception Res Ner V2 is a convolutional neural network trained on more than a million images from the ImageNet database.

c) MobileNet: MobileNet is used for embedded vision applications with modifications for skin disease applications and successfully predicts the disease based on maximum voting from the three networks.

B) Image Classification and processing

This project is mainly based on CNN. We use layers of the convolutional neural layer to predict the disease. The layers of CNN are:

- Convolutional Layer.
- Pooling Layer
- ReLU Layer

a) Convolutional Layer: The main purpose of this layer is to detect the presence of a set of features in the images received as input. The convolutional layer receives several images as input and calculates the convolution of each of them with each filter. The filters correspond exactly to the features that we want to find in the images. We get for pair(image, filter) of a feature map, which tells us where the features are in the image: the higher the value, the more the corresponding

place in the image resembles the feature.

b) The Pooling layer: This operation consists in reducing the size of the images while preserving their important characteristics. To do this we cut the image into regular cells and then we keep the maximum value within each cell. In this approach we use small square cells we reduce the risks of losing too much information.

The maximum values are spotted less accurately in the feature maps obtained after pooling, which acts as an advantage. For Example: when you recognize a cat, its ears do not need to be located as precisely as possible: knowing that they are located almost next to the head is enough.

c) The ReLU correction layer: ReLU(Rectified Linear Units) refers to the non-linear function defined by ReLU(x)= max(0,x).

It acts as an activation function.

2. Diagnosis of Diseases

2.1. Actinic kertoses

Dysplastic keratinocyte proliferation having the potential to become cancerous is called actinic keratoses. Actinic keratoses typically appear clinically as macules, papules, or hyperkeratotic plaques with an erythematous background on photo-exposed skin. In the beginning, palpation may be more effective than visual inspection in identifying them.

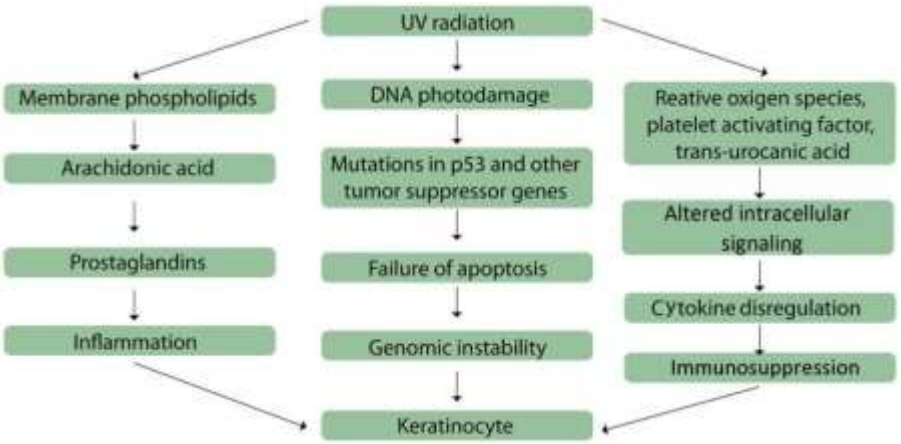

Figure 1. The mechanism involved in Actinic keratoses.

When numerous, they form the so-called field cancerization. They may also be colored and exhibit varying degrees of penetration. Caucasian people over 40, form the so-called field cancerization. They may also be colored and exhibit varying degrees of penetration. In Caucasian people over 40, their prevalence ranges from 11% to 60%. The main cause of pathogenesis is ultraviolet light, although other factors, like an individual's genetic makeup, can also contribute to the development of lesions.

The activation of these mediators causes lipid peroxidation, an increase in intralesional levels of T lymphocytes and Langerhans cells, an increase in p53 and Bcl-2, and a decrease in Fas (cd95) and Fas-ligand, which are important initial factors in the apoptosis process.

The inflammatory process is mediated by the arachidonic acid pathway, by the production of proinflammatory cytokines, and by the activation of mast cells In lesions that have developed into SCC, there is a correlation between inflammation and actinic keratoses; actinic keratoses can go through an inflammatory phase before becoming invasive.

Age, sex, phototypes I and II, a history of cutaneous neoplasms, and occupational sun exposure are the five most significant independent risk factors for the development of actinic keratoses.

Analysis

Actinic keratoses are a skin disorder that negatively affects the quality of life and is a significant precursor to cutaneous neoplasias. Because of this, it is crucial to identify such lesions and treat them very away to stop the disease from progressing. Dermoscopy, in particular, a clinical and non-invasive imaging tool, can aid with this endeavor. There are several therapeutic choices accessible, and the optimal option should be selected individually for each patient based on their circumstances and, whenever possible, scientific data.

The best way to prevent AKs is to shield your skin from the sun's damaging UV rays by donning protective clothes, applying sunscreen, finding shade during peak sun hours, and staying away from tanning booths. Cryotherapy (freezing), topical drugs, photodynamic therapy, and surgical removal are among the available treatments for AKs. If you detect any changes in the look of your skin, including the emergence of new AKs or modifications to those that already exist, it is crucial to seek medical assistance.

Actinic keratoses (AKs) are tiny, scaly patches that develop on the skin after being exposed to the sun's ultraviolet (UV) rays for an extended period. They are sometimes referred to as sun keratoses and are regarded as precancerous lesions that, if ignored, can turn into squamous cell carcinoma. The face, scalp, ears, arms, and hands are examples of sun-exposed body parts where AKs commonly manifest. Normally, they begin as tiny, rough spots that can be pink, red, or brown in hue. They might enlarge, thicken, and acquire a more scaly texture with time.

Advantages and Disadvantages :

Advantages: The ability to detect actinic keratoses through analysis makes it easier to cure them before moving on to the subsequent procedure or processes.

Disadvantages: Its high potential for false positive results can lead to unnecessary processes and diagnoses.

Clinical diagnosis	Dermatoscopic findings
Actinic keratosis	Red pseudo network
Actinic keratosis evolving to *in situ* SCC	Starburst pattern
In situ SCC	Yellowish opaque structures and dotted vessels
In situ, SCC progressing to invasive SCC	White areas without structures, dotted and hairpin vessels
Minimally invasive SCC	Central keratin mass and vessels hairpin

Table 1. Progression model of actinic keratoses to invasive squamous cell carcinoma (SCC) based on dermoscopic

2.2. Basal cell carcinoma

Basal cell carcinoma Skin cancer that develops in the basal cells, which are found in the epidermis' lowest layer, is known as basal cell carcinoma (BCC). (the outermost layer of the skin). Approximately 80% of all occurrences of skin cancer are BCC, making it the most prevalent kind. On the skin, BCC typically manifests as a tiny, glossy lump or nodule. It could appear waxy or glossy and be pink or crimson in color. The bump could enlarge and turn into a sore that doesn't heal or bleeds easily over time. BCC can appear anywhere on the body, however, it tends to appear more frequently on exposed skin, such as the face, neck, and arms Fair skin, a history of sunburns or prolonged sun exposure, a family history of skin cancer, exposure to UV radiation from indoor tanning, and a compromised immune system are risk factors for BCC. The size, location, and kind of tumor, as well as the patient's general condition, all influence the BCC treatment options.

Surgical removal, radiation therapy, cryotherapy (freezing), and topical drugs are typical forms of treatment.BCC has a relatively favorable prognosis since it advances slowly and seldom metastasizes to other body regions.

To stop harm to neighboring tissues and structures, early detection and treatment are crucial. People are advised to regularly self-examine their skin and visit a dermatologist if they notice any unusual changes in their skin. BCC often manifests as a glossy papule or nodule that is pink or flesh-colored and has surface telangiectasia. The edges of the tumor may roll or develop a rodent ulcer as it enlarges and ulcerates. The nose, cheeks, forehead, nasolabial folds, and eyelids are the areas of the face where nodular basal cells are most frequently found. Patients frequently seek assessment because of a history of crusting and recurrent bleeding. Islands or nests of basaloid cells, with cells palisading at the periphery in a disorganized arrangement in the centers of the islands, are the defining characteristic of BCCs. Each of these tiny pleomorphic cells consists of a sparse amount of cytoplasm surrounding a basophilic nucleus without a visible nucleolus. On paraffin-embedded sections, retraction artifact, also known as clefting, is typically visible between the tumor and its surrounding stroma Both the stroma around the tumor and the tumor itself may have mucin deposition. Figures from mitosis are also possible. Perineural invasion, sometimes referred to as perineural growth, is a sign of an aggressive illness. Trichoepithelioma or trichoblastoma may be included in the histologic differential diagnosis. Nodular (solid), micronodular, superficial, cystic, infiltrating, infundibula cystic, pigmented, adenoid, sclerosing, metatypical, basosquamous, and fibroepitheliomatous are only a few of the morphological subtypes that have been identified. It is also usual to see mixed patterns of the aforementioned sorts.

The majority of cases are of the nodular form. Islands of cells with peripheral palisading and an ad hoc arrangement of the more central cells make up nodular BCCs. Larger lesions might have ulceration.

Except for the fact that it consists of several tiny nodules, the micronodular subtype shares many histologic characteristics with the nodular subtype. Compared to the solid type, the micronodular type has a substantially higher risk of local recurrence. A dense fibrous stroma surrounds spiky, basaloid, thin strands of cells that infiltrate the dermis to form the sclerosing (morphea-like) subtype. The histopathological differential diagnosis could be metastatic cancer, desmoplastic trichoepithelioma, or microcystic adnexal carcinoma. Pigmented basal cell carcinoma is a type of skin cancer that occurs when melanocytes and melanin are present within the tumor cells. This type of cancer is more commonly found in the superficial, micronodular, or follicular variants. However, the infundibula cystic variant is also possible and is often found on the face.

Analysis:

On the skin, it often presents as a tiny, raised, pearly or waxy bump that can be pink, red, or brown in hue. The bump may enlarge, develop an ulcer, and turn into a sore that doesn't heal or bleeds readily over time. Although BCC can appear anywhere on the body, it is most frequently detected on exposed skin, especially on the face, arms, and neck. A small sample of the lesion is extracted and studied under

a microscope during a skin biopsy to diagnose BCC.

Further testing could be required to ascertain the cancer's extent and whether it has spread to other body parts if the biopsy confirms the presence of BCC. Dark-skinned people are more likely to develop pigmented nodular BCCs, A pink-red, scaly macule or patch with telangiectasia characterizes superficial BCCs. They prefer the shoulders, chest, or back, and there may be many lesions. Various pigmented forms of superficial BCC exist as well, But in 2015, the accuracy offered by Naive Bayes is low. It presents 79.5652% or 79.57% accuracy.

The model requires more training data for development and testing. Additionally, there is an accuracy graph that shows the performance of different algorithms for diagnosing diabetes disease over time.

Improving Healthcare Team Results:

The disease basal cell cancer is rather frequent. Patients frequently complain of an odd skin lesion when they first visit their primary care physician. It has a great prognosis when detected early, but if it's detected later, the tumor may grow and cause severe morbidity An interprofessional team composed of a dermatologist, a Mohs surgeon, a plastic surgeon, a nurse practitioner, a primary care provider, and a dermatopathologist is ideally suited to manage basal cell cancer. In general, basal cell carcinomas grow slowly and frequently invade nearby tissue. Vision loss may result from tumors near the nose and eyes.

2.3. . Dermatofibroma

Dermatofibromas are benign skin growths that are often quite tiny in diameter. They can be any hue, but in most cases, they are pink to light brown in people with a light complexion and dark brown to black in people with dark skin. If someone unintentionally irritates them, such as when shaving, they may appear darker or pinker. Many people claim that they feel like a little stonebeneath or risen above the skin since they are solid and stiff to the touch.

The majority of dermatofibromas are asymptomatic, however, some individuals report itchiness, discomfort, or tenderness at the growth's location. In the deeper skin layers, dermatofibromas are a collection of additional cells. The precise reason for these growths is unknown to medical researchers. According to some researchers' Trusted Sources, the lesion may have developed as a result of an unpleasant reaction to local trauma, such as a minor wound or insect bite. Given that the growths primarily affect adults, age may be another risk factor.

Dermatofibromas and the presence of multiple growths may both be more common in those with immune system suppression. Additionally, those with underlying diseases are more likely to develop several dermatofibromas, particularly those with systemic lupus erythematosus.

Dermatofibromas usually develop gradually. The growths usually have some distinguishing features that can help with the identification

An important indicator of dermatofibroma is:

Size: Most lesions have a diameter of between 0.7 and 1.0 centimeters (cm), which is within the normal range of 0.5 to 1.5 cm. Usually, the size will not change.

Color: The growths can range in hue from pink to red to grey to brown to black, depending on the individual.

Location: Dermatofibromas are most frequently found on the legs, while they can also occasionally be found on the arms, trunk, and, less frequently, other parts of the body.

Additional symptoms: These growths may occasionally be itchy, tender, painful, or inflamed, even though they are normally harmless and painless.

Given that the growths primarily affect adults, age may be another risk factor. Dermatofibromas and the presence of multiple growths may both be more common in those with immune system suppression.

Additionally, those with underlying diseases are more likely to develop several dermatofibromas, particularly those with systemic lupus erythematosus. A doctor will usually do the following in addition to asking about the patient's symptoms and inspecting the area's dependable source.

Pinch test: The physician may pinch the nearby skin to look for the distinctive dimple.

A dermatoscopy is a tool the doctor can use to examine the growth's surface up close. Dermatofibromas typically have a pigmented area encircling a core white area in the middle. Biopsy: Doctors may decide to perform a biopsy if the tumor is bleeding, irregularly shaped, itchy, or has a sore on top of it. In this technique, a little sample of the papule's tissue is removed for laboratory examination under a microscope.

Analysis:

Dermatofibromas are benign skin growths that appear. They typically do not disappear on their own, though. Unattractive or unpleasant growths can be surgically removed, or a person can try several other, less intrusive therapies. These additional therapies, however, could not completely get rid of the tumor. Even though dermatofibromas are benign, anyone should consult a doctor if they notice any new skin growths, particularly if they change in size, shape, or color or have an unnatural pattern. Additionally, any growth that bleeds, gets uncomfortable, itches, or grows quickly should be reported as soon as possible. Such growths may occasionally represent more severe skin problems that are comparable but less obvious.

Removal of dermatofibromas:

Removal is frequently the simplest and most effective solution, although it necessitates surgery. If a person has a growth that is unattractive or in an embarrassing location, they may request this therapy. After the wound heals, the operation may nevertheless leave a pronounced scar. Because of this, doctors rarely suggest removal unless the tumor is excruciatingly uncomfortable. A variety of tissues, including blood vessels, fibroblasts, and macrophages, make up dermatofibromas. The dermis, the skin's middle layer, is where the growths penetrate. In a few rare instances, the growths may reach the deeper subcutis. It might be more difficult to surgically remove these growths.

Alternative therapies:

The growth may also be frozen using liquid nitrogen, given a corticosteroid injection, or treated with lasers. These approaches might not, however, be successful. A dermatofibroma cannot yet be permanently altered in size using any known techniques. Rarely, but occasionally, a growth may decrease or vanish on its own. These growths shouldn't be attempted to be removed at home. Deep scarring, infection, and incorrect healing might result from inappropriate removal.

2.4. Melanoma

The cells (melanocytes) that are responsible for the production of melanin, the pigment that gives your skin its color, are where the most deadly form of skin cancer, melanoma, develops. In rare cases, melanoma can develop inside the body, such as in the nose or throat, as well as in the eyes.

Although the exact cause of all melanomas is unknown, UV exposure from sunlight or tanning beds and lamps increases your risk of developing the disease. Melanoma risk can be reduced by limiting exposure to UV radiation.

Melanoma seems to be getting more likely to happen to people under 40, especially women.

They are properly recognized and seen before the treatment of the diseases.

Melanoma can be dealt with effectively assuming it is identified early.

Melanomas can develop on any part of the body. They usually appear on your back, legs, arms, and face, which have been exposed to the sun.

Melanomas can also develop in places where you don't get much sun, like the palms of your hands, fingernail beds, and soles of your feet. People with darker skin are more likely to develop these hidden melanomas.

Typically, the first signs and symptoms of melanoma are:

An adjustment of a current mole

The improvement of another pigmented or uncommon-looking development on your skin Melanoma doesn't necessarily in all cases start as a mole. It can also happen to skin that looksnormal.

Normal moles typically have a distinct border that separates the mole from the skin around it and are typically a single color, such as tan, brown, or black. They are usually round or oval in shape and have a diameter of less than six millimeters, or about the same as a pencil eraser.

The majority of moles appear in childhood, and new moles may not appear until around age 40. The appearance of moles can change over time, and some may even go away as you get older.

The majority of people have between 10 and 40 moles by the time they reach adulthood Unusual moles that could be signs of melanoma.

To figure out the characteristics of unusual intelligencers that could be signs of tubercles or other skin cancers, suppose of the letters ABCDE:

A) Denotes an asymmetrical shape. Look for moles that have a strange shape, like two halves that look very different.

B) Indicates an irregular border. Melanoma-like moles have borders that are irregular, notched, or scalloped.

C) Stands for color changes. Search for developments that have many tones or a lopsided conveyance of variety.

D) Denotes diameter. If a mole is larger than 1/4 inch (6 millimeters), look for new growth.

E) Stands for changing. Search for changes over the long haul, for example, a mole that fills in size or that changes tone or shape. Moles can also change to produce new signs and symptoms, like bleeding or itching.

Melanoma of the mouth, digestive system, bladder, or genital area. Mucosal melanoma creates in the mucous layer that lines the nose, mouth, throat, rear-end, urinary parcel, and vagina. Mucosal melanomas are particularly hard to identify because they can without much of a stretch be confused with other undeniably more normal circumstances.

an eye melanoma. Melanoma of the eye, also known as ocular melanoma, most frequently affects the uvea, which is the layer beneath the white of the eye (the sclera). During an eye exam, melanoma of the eye can be diagnosed because it can alter vision.

2.5 Nevus

Melanocytes, dendritic cells that produce pigment and are typically found between keratinocytes in the basal layer of the epidermis, are the source of the benign tumor known as nevus pigments. The developing Nevus Pigmentosus is extremely risky and very challenging to handle. Nevus Pigmentosus

can develop into carcinoma, a deadly skin cancer, if not caught beforehand and exposed to pollution, ultraviolet light, and dangerous chemicals.It can also cause birthmarks or moles. Different impacts of this illness patients impacted by difficulties will encounter nerve issues, like seizures, blacking out, and regurgitating

A group of rare, complex disorders known as epidermal nevus syndromes (ENSs) are characterized by the presence of epidermal nevi—skin lesions—and additional extra-cutaneous abnormalities, most frequently affecting the brain, eye, and skeletal systems. Overgrowths of epidermal structures and tissue are known as epidermal nevi. The epidermis is the skin's outermost layer. The size, number, distribution, and appearance of the various epidermal nevi can vary. Seizures, cognitive impairment, developmental delays, and paralysis of one side of the body (hemiparesis) are examples of neurological abnormalities that are associated with ENSs. Abnormalities of the arms and legs (such as underdevelopment, absence, or overgrowth of limbs) and malformations of the hip are examples of skeletal anomalies. Cataracts, corneal clouding (opacity), and colobomas—partially missing iris or retina tissue—are examples of ocular abnormalities. Vitamin D-resistant rickets and other endocrine abnormalities have been linked to Schimmelpenning syndrome. ENSs can have a wide range of specific symptoms and severity levels, depending on the individual. The majority of ENSs occur at random and for no apparent reason (sporadically), most likely as a result of a gene mutation that takes place after fertilization (postzygotic mutation) and only affects a small number of the body's cells (mosaic pattern).
In the medical literature, the term "epidermal nevus syndrome" has sparked a lot of debate and confusion. In the past, the term was used to refer to a disorder that was a collection of erroneously grouped disorders. The condition that is now known as Schimmelpenning syndrome was once referredto by this name. However, there are several conditions to which the term "epidermal nevus syndrome" can be appropriately applied. As a result, the term "epidermal nevus syndromes" now refers to a collection of distinct disorders that share the presence of one of the various epidermal nevi. However, the medical literature is still in disarray due to the lack of consensus regarding how to categorize this diverse group of disorders. Contrary to what is frequently erroneously stated in the medical literature, these disorders are very distinct from one another. The classification may change or expand in the futureas the genetic and molecular causes of these disorders are better understood.

The terms "organoid nevus syndrome" and "keratinocyte nevus syndrome" have also been used to describe ENSs. However, these terms should not be used in conjunction with epidermal nevus syndromes or as a synonym for a single disorder. The general term "organoid nevus syndrome" can be used to describe at least five distinct ENS types. The term "keratinocyte nevus syndrome" can be used to describe four distinct ENS subtypes. Nevi are typically diagnosed clinically using dermatoscopy or the naked eye. Computerized dermoscopy and image analysis are two more advanced imaging tests that can be used to distinguish melanocytic nevi from melanoma.

The treatment of nevi varies based on the type of nevus and the degree of diagnostic uncertainty. It is possible to simply keep an eye on some nevi over time because they are known to be benign. Others may necessitate a more in-depth examination and biopsy for histopathological examination, which involves examining a skin sample under a microscope to identify distinctive cellular characteristics. A doctor might want to know, for instance, if a pigmented nevus is a type of melanocytic nevus, dysplastic nevus, or melanoma because some of these skin lesions could be cancerous. In adults, the ABCDE criteria (asymmetry, border irregularity, color variegation, diameter greater than 6 millimeters, and evolution) are frequently used to distinguish nevi from melanomas. In children, however, modified criteria (amelanosis, bleeding or bumps, uniform color, small diameter or de novo, and evolution) can be used to evaluate suspicious lesions. In addition to histopathological examination, some lesions may also require additional tests to aid in diagnosis.

2.6 Pigmented Benign

Overproduction of melanin or an abnormal increase in the density of active melanocytes are the two main causes of benign pigmented skin lesions (PSLs). The patient's mental health and quality of life may be negatively impacted by these changes, which may result in severe skin disfigurement. The most common benign PSLs are melasma, nevus of Ota, and freckles. Skin pigmentation disorders, which necessitate specialized clinical care and restricted cosmetic use, are more prevalent in Asians. In any case, most skin sicknesses or determinations are performed by non-trained professionals, specifically, general doctors. Although all PSLs are caused by melanocyte abnormalities and exhibit clinical manifestations that are almost identical, the treatment strategies and prognoses of various subtypes may be quite distinct. By delaying the appropriate treatment, a misdiagnosis can exacerbate clinical outcomes. This demonstrates the necessity of precise methods for identifying benign PSLs.

Medical image processing research that is based on machine learning has become a hot research topic in the field of computer-aided diagnosis in recent years, with the development of machine learning in the field of computer vision. Digital images are utilized in disease diagnosis by several computer-based systems in dermatology, oncology, and ophthalmology For the classification of clinical skin disease images, the implementation of image classification by machine learning provides a lot of reference material. The deep learning machine vision algorithm based on convolutional neural networks has gained more and more attention from researchers since AlexNet's 2012 victory in the ImageNet image recognition competition.

Since then, it has swiftly established itself as the standard approach for image classification, target detection, and segmentation. Pathological maps of dermatology were studied abroad relatively recently. Cascinelli et al. [An examination of images of pigmented skin lesions (PSLs) using an automatic

classification algorithm was proposed by]. Umbaugh and co.] proposed the color moment feature extraction and image segmentation method for skin cancer diagnosis. Stanganelli and others [classified dermatological case maps using images from a fluorescence microscope and a support vector machine classifier. Kassem and others] classified the skin lesions into distinct groups by applying transfer learning in various ways to the Alex-net. They also came up with a novel AlexNet-based method to classify seven different kinds of skin lesions. The model performs better than any other classification method by at least 6%. Esteva and others In a Nature paper, a deep learning convolutional neural network was used to accurately detect melanoma from a dermatoscopic image dataset. However, the dataset that the author used, which contained 120,000 dermatoscopic images, was not published. Current dermatological case map research focuses on image pretreatment, segmentation, feature selection, and extraction, image classification and recognition, and a few clinical dermatological image-based studies. However, the majority of these studies are based on dermatoscopic images. Dermoscopes, on the other hand, are mostly only available to dermatologists, especially those in rural areas. Additionally, dermoscopes aren't needed to diagnose many common skin conditions. On the other hand, most recent research has investigated the possibility of identifying skin lesions using digital images because of the availability of digital images.

In light of our assignment of distinguishing and characterizing skin sicknesses, we want to utilize object discovery calculation. One of the fundamental computer vision tasks, object detection has been studied in academia for nearly two decades. The target detection algorithm has also shifted from the traditional algorithm based on manual features to the technology based on deep neural networks in recent years due to the rapid development of deep learning technology. From the original R-CNN and OverFeat, which were proposed in 2013, to the Fast/Faster R-CNN series, SSD, YOLO, and the most recent Pelee,which was released in 2018, In less than five years, target detection technology based on deep learninghas produced a large number of efficient algorithms whose structures have changed from two stages toone stage, from a single scale network to a feature pyramid network, and from a top-down to a bottom-up structure. On an open target detection dataset, these algorithms perform exceptionally well and have excellent detection effects.

2.7 Seborrheic keratoses

Seborrheic keratoses are common benign skin growths that typically appear in older adults. They can range in color from light tan to dark brown or even black and can vary in size and shape. Seborrheic keratoses are generally harmless and do not have the potential to become cancerous. While they are not contagious, seborrheic keratoses can be unsightly and may cause cosmetic concerns. They can appear on any part of the body, including the face, neck, chest, and back. Seborrheic keratoses can be mistaken for other more serious skin conditions such as melanoma or basal cell carcinoma, so it is

important to have any unusual skin growths checked by a healthcare professional. Seborrheic keratoses can be easily diagnosed by a healthcare professional by their characteristic appearance. Treatment for seborrheic keratoses is not always necessary, but they can be removed if they become bothersome or if the person desires to have them removed for cosmetic reasons. Treatment options include cryotherapy, electrocautery, curettage, laser therapy, and topical medications. Overall, seborrheic keratoses are generally harmless but can be a cosmetic concern. If you have any concerns about skin growth or changes, it's essential to talk with a healthcare professional to receive a proper diagnosis and treatment Seborrheic keratoses are typically diagnosed by a dermatologist through a visual examination. However, CNN or computer-aided diagnostic tools can also be used to assist in the detection of seborrheic keratoses. The CNN algorithm can be trained to recognize the characteristic features of seborrheic keratoses, such as their waxy, raised appearance, and their color variations. The algorithm uses a large dataset of images of seborrheic keratoses and normal skin to learn these features and develop an accurate diagnostic tool. Once the algorithm has been trained, it can be used to analyze images of skin lesions and provide a probability score for the presence of seborrheic keratoses. This can help dermatologists make more accurate diagnoses and provide better treatment recommendations for their patients Seborrheic keratoses are benign skin growths that are quite common, especially in older adults. The advantages of seborrheic keratoses include Benign nature: Seborrheic keratoses are non-cancerous and do not have the potential to spread or become life-threateningNo symptoms: Seborrheic keratoses do not usually cause any symptoms, such as pain, itching, or bleeding. Easily identifiable: Seborrheic keratoses have a unique appearance, making them easy to identify anddiagnose by a healthcare professional. Easy to remove: Seborrheic keratoses can be easily removed if they become bothersome or unsightly, either through cryotherapy, electrocautery, or other methods. However, there are a few disadvantages of seborrheic keratoses, such as Cosmetic concerns: Seborrheic keratoses can sometimes be unsightly, especially if they appear on visible areas of the body such as the face or neck, and can affect a person's self-confidence.

Misdiagnosis: Sometimes, seborrheic keratoses can be mistaken for more serious skin conditions such as melanoma or basal cell carcinoma, which can lead to unnecessary concern and medical procedures. Overall, seborrheic keratoses are generally harmless, but it's always essential to have any unusual skin growths checked by a healthcare professional to ensure proper diagnosis and appropriate treatment.

2.8 Squamous cell carcinoma

Squamous cell carcinoma (SCC) is a type of skin cancer that arises from the squamous cells, which are the flat cells that make up the outermost layer of the skin. SCC usually develops in areas of the skin that have been exposed to the sun, such as the face, ears, neck, arms, and hands. SCC can appear as a scaly, red patch, a raised bump, or a sore that doesn't heal. CNN (Convolutional Neural Network) is a

type of deep learning algorithm that can be used for image recognition and classification. In the case of detecting squamous cell carcinoma, a CNN can be trained on a large dataset of skin images that include both normal and cancerous skin samples. The CNN can learn to identify the visual patterns and features that are associated with squamous cell carcinoma, such as irregularly shaped or colored lesions. Once the CNN has been trained, it can be used to classify. In the case of squamous cell carcinoma, CNN can be trained to detect features that are characteristic of SCC in skin images. To traina CNN to detect SCC, a dataset of skin images that include both SCC and non-SCC images is required.The images are labeled as either SCC or non-SCC. The CNN is then trained on this dataset using a process. CNN can be trained to recognize the visual characteristics of SCC in skin images. To train a CNN to detect SCC, a large dataset of skin images would be needed, including both SCC and non-SCCimages. The SCC images would be labeled as positive examples, while the non-SCC images would belabeled as negative There are no known advantages to having squamous cell carcinoma. Squamous cellcarcinoma is a type of skin cancer that can be aggressive and have the potential to spread to other partsof the body if left untreated. It can be life-threatening and cause significant medical problems. Early detection and treatment are essential in managing squamous cell carcinoma effectively. If you have any concerns about unusual skin growth or changes, it's essential to talk to a healthcare professional assoon as possible. They can provide a proper diagnosis and develop a personalized treatment plan to help manage your condition. Squamous cell carcinoma (SCC) is a type of skin cancer that can cause several disadvantages such as the Risk of spreading: If left untreated, SCC can spread to other parts ofthe body, leading to serious medical problems and potentially life-threatening complications. Disfigurement: SCC lesions can grow quite large and become disfiguring, which can significantly affect a person's self-esteem and confidence.

Pain: SCC lesions can become painful, especially if they grow deep or spread to nearby nerves. Reduced mobility: SCC lesions can impair mobility, especially if they are located on the feet, legs, or other areas where movement is essential.Scarring: SCC lesions that are treated with surgery or other methods can lead to scarring, which can be unsightly and affect a person's self-image. Emotional distress: SCC diagnosis can be emotionally distressing for the person and their loved ones, leading to anxiety, depression, and other mental health problems. It's essential to seek medical attention if you suspect you have SCC or any other type of skin cancer to receive a proper diagnosis and treatment. Early detection and treatment are crucial in effectively managing SCC and minimizing the potential disadvantages associated with this condition.

2.9 Vascular lesions

While some vascular lesions are harmless, others can be a sign of a more serious underlying condition, such as a blood clot or atherosclerosis. It is important to have any new or unusual skin marks or lesions checked by a medical professional to determine their cause and appropriate treatment. Some common treatments for vascular lesions include laser therapy, sclerotherapy, and surgical removal. To better

describe these lesions. Today, vascular lesions of the head and neck are classified into several different categories, including hemangiomas, vascular malformations, and rare vascular tumors. Hemangiomas are benign tumors that are typically present at birth or develop shortly thereafter. They are characterized by rapid growth during the first year of life, followed by a period of slow involution. Vascular malformations, on the other hand, are present at birth and grow proportionally with the child. A Convolutional Neural Network (CNN) is a type of deep learning algorithm that is commonly used for image classification tasks. In the context of skin lesion classification, a CNN can be trained to analyze images of skin lesions and predict whether they are benign or malignant. The first step in building a CNN for skin lesion classification is to collect a dataset of images of skin lesions. This dataset should include a mix of benign and malignant lesions and should be large enough to provide a diverse range On the other hand, treating vascular lesions has several advantages, including Improved quality of life: Treating vascular lesions can help alleviate symptoms such as pain and swelling, which can significantly improve a person's quality of life. Preventing complications: Untreated vascular lesions can lead to more serious medical problems, including blood clots, chronic wounds, and infections. Treating the lesion early can help prevent these complications from occurring. Improved cosmetic appearance: Many types of vascular lesions, such as spider veins, can be unsightly and affect a person's self-confidence.

Treating these lesions can help improve the cosmetic appearance of the affected area. Enhanced mobility: vascular lesions can restrict blood flow to the affected area, leading to reduced mobility. Treating the lesion can help restore blood flow and improve mobility. Some of the disadvantages of vascular lesions include Pain: vascular lesions can cause significant pain, especially if they are deep and affect the nerves in the area. Swelling: vascular lesions can lead to swelling and edema, which can be uncomfortable and affect mobility. Restricted mobility: Depending on the location of the vascular lesion, it can lead to reduced mobility and difficulty performing daily activities. Risk of infection: If the vascular lesion breaks open or forms an ulcer, it can increase the risk of infection. Risk of bleeding: vascular lesions can sometimes bleed, especially if they are located close to the skin's surface, which can be problematic if left untreated. Embarrassment: Some types of vascular lesions, such as spider veins, can be unsightly and affect a person's self-confidence. Overall, vascular lesions can significantly affect a person's quality of life and cause discomfort, pain, and other medical problems. It's essential to seek medical attention if you suspect you have a vascular lesion to receive a proper diagnosis and treatment.

Conclusion

Skin diseases are destructive sicknesses that can be securely analyzed when identified early and to maintain a healthy lifestyle. One of the precise ways of recognizing these diseases early is by utilizing

an AI calculation which is CNN which offers possible solutions. This paper contains the technique of identifying skin disease with an approximate accuracy of more than 90% as CNN is exceptionally strong and is made for image processing. We train various kinds of skin disease cells through image format and apply CNN so that it can perform well. The dataset is taken manually from various sites. We have analyzed various sorts of calculations utilized to identify skin malignant growth in this paper. Consequently, after an examination of various calculations, CNN ended up being the best calculation to distinguish skin disease.

References

[1] VinayShekharBannihatti and Sujay S Kumar, Varun Saboo- "Dermatological disease detection using image processing and machine learning", AIRP International Conference on Pp. 1-6, 2020.

[2] Pravin Ambad- "An image analysis system to detect skin diseases",www.Iosrjournals.Org, Vadgaon, Pune, India 2016.

[3] Amarathunga,- "Expert system for diagnosis of skin diseases", International Journal of Scientific & Technology Research, vol. 4, no. 01, 2015.

[4] Zeljkovic, Druzgalski, and Tameze, Mayorga Pan-"Supplemental melanoma diagnosis for darker skin complexion gradients", American Health care Exchanges P,2015.

[5] Arifin.M, Golam Kibria.M , Firoze. A, Ashraful Amini, M & Hong Yan,-"Dermatological disease diagnosis using color-skin images", International Conference on Machine Learning and Cybernetics, 2012.

[6] Jana e., Subban, R, & Saraswathi S.-"Research on skin cancer cell detection using image processing", IEEE international conference on computational intelligence and computing research, 2017.

[7] Mhaske, h. R., & Phalke -"Melanoma skin cancer detection and classification based on supervised and unsupervised learning", D.A, International Conference on circuits, controls, and communications, 2013.

[8] Alfred N, Khelifi, F, Bouridane, A, & Seker, H,-"Pigment network-based skin cancer detection", 37th annual international conference of the IEEE Engineering in Medicine, 2015.

[9] Evgin Goceri, - "Skin disease diagnosis from a photograph using DL", ECCOMAS thematic conference on computational vision and medical image processing, 239-246, 2019.

[10] Parvathaneni NagaSrinivasu, Jalluri Gnana SivaSai -"Classification of skin disease using deep learning neural network with LSTM", Sensors 21(8), 2852, 2021.