LITERATURE SURVEY

1. AI-based detection of erythema migrans and disambiguation against other skin lesions

This work investigates the application of deep learning (DL) and AI techniques for pre screening skin lesions and identifying the erythema migrans rash associated with acute Lyme illness. It is possible to prevent subsequent neurologic, rheumatologic, and cardiac problems of Lyme disease by accurately identifying erythema migrans and treating it at an early stage. In this analysis of publicly available images, we find that the DL system's accuracy varies from 71.58% (and a 95% error margin of 3.77%) for an 8-class problem of EM versus 7 other classes, such as other skin pathologies, insect bites, and normal skin, to 94.23% (3.66%) for a binary problem of EM vs. non-pathological skin. The DL system's sensitivity on clinical pictures of affected people is 88.55% (2.39%). These findings imply that, in the presence of clinically relevant confusers, a DL system can assist in prescreening and directing patients to doctors for earlier diagnosis and treatment, thereby preventing further difficulties and morbidity.

1. AI‐based localization and classification of skin disease with erythema

This paper presents a novel way to successively combine precise segmentation and classification models, demonstrating that CAD may also be a feasible choice in dermatology. A dissected image of the skin is used, in order to extract high-level features and normalise the image conditions. Our classification model is more accurate than a baseline model trained without segmentation, while also being able to classify multiple diseases within a single image. This improved performance may be sufficient to use CAD in the field of dermatology.

1. Analysis of Skin Erythema Using True-Color Images

An innovative approach to examining the dispersal of cutaneous erythemas is presented in this article. These are brought on by the cutaneous vascular axon reflex, which can be triggered by noxious skin stimulation. Using a video camera, a series of true-color photos of the noticed skin patch were captured. High geographical and temporal resolution and independence from human observers were features of the automatically detected flare sizes. It was employed in a crossover research to evaluate the efficacy of novel medications that alter skin blood flow brought on by intradermal histamine administration.

1. Automated detection of erythema migrans and other confounding skin lesions via deep learning

This study's goal was to create deep learning methods employing deep convolutional neural networks to identify acute Lyme illness from erythema migrans photos with varied levels of quality and acquisition settings. In order to classify erythema migrans in comparison to other skin disorders like tinea corporis and herpes zoster, as well as normal, non-pathogenic skin, this study used a cross-sectional dataset of picture training data. The findings revealed that the machine and physician criterion standards were in substantial accord. Machine performance was compared to non-medical expert human performance, and the results showed that the machine could operate with higher sensitivity and almost always exceeded acceptable specificity. Pre Screening prior to physician referral, earlier therapy, and morbidity decreases could all result from this.

1. ERYTHEMA DETECTION IN DIGITAL SKIN IMAGES

We describe a 3-layer segmentation strategy for automatic erythema detection in this paper. A Bayesian classifier built on a histogram is used to first identify a skin region. Next, using Independent Component Analysis, the extracted skin image is expressed in terms of melanin and haemoglobin components (ICA).Despite being a key sign of the severity of psoriasis, the distribution of aberrant redness on the skin is often subjectively assessed by doctors. Our method can be used in a system for statistically and objectively assessing therapy.The distribution of aberrant redness on the skin is a crucial indicator of the severity of psoriasis, but physicians typically judge it subjectively. Our approach can be applied in a system for objectively and statistically evaluating therapy.

1. Hyperspectral Image Processing for Detection and Grading of Skin Erythema

The most frequent clinical evaluation of skin reactions in radiation is visual assessment. Additional noninvasive approaches are required for a more accurate evaluation because this method is subjective. Our objective is to assess how well hyperspectral image analysis serves that function. The detection and evaluation of cutaneous erythema were the main goals of this pilot investigation. This study presents the experimental results and the processing pipeline we suggest. Experiments have been carried out to show how well the suggested method reproduces clinical evaluations and outperforms RGB imaging data.

1. Hyperspectral Imaging and Classification for Grading Skin Erythema

Skin erythema in radiation therapy is frequently evaluated visually by a specialist using defined grading criteria. Visual evaluation (VA) is subjective, and the grading scales that are frequently used are insufficiently coarse to account for the beginning of erythema. This study aims to describe the performance of hyperspectral imaging (HSI) in comparison to traditional digital photography red-green-blue (RGB) images, as well as the viability of using HSI for quantitative assessment of early erythema. In order to achieve classification, linear discriminant analysis (LDA) was used to examine HSI and colour imaging data. The classification outcomes, including precision and accuracy, showed that HSI is superior than colour imaging for assessing skin erythema.

1. Supervised Visual System for Recognition of Erythema Migrans, an Early Skin Manifestation of Lyme Borreliosis

The most typical sign of Lyme borreliosis is erythema migrans, a skin lesion that arises days to weeks after a tick bite. Early detection of the lesion is crucial because it enables correct therapy, which in turn prevents subsequent illness effects that could interfere with daily life. This paper introduces a unique visual approach for erythema migrans detection based on cutting-edge multimedia interactive terminal technology that is also available on cellphones. We compared GrowCut, maximal similarity based region merging, and the random walker segmentation method for probable erythema migrans skin lesion edge identification. The GrowCut technique, enhanced with our brand-new finger draw (FD1) marker, produces results that are comparable. The GrowCut method, enhanced with our brand-new finger draw (FD1) marker, produces outcomes that are close to those of the region merging method based on maximum similarity. In order to categorise skin lesions into ellipse, the most typical shape of erythema migrans, and erythema migrans class, several classification techniques, including naive Bayes, support vector machine, AdaBoost, random forest, and neural network, were compared and applied.