

## LITERATURE SURVEY

### TOPIC :

AI – based localization and classification of skin disease with erythema

### TEAM :

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### INTRODUCTION :

**TITLE :** Skin disease recognition method based on image color and texture features

### ABSTRACT :

Skin disease among humans has been a common disease, millions of people are suffering from various kinds of Skin diseases. Usually, these diseases have hidden dangers which lead to not only lack of self-confidence and psychological depression but also lead to a risk of skin cancer. Medical experts and high-level instruments are needed to diagnosis these skin diseases due to non-availability of visual resolution in skin disease images. The proposed framework includes deep learning techniques such as CNN architecture and three predefined models called Alex Net, ResNet, InceptionV3. A dataset of images with seven diseases has been taken for the classification of skin diseases. They include diseases like Melanoma, Nevus, Seborrheic Keratosis etc. The dataset was extended by adding images having cuts and burns, which were classified as skin disease by most of The existing systems. The usage of deep learning algorithms has reduced the need for human labor, such as manual feature extraction and data reconstruction for classification purposes.

### METHODS :

Algorithm	Sensitivity %	Specificity %	Accuracy %	JSI%	MCC%
HARIS[25]	78.21	83.00	77.00	83.01	77.00
FTNN[77]	79.54	84.00	79.00	84.00	79.00
CNN[32]	80.41	85.00	80.00	85.16	80.00
VGG19[78]	82.46	87.00	81.00	86.71	81.00
Mobile Net V1[71]	84.04	89.00	82.00	88.21	83.00
Mobile Net V2[80]	86.41	90.00	84.00	89.95	84.00
Mobile Net V2-LSTM	88.24	92.00	85.34	91.07	86.00

### RESULTS:

Skin diseases are ranked fourth most common cause of human illness, but many still do not consult doctors. We presented a robust and automated method for the diagnosis of dermatological diseases. Treatments for skin are more effective and less disfiguring when found early. We should point out that it is to replace doctors because no machine can yet replace the human input on analysis and intuition. Researches in European Society of Medical Oncology Have shown for the first time that form of AI or ML is better than experienced dermatologists. In this a brief description of the system and the implementation methodology is presented.

**TITLE :** Erythema detection in digital skin images

**AUTHORS :**

Lu, J., Manton, J. H., Kazmierczak E. & Sinclair, R. In 2010 IEEE International Conference on Image Processing, Hong Kong, 2545–2548.

**LINK :** <https://doi.org/10.1109/ICIP.2010.5653524>

**ABSTRACT :**

Deep learning models are efficient in learning the features that assist in understanding complex patterns precisely. This study proposed a computerized process of classifying skin disease through deep learning based MobileNet V2 and Long Short Term Memory (LSTM). The MobileNet V2 model proved to be efficient with a better accuracy that can work on lightweight computational devices. The proposed model is efficient in maintaining stateful information for precise predictions. A grey-level co-occurrence matrix is used for assessing the progress of diseased growth. The performance has been compared against other state-of-the-art models such as Fine-Tuned Neural Networks (FTNN), Convolutional Neural Network (CNN), Very Deep Convolutional Networks for Large-Scale Image Recognition developed by Visual Geometry Group (VGG), and convolutional neural network architecture that expanded with few changes. The HAM10000 dataset is used and the proposed method has outperformed other methods with more than 85% accuracy. Its robustness in recognizing the affected region much faster with almost 2× lesser computations than the conventional MobileNet model results in minimal computational efforts. Furthermore, a mobile application is designed for instant and proper action. It helps the patient and dermatologists identify the type of disease from the affected region's image at the Initial stage of the skin disease. These findings suggest that the proposed system can help general practitioners efficiently and effectively diagnose skin conditions, thereby reducing further complications and morbidity.

**RESULT :**

We have shown that even without a large dataset and high-quality images, it is possible to achieve sufficient accuracy rates. In addition, we have shown that current state-of-the-art CNN models can outperform models created by previous research, through proper data preprocessing, self-supervised learning, transfer learning, And special CNN architecture techniques. Furthermore, with accurate segmentation, we gain knowledge of the location of the disease, which is useful in the preprocessing of data used in classification, as it allows the CNN Model to focus on the area of interest. Lastly, unlike previous studies, our method provides a solution to classify multiple diseases within a single image. With higher quality and a larger quantity of data, it will be viable to use State-of-the-art models to enable the use of CAD in the field .

**TITLE :** Segmentation and classification of skin disease diagnosis

**AUTHORS :**

Sumithra, R., Suhil, M. & Guru, D. S. *Proced. Comput. Sci.*45, 76–85.

**LINK :** <https://doi.org/10.1016/j.procs.2015.03.090>

**ABSTRACT :**

Dermatology is the branch of bioscience that's Involved with diagnosing and treatment of skin based mostly disorders. The immense spectrum of dermatologic disorders varies geographically and additionally seasonally because of temperature, humidness and alternative environmental factors. Human skin is one amongst the foremost unpredictable and tough terrains to mechanically synthesize and analyse because of its quality of unevenness, tone, presence of hair and alternative mitigating options. Though, many researches are conducted to find and model human skin victimization (PC Vision Techniques), only a few have targeted the medical paradigm of the matter. Due to lack of medical facilities available in the remote areas, patients usually ignore early symptoms which may worsen the situation as time progresses. Hence, there is a rising need for automatic skin disease detection system with high accuracy. Thus, we develop a multiclass deep learning model to differentiate between Healthy Skin Vs Skin suffering from a Disease and Classification of Skin Diseases into its main classes Like MelanocyticNevi, Melanoma, Benign keratosis-like lesions, Basal cell Carcinoma, ActinickKeratoses, Vascular lesion and Dermatofibroma. We have used deep learning to train our Model, Deep Learning is a part of Machine Learning in which Unlike Machine Learning it uses large dataset and hence the Number of classifiers is reduced substantially. The machine Learns itself and divide the data provided into the levels of prediction and in a very short period of time gives the accurate results, thereby promoting and supporting development of dermatology. The algorithm that we have used is Convolutional Neural Network (CNN) as it is one of the most preferred algorithm for image classification.

**RESULTS :**

The project achieved 94.4% accuracy in determining the Seven skin diseases. Using undersampling method and the default preprocessing of input data achieved an 84.28% accuracy on the test dataset. While, using the imbalanced dataset and the default preprocessing of input data achieved a 93.6% accuracy. Then, the researcher used oversampling and the model attained a 91.8% accuracy. Lastly, using the oversampling and data augmentation technique provide an accuracy of 94.4%. In conclusion, in order to enhance the accuracy of the model different sampling techniques and preprocessing of input data can be explore. In our study, using oversampling and data augmentation generate the most accurate result.