LITERATURE REVIEW

[1] Son, H. M., Jeon, W., Kim, J., Heo, C. Y., Yoon, H. J., Park, J. U., & Chung, T. M. (2021), has proposed a paper titled "AI-based localization and classification of skin disease with erythema", 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 pre-processing, 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 pre-processing 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 of dermatology.

Advantage: Clustering algorithms generally have the advantage of being flexible, easy to implement, with the ability to generalize features that have a similar statistical variance.

Disadvantage: An inherent disadvantage of clustering a skin disease is its lack of robustness against noise. Clustering algorithms rely on the identification of a centroid that can generalize a cluster of data.

[2] N. V., Kumar, P. V., Pramodh, K., & Karuna, Y. (2019, March), has proposed paper titled," Classification of Skin diseases using Image processing and SVM", Here, we proposed an efficient technique in which the database of pre-processed images is trained and tested and are classified using SVM, a machine learning based algorithm to identify whether the skin lesion is benign or malignant. This will be very helpful in the diagnosis of the Melanoma skin cancer efficiently.

Advantage: It is observed that better results and precision can be achieved when the SVM is trained with a greater number of images. Higher accuracy can be attained when other kernels such as Polynomial Kernels are used.

Disadvantage: Noisy data, or the presence of outliers, can significantly degrade the performance of these algorithms.

[3] Filimon, D. M., & Albu, A. (2014, May),has proposed paper titled," Skin diseases diagnosis using artificial neural networks", This paper focuses on the applications of artificial neural networks in medicine. The medical informatics field evolved around the structure, the storing, and the processing of medical information for various purposes. One of these purposes is to develop algorithms able to make predictions regarding the diagnosis, the treatment, or the medical evolution of a patient. The diagnosis phase is often a long-term process; its duration is proportionally extended by the complexity of the disease and by the

number of features (symptoms, laboratory tests, specific descriptions of the patient) that must be analysed.

Advantage: The most important benefit is recorded for diseases with many symptoms, diseases that are difficult to be identified even after a detailed analysis of a human physician.

Disadvantage: Therefore, it is very difficult to make the difference between diseases.

[4] Ogorzałek, M. (2015, June),has proposed paper titled," Automatic diagnosis of melanoid skin lesions using machine learning methods", Dermatology is one of the fields where computer aided diagnostic is developing rapidly. The presented research concentrates on creation of automatic methods for melanoid skin lesions diagnosis using machine learning methods and thermoscopic structures together with the selected machine learning methods may be an important and accurate diagnostic tool.

Advantage: Thermoscopic structures can be accurate and bring new knowledge about melanoma skin cancer.

Disadvantage: Segmentation of the image is difficult.

[5] Guru, D. S. (2015),has proposed paper titled," Segmentation and classification of skin lesions for disease diagnosis.", In this paper, a novel approach for automatic segmentation and classification of skin lesions is proposed. Initially, skin images are filtered to remove unwanted hairs and noise and then the segmentation process is carried out to extract lesion areas. For segmentation, a region growing method is applied by automatic initialization of seed points.

Advantage: Important aspect is the features used to describe the lesion regions and colour and texture.

Disadvantages: Data Acquisition Machine Learning requires massive data sets to train on, and these should be inclusive/unbiased, and of good quality.

[6] Wu, Z. H. E., Zhao (2019), has proposed paper titled, "studies on Different CNN Algorithms for Face Skin Disease Classification Based on Clinical Images" , this paper studied different CNN algorithms for face skin disease classification based on the clinical images. First, from Xiangya–Derm, which is, to the best of our knowledge, China's largest clinical image dataset of skin diseases, we established a dataset that contains 2656 face images belonging to six common skin diseases [seborrheic keratosis (SK), actinic keratosis (AK), rosacea (ROS), lupus erythematosus (LE), basal cell carcinoma (BCC), and squamous cell carcinoma (SCC)]. We performed studies using five mainstream network algorithms to classify these diseases in the dataset and compared the results.

Advantage: The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision.

Disadvantage: Lack of ability to be spatially invariant to the input data.Lots of training data is required.

[7] Roja, M. M. (2017, June),has proposed paper titled," Digital dermatology: Skin disease detection model using image processing" ,This paper proposes a skin disease detection method based on image processing techniques. This method is mobile based and hence very accessible even in remote areas and it is completely non-invasive to patient's skin. The patient provides an image of the infected area of the skin as an input to the prototype. Image processing techniques are performed on this image and the detected disease is displayed at the output. The proposed system is highly beneficial in rural areas where access to dermatologists is limited.

Advantage: Information can be processed and extracted from images for machine interpretation

Disadvantage: There are also certain disadvantages of the current image processing techniques used for skin disease detection. The main problem with the median filter is its high computational cost.

[8] ALEnezi, N. S. A. (2019), has proposed paper titled, "A Method Of Skin Disease Detection Using Image Processing And Machine Learning", This paper describes approach is simple, fast and does not require expensive component other than a camera and the computer. This approach works on the input of the colour 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 of dermatology.

Advantage: It allows the use of much more complex algorithms, and hence, can offer both more sophisticated performance at simple tasks.

Disadvantage: Lack of ability to implement it in real time application successfully

Summary of Literature Review:

The above paper proposes a skin disease detection method based on image processing techniques. This method is mobile based and hence very accessible even in remote areas and it is completely non-invasive to patient's skin. The patient provides an image of the infected area of the skin as an input to the prototype. Image processing techniques are performed on this image and the detected disease is displayed at the output. The proposed system is highly beneficial in rural areas where access to dermatologists is limited.

Proposed Work:

- The proposed solution is a prototype with a database of six common skin diseases, using which a patient can self-diagnose and get some prior knowledge of their skin disease before consulting a dermatologist.
- The proposed prototype provides a non-invasive method of skin disease detection where the patient provides a picture of the infected area as an input to the prototype and any further analysis is done on this input image.

References:

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[5] Sumithra, R., Suhil, M., & Guru, D. S. (2015). Segmentation and classification of skin lesions for disease diagnosis. *Procedia Computer Science*, *45*, 76-85.

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