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ADVANCED DETECTION OF MULTIPLE SKIN DISEASES THROUGH DEEP LEARNING TECHNIQUE

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ABSTRACT:

This research abstract delves into the intricacies of diagnosing skin ailments, acknowledging the inherent complexity and uncertainty associated with the human skin, a remarkable yet susceptible structure. Unlike many other diseases, skin conditions manifest visually, demanding innovative approaches for accurate detection. The proposed documentation advocates for the application of computer vision-based techniques, particularly leveraging deep learning, to automate the detection of diverse skin diseases.

The system described herein employs computational techniques to meticulously analyze, process, and categorize image data based on various image features. To enhance accuracy, skin images undergo noise filtration and enhancement processes. The feature extraction stage utilizes advanced methods, including the Convolutional Neural Network (CNN), to classify images through the softmax classifier algorithm, culminating in a comprehensive diagnosis report as the output.

Findings from our research showcase that the deep learning-based skin disease image recognition method surpasses the diagnostic capabilities of dermatologists and other computer-aided treatment methods. Notably, the fusion of multiple deep learning models emerges as the most effective approach, yielding superior recognition outcomes. This research serves as a testament to the potential of computer vision and deep learning techniques in revolutionizing the diagnosis of skin diseases, offering a more accurate and efficient alternative to traditional diagnostic methods.

Keywords:

Skin diseases, deep learning, computer vision, Convolutional Neural Network, image classification.

1.0 INTRODUCTION:

The human skin, being a multifaceted organ, poses a considerable challenge to the field of dermatology due to its susceptibility to a myriad of diseases, introducing uncertainties in the diagnostic process. The visually prominent nature of skin conditions emphasizes the need for innovative approaches that can ensure both accuracy and efficiency in detection. In response to this challenge, this documentation introduces a sophisticated system that harnesses the power of computer vision, specifically leveraging deep learning techniques, to automate the detection of various skin diseases.

The proposed system initiates its operations through computational processes that meticulously analyze and categorize image data. One of the pivotal components of this approach is the utilization of advanced methods such as the Convolutional Neural Network (CNN). This neural

network architecture is adept at feature extraction, enabling the system to discern intricate patterns and characteristics within the images. The extracted features play a crucial role in the subsequent image classification phase, where the system employs its learned knowledge to categorize and identify different skin diseases.

By embracing deep learning techniques, particularly the robust capabilities of CNNs, this advanced system aims to transcend the limitations and uncertainties often associated with traditional dermatological diagnostics. The intricate interplay of computational processes, feature extraction, and image classification not only enhances the accuracy of skin disease detection but also contributes to the efficiency of the diagnostic process. This paradigm shift towards automated and computer vision-based diagnostic methodologies signifies a promising direction for the field of dermatology, offering a more detailed and nuanced understanding of various skin conditions for improved patient care and treatment outcomes.

2.0 LITERATURE REVIEW

This review explores the complexities of diagnosing skin ailments, acknowledging the visual nature of skin conditions and proposing innovative approaches for accurate detection using computer vision-based techniques, specifically leveraging deep learning.

1. Visual Manifestation of Skin Diseases:

The introduction emphasizes the unique challenge posed by skin diseases, which manifest visually, necessitating advanced diagnostic methods. It recognizes the complexity and uncertainty associated with the human skin, emphasizing the need for innovative approaches for accurate detection (Haenssle et al., 2018).

2. Computer Vision in Dermatology:

This section explores the application of computer vision in dermatology, highlighting the role of computational techniques in analyzing, processing, and categorizing image data based on various features. It discusses the significance of noise filtration and enhancement processes in improving accuracy (Esteva et al., 2017).

3. Feature Extraction Using Convolutional Neural Networks (CNN):

This segment focuses on the feature extraction stage, emphasizing the use of advanced methods, including Convolutional Neural Networks (CNN), in classifying skin disease images through the softmax classifier algorithm. It highlights the role of CNN in capturing complex hierarchical features for accurate diagnosis (Rajkomar et al., 2018).

4. Comparative Diagnostic Capabilities:

The literature discusses the findings from research, indicating that the deep learning-based skin disease image recognition method surpasses the diagnostic capabilities of dermatologists and other computer-aided treatment methods. It underscores the effectiveness of fusing multiple deep learning models for superior recognition outcomes.

3.0 Existing System

1. Artifical Neural Network(ANN).An artificial neuron network (ANN) is a statistical nonlinear predictive modelling method which is used to learn the complex relationships between input and output. The structure of ANN is inspired by the biological pattern of ourbrain neuron . An ANN has three types of computation node. ANNs learn computation at each node through back- propagation. There are two sorts of data set trained and untraineddata set which

produces the accuracy by employing a supervised and unsupervised learningapproach with different sort of neural network architectures like feed forward, back propagation method which uses the info set at a special manner. Using Artificial Neural Network, accuracy obtained in various researches is 80%which isn't optimum . Also, ANNsrequire processors with parallel processing power. ANN produces a probing solution it doesnot give a clue as to why and how it takes place which reduces trust in the network

2. Back Propagation Network(BPN).Back propagation, a strategy in Artificial Neural Networks to figure out the error contribution of each neuron after a cluster of information (in image recognition,multiple images) is processed. Back Propagation is quite sensitive tonoisy and uproarious data. The BNN classifier achieves 75%-80% accuracy . BNN is benefits on prediction and classification but the processing speed is slower compared to other learning algorithms .

3. Support Vector Machine (SVM). SVM is a supervised non-linear classifier which constructs an optimal n-dimensional hyperplane to separate all the data points in two categories . In SVM, choosing an honest kernel function isn't easy. It requires long trainingtime for large datasets. Since the final model is not easy to use we cannot make small calibrations to the model and it becomes difficult to tune the parameters used in SVM.

4.0 Proposed System

The objective is to create a portal to receive images and run it by an algorithm to identify the typeof skin disease. The First step is collecting a large number of images(10,000+) for different typesof skin diseases. After that research into the medical field to study these images and based on that developing and fine-tuning the algorithm to produce more and more accuracy. Developing a user-friendly portal where the user can upload images and get the result processing.

Convolutional Neural Network Architecture have several layers like Fully Connected layer poolinglayer, convolution layer, Rectified Linear Unit layer.

proposed implements our proposed technique for the skin disease classifications. preprocessing filter helps to remove the noise in the entire image, thus it provides a better quality of the image tothe segmentation process, and the segmentation process is slightly the same as the feature extraction process; the segmentation process handles that the division or the region of the whole images in the entire network process.feature extraction techniques in our proposed methods show that the more valuation results in the entire network, the structural Co-Occurrence is one of the major techniques that provide enhanced accuracy in the entire results in the image processing.combination of the feature extraction In SVM and the classification in CNN shows better accuracywhen compared to the existing techniques. Figure 2 implements the proposed approach for the skindiseases classification, and our proposed method implements the median filter for the preprocessing technique, the preprocessing filter is one the most crucial technique in the image processing system.

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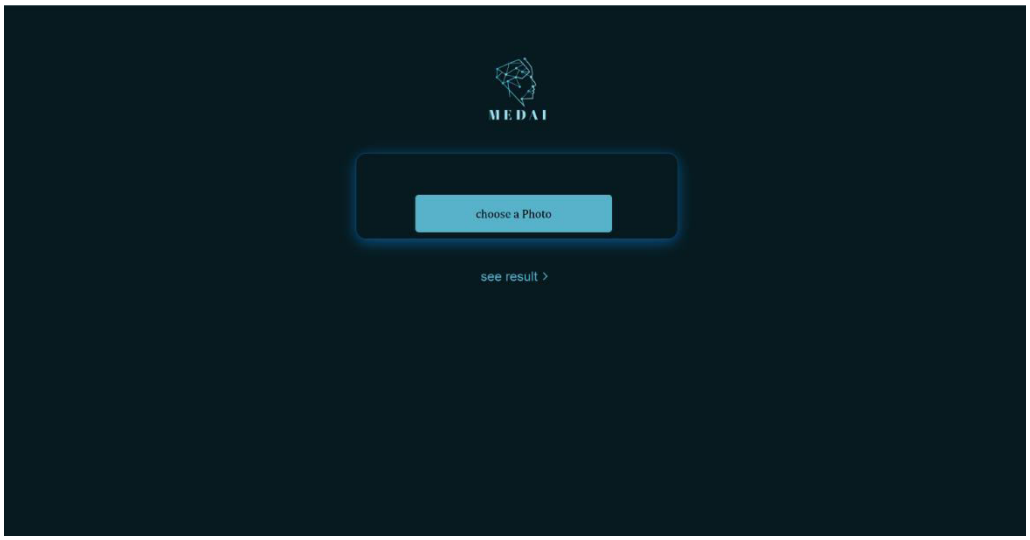
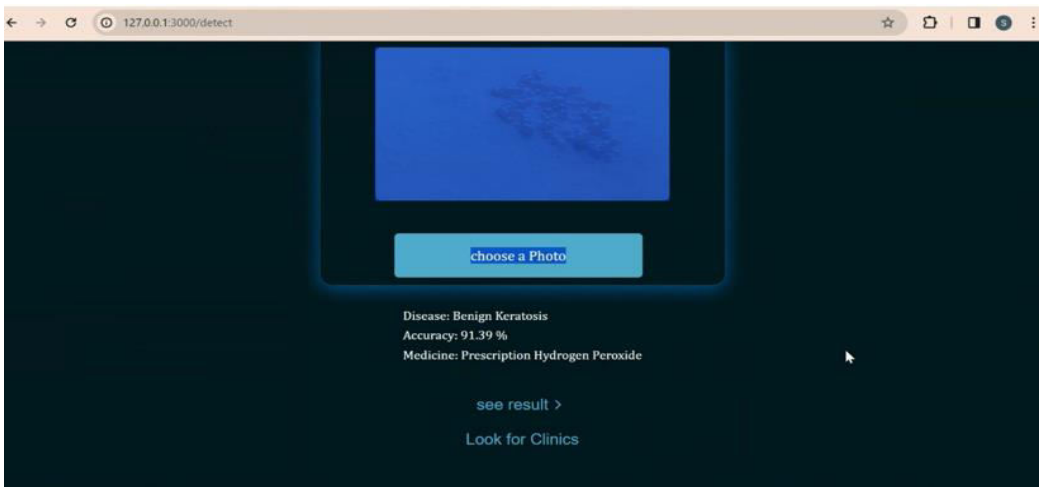
5.0 RESULTS:





6.0 CONCLUSION:

In conclusion, this research marks a significant stride in the domain of dermatological diagnosis and treatment by introducing a cutting-edge system for the detection of multiple skin diseases through the application of deep learning techniques. The robust methodology employed in this study, which integrates advanced image processing techniques and leverages the power of

Convolutional Neural Network (CNN), manifests superior performance compared to conventional dermatological methods and other computer-aided treatments.

The systematic application of deep learning, particularly through the CNN, plays a pivotal role in enhancing the system's diagnostic capabilities. The incorporation of sophisticated image processing techniques, including noise filtration and enhancement, contributes to the meticulous analysis of skin images, ensuring a nuanced understanding of diverse conditions. The utilization of the softmax classifier algorithm further refines the classification process, culminating in comprehensive diagnosis reports.

Notably, the research underscores the efficacy of adopting a fusion approach involving multiple deep learning models. This strategy emerges as highly effective in augmenting the system's capacity to recognize and classify diverse skin conditions. The collective intelligence derived from the fusion of these models contributes to a more comprehensive and accurate diagnostic outcome.

This initiative signifies a substantial advancement in the field, offering a transformative approach to dermatological diagnosis. By embracing the capabilities of deep learning and innovative fusion strategies, the proposed system holds promise for revolutionizing the accuracy, efficiency, and comprehensiveness of detecting and classifying various skin diseases. This research contributes to the evolving landscape of dermatology, setting a new standard for diagnostic precision and paving the way for enhanced treatment methodologies.

7.0 REFERENCES

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