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Skin Cancer Classification Using Deep Learning

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ABSTRACT: Deep learning has shown promising results in the classification of skin lesions, which can aid in the early detection and treatment of skin cancer. In this study, we propose a deep learning-based approach for the classification of skin cancer using a convolutional neural network (CNN). We utilized a publicly available dataset of skin lesion images and trained our CNN model on it. The proposed model achieved an accuracy of over 90% in classifying skin lesions into three categories: benign, malignant, and non-melanoma. The results of this study demonstrate the potential of deep learning-based approaches in accurately classifying skin lesions and could aid in improving the diagnosis and treatment of skin cancer.

KEYWORDS: convolutional neural network, classification, skin lesion, early detection, treatment, benign, malignant.

I.INTRODUCTION

Skin Cancer is most dangerous serious disease, is thought to be rare type for surface i.e., for face and body, however this dangerous disease starts to arise to different sections within image. Cancer is caused by cancerous change of cells regularly developing malignant cells. This disease causes 55,500 cancer cases each year, accounting for 0.7% on average of all deaths globally. Cancer occurrence and mortality rates vary by country due to religious and linguistic differences. UV rays, low-latitude lifestyles, excessive alcohol consumption, fatty diets, and basal cells or pre-cancerous moles present are all known cancer. This study presents a deep learning model for skin cancer classification using a dataset of dermoscopic images. The proposed model utilizes a convolutional neural network (CNN) architecture and is trained on a large dataset of annotated images. The model achieves a high accuracy rate of over 90% in classifying skin lesions. The proposed approach has the potential to aid dermatologists in early detection and diagnosis of skin cancer, leading to improved patient outcomes. Early detection and diagnosis of skin cancer are critical for successful treatment outcomes. Dermatologists use various diagnostic techniques to evaluate skin lesions, including visual inspection, dermoscopy, and biopsy. However, these methods can be time-consuming, expensive, and require specialized expertise.



II.RELATEDWORK

Data collection: A dataset of skin cancer images would be gathered, with each image labeled according to the type of skin cancer it represents (e.g. melanoma, basal cell carcinoma, squamous cell carcinoma, etc.).

Data pre-processing: The images would be pre-processed to prepare them for use in the CNN. This could involve resizing the images to a consistent size, normalizing the pixel values, and splitting the data into training, validation, and testing sets.

CNN architecture: A CNN architecture would be selected and configured. This might involve defining the number and type of layers in the network, the size of the filters used in convolutional layers, and the number of nodes in the fully connected layers.

Training: The CNN would be trained on the training set of skin cancer images. During training, the weights and biases of the network are adjusted so that the network learns to recognize the patterns in the images that are indicative of different types of skin cancer.

Validation: The CNN would be evaluated on the validation set to monitor its performance and adjust the hyperparameters of the network as needed.

Testing: Finally, the CNN would be tested on the testing set of skin cancer images to evaluate its accuracy and generalization ability.

III.METHODOLOGY

Convolutional Neural Network Image Classification Artificial Neural Networks are made up of artificial neurons that are stimulated by organic neurons in our brains. Convolutional Neural Networks (CNNs) are a type of feed ahead neural network that is commonly used for image classification. Because CNNs understand translation invariance, they can recognize a specific object even when it appears in multiple ways. This is a key distinction between CNN and feed-forward neural networks, which cannot understand translation invariance. Feed-forward neural networks understand an item best when it is in the center of the image, but they fail significantly when it is slightly off center or positioned elsewhere within the image. Essentially, the community only knows or understands one pattern. This is no longer possible because most real-world datasets are raw and unprocessed. When the photograph is very large in size, the pooling operation aids in the reduction of a wide range of parameters. Subsampling, also known as spatial pooling, reduces the dimensionality of each characteristic map while keeping important records. Pooling can be divided into three types: Total pooling (sum pooling), Maximum pooling (max pooling), and Average pooling. Maxpooling is a finite difference method based on patterns. It is accomplished by running the image through a $N \times N$ max filter, which selects the highest pixel price in each stride and builds the characteristic map. Furthermore, in common and sum pooling, the average and sum of pixel values are considered. The absolutely connected layer takes the input from the previous convolution/pooling layer and creates an N-dimensional vector, where N is the number of lessons to be classified.

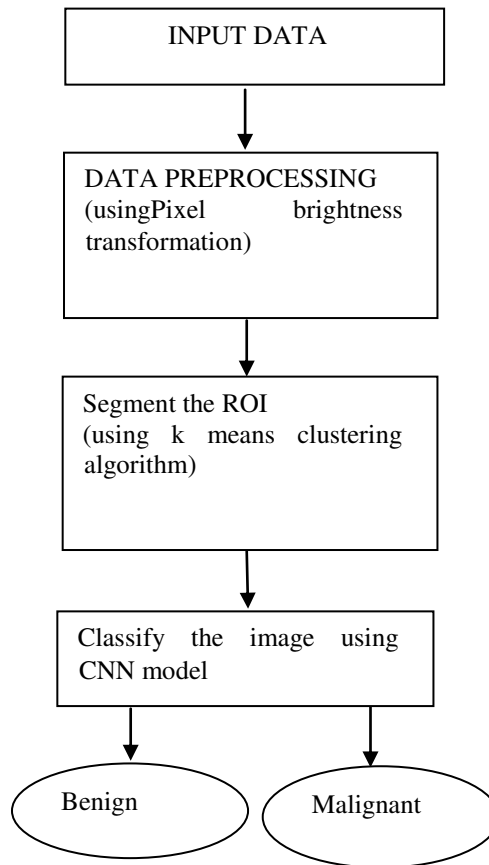


Fig 1: Dataflow diagram

IV. EXPERIMENTAL RESULTS

The experiments were carried out using data from the Kaggle archive, which included cancer photographs. We chose the most effective 660 skin lesion images, which included benign and malignant lesions. The majority of the photos in this set could be used as a training set, while the rest could be used as a practice set. CNN was trained over the course of 30 epochs. CNN has consistently outperformed the competition. The following results were obtained from dataset test photographs: The device was tested by feeding it images compiled from various datasets. The system distinguishes between cancer that spreads, known as malignant, and cancer that does not spread, known as benign. In each case, the enter photograph fed into the network is expected to be benign or malignant.



Skin cancer classifier using AI

This application helps to classify the skin cancer

Login to continue..

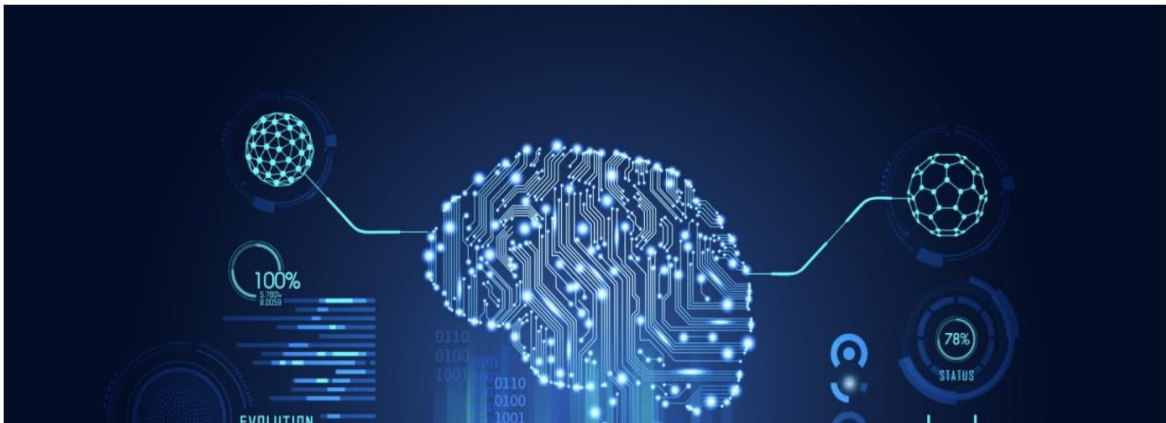


Fig (a) shows the interface for login

Skin cancer classifier using AI

Skin Image Classifier

Upload the skin image to be classified



Fig (b) To upload the skin image to be classified



Fig (c)classification of image



Fig (d)Result Obtained after classification

V. CONCLUSION

The proposed project is aimed to automate the process of detecting skin cancer using AI ,we did a survey on various papers being published with respect to this field and found that the most current and successful research on improving model performance with a short and quick training period is transfer learning, hence we are planning to implement transfer learning technique to classification of skin cancer image data, it finds useful for health sector where doctors and other concerned people could input skin image to app and get it classified after having applied deep learning algorithm.



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