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DEEP SKIN: ENHANCING SKIN CANCER CLASSIFICATION USING XCEPTION, DENSENET201, AND OTHER DEEP LEARNING MODELS

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Abstract: Due To The Limited Availability Of Resources, Skin Cancer Is One Of The Most Quickly Spreading Diseases In The Globe. Identification Of Skin Cancer Through An Accurate Diagnosis Is Essential For A Preventative Approach In General. Dermatologists Struggle To Detect Skin Cancer At An Early Stage, And In Recent Years, Both Supervised And Unsupervised Learning Tasks Have Made Extensive Use Of Deep Learning. One Of These Models, Convolutional Neural Networks (Cnn), Has Surpassed All Others In Object Detection And Classification Tests. The Dataset Is Screened From Mnist: Ham10000 Which Consists Of Seven Different Types Of Skin Lesions With The Sample Size Of 10015 Is Used For The Experimentation. The Data Pre-Processing Techniques Like Sampling, Dull Razor And Segmentation Using Autoencoder And Decoder Is Employed. Transfer Learning Techniques Like Densenet169 And Resnet 50 Were Used To Train The Model To Obtain The Results. From The Experimental Results Densenet169's Undersampling Technique Produced Good Accuracy With A Good F1- Measure And Resnet50's Oversampling Technique Produced High Accuracy And F1-Measure. The Future Extension Of This Study Includes Increasing Forecast Accuracy Through Parameter Tuning.

Keywords: Skin Cancer, Deep Learning, Convolutional Neural Networks (Cnn), Ham10000 Dataset, Transfer Learning,Densenet169, Resnet50, Autoencoder, Segmentation, Classification, F1-Measure, Parameter Tuning, Image Processing.

I. Introduction

A Tumor Is Formed When Healthy Cells Begin To Change And Grow Out Of Control. Both Cancerous And Noncancerous Tumors Are Conceivable. Malignant Tumors Are Those That Have The Potential To Grow And Spread To Other Areas Of The Body [1]. A Benign Tumor May Form, But It Does Not Usually Spread. Skin Cancer Is The Result Of Abnormal Skin Cell Growth. It Is The Most Prevalent Cancer Nowadays And Occurs Everywhere. Every Year, Various Forms Of Melanomas Are Thought To Cause More Than 3.5 Million Cases To Be Discovered [2], [3]. This Number Exceeds The Sum Of Cases Of Lung, Bone, And Colon Cancers. In Reality, A Person With Melanoma Dies Every 57 Seconds. When Cancer Is Detected In Dermoscopy Images In Advance, The Survival

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Percentage Is Significantly Boosted. Therefore, Accurate Automatic Skin Excrescence Discovery Will Undoubtedly Help Pathologists Become More Skilled And Productive. The Purpose Of The Dermoscopy Technique Is To Improve Each Melanoma Patient's Performance. Noninvasive Skin Imaging Technique Dermoscopy Uses A Magnified And Lighted Picture Of The Affected Skin Area To Increase Visibility Of The Spots, Therefore Reducing Facial Reflection [4]. Skin Cancer Early Detection Is Still A Prized Possession. It's Difficult To Tell If A Skin Lesion Is Benign Or Malignant Because They All Seem Similar. The Sun's Harmful Ultraviolet (Uv) Rays And The Usage Of Uv Tanning Beds Are The Two Most Common Causes Of Skin Cancer. It Is Particularly Difficult For Dermatologists To Distinguish Between Melanoma And Non- Melanoma Lesions Because Of The Low Degree Of Difference Between Lesions And Skin [5]. The Main Problem Of Similar Opinion Is Largely Dependent On Private Judgment And Is Scarcely Reproducible. With The Help Of Robotization Using Operation Of Deep Literacy Helps The Case To Get The Early Opinion Report And Grounded On The Report Case Can Consult Dermatologists For Treatment [6]. An Early Diagnosis Of Skin Cancer Is Crucial And Has Limited Number Of Available Treatment Options. Accurate Evaluation And The Capacity To Accurately Identify Skin Cancer Are Critical Components Of A Skin Cancer Prevention Approach. Even In Literacy Tasks That Are Unsupervised, Deep Literacy Has Been Widely Adopted [7]. Object Detection And Bracket Tasks Have Been Dominated By Convolutional Neural Networks (Cnn). As A Result, Trained End- To-End In A Controlled Environment, Cnns Eliminate The Need For Humans To Manually Create Feature Sets. The Use Of Convolutional Neural Networks (Cnns) To Categorize Lesions In Skin Cancer In Recent Years Has Outperformed Skilled Mortal Specialists.

II. Objective

Develop An Automated Skin Cancer Detection System Utilizing Deep Learning Techniques, Specifically Convolutional Neural Networks (Cnns), To Enhance Early Diagnosis Through Dermoscopy Images. The Goal Is To Improve The Accuracy Of Identifying Malignant And Benign Lesions, Enabling Timely Intervention And Increasing Survival Rates. The System Aims To Assist Pathologists By Providing Rapid And Precise Analysis, Ultimately Enhancing The Overall Efficiency Of Melanoma Patient Care.

III. Existing System:

In Literature Theyintroduced A Model That Uses Convolutional Neural Networks To Predict And Classify Four Different Types Of Skin Lesions. A Website Is Developed For The Real Time Usage Of The Model, Which Can Predict The Three Most Probable Types Of Skin Lesions For A Given Image. The Observations And Results Are Based On The Experiment Conduct The Mnist:Ham10000 Dataset Which Consists Of 10000 Labelled Images.Another Researcher Introduced The Algorithm That Applies Feature Extraction Using Abcd Rule, Glcm And Hog Feature Extraction For Early Detection Of Skin Lesion. In Their Work,

Pre-Processing Is To Improve The Skin Lesion Quality And Clarity To Reduce Artifacts, Skin Color, Hair, Etc. Segmentation Was Performed Using Geodesic Active Contour (Gac) Which Segments The Lesion Part Separately Which Was Further Useful For Feature Extraction. Abcd Scoring Method Was Used For Extracting Features Of Symmetry, Border, Color And Diameter. Hog And Glcm Was Used For Extracting Textural Features. The Extracted Features Are Directly Passed To Classifiers To Classify Skin Lesion Between Benign And Melanoma Using Different Machine Learning Techniques Such As Svm, Knn And Naïve Bayes Classifier. In Their Project Skin Lesion Images Were Downloaded From International Skin Imaging Collaboration (Isic) In Which 328 Images Of Benign And 672 Images Of Melanoma.

Disadvatages

1. The Existing Work Classifies Only Four Types Of Skin Lesions,This Means That The Existing Model May Not Provide As Comprehensive A Diagnosis As Our Model.Potentially Leading To Misdiagnoses Or Missed Detections Of Certain Skin Conditions.
2. The Existing Work's Data Pre-Processing Techniques Are Not As Advanced, Which Could Impact The Quality And Robustness Of The Model's Predictions.
3. The Existing Work Might Not Take Full Advantage Of State-Of-The-Art Transfer Learning Approaches, Potentially Affecting Its Model's Accuracy And Generalization.
4. The Existing Work Might Not Have Explored Segmentation, Potentially Limiting The Quality Of Its Features.
5. The Second Existing Work Focuses Only On Classifying Between Benign And Melanoma Lesions. This Limited Scope In Classification Might Lead To Missed Diagnoses Or Inadequate Identification Of Other Significant Skin Conditions.
6. The Use Of Geodesic Active Contour (Gac) For Segmentation In The Second Existing Work Might Be Less Accurate Or Detailed Compared To The Segmentation Approach. This Could Affect The Quality Of The Extracted Features.

IV. Proposed System:

We Proposes A Convolutional Neural Networks (Cnn), It Has Surpassed All Others In Object Detection And Classification Tests. The Dataset Is Screened From Mnist: Ham10000 Which Consists Of Seven Different Types Of Skin Lesions With The Sample Size Of 10015 Is Used For The Experimentation. We Employedthe Data Pre- Processing Techniques Like Sampling, Dull Razor And Segmentation Using Autoencoder And Decoder. Transfer Learning Techniques Like Densenet169 And Resnet 50 Were Used To Train The Model To Obtain The Results. We Compare Performance Of The Both Transfer Learning Models By Using The Undersampling And Oversampling Techniques.

Advantages:

1. Our Work Employs More Advanced Data Pre- Processing Techniques, Such As Sampling, Dull Razor, And Segmentation Using

Autoencoder And Decoder.

2. Our Work Benefits From A Larger Dataset, Potentially Leading To Improved Model Generalization And Better Performance Compared To The Smaller Datasets Used In The Existing Works.

3. Our Work May Have A More Diverse Set Of Lesion Types, Enhancing The Model's Ability To Generalize Across A Wider Range Of Skin Conditions.

4. Our Work Incorporates Techniques Like Segmentation Using Autoencoder And Decoder, Which Can Provide More Detailed And Accurate Feature Extraction.

V. Conclusion

Skin Cancer Is One Of The Illnesses That Is Spreading The Quickest On The Earth. Skin Cancer Is Mostly Brought On By A Person's Vulnerability To The Sun's Uv Radiation. Given The Limited Resources Available, Early Identification Of Skin Cancer Is Essential. Accurate Diagnosis And Identification Viability Are Generally Essential For Skin Cancer Prevention Strategies. Additionally, Dermatologists Have Trouble Seeing Skin Cancer In Its Early Stages. The Use Of Deep Learning For Both Supervised And Unsupervised Applications Has Increased Significantly In Recent Years. Convolutional Neural Networks (Cnns) Are One Of These Models That Have Excelled In Object Identification And Classification Tasks (Cnn). The Dataset Is Filtered From Mnist: Ham10000, Which Has A Sample Size Of 10015 And Includes Seven Different Types Of Skin Lesions. Data Preprocessing Methods Include Sampling, Segmentation Using An Autoencoder And Decoder, And Dull Razor. The Model Was Trained

Using Transfer Learning Methods Like Densenet169 And Resnet 50. Different Ratios Were Used For The Training And Assessment, Including 80:20, 70:30, And 40:60. When Undersampling And Oversampling Were Compared, Densenet169's Undersampling Technique Produced Accuracy Of 91.2% With A F1-Measure Of 91.7% And Resnet50's Oversampling Technique Produced Accuracy Of 83% With A F1- Measure Of 84%. The Future Extension Of This Study

Includes Increasing Forecast Accuracy Through Parameter Tuning

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