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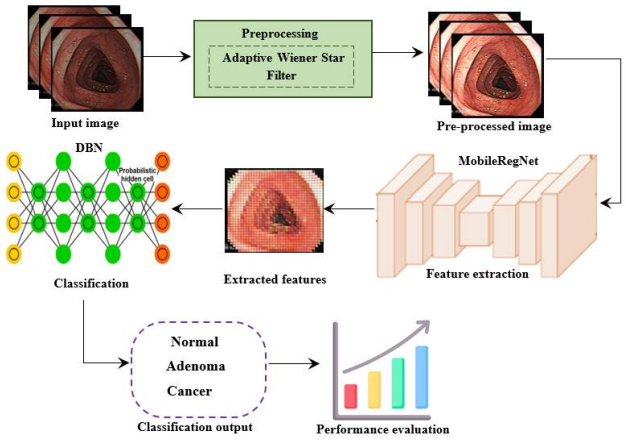
1. COPN-NET: DEEP LEARNING BASED COLORECTAL POLYP CLASSIFICATION VIA MOBILEREGNET AND DEEP BELIEF NETWORK

Ashwin G Singerji, Syed Hauider Abbas

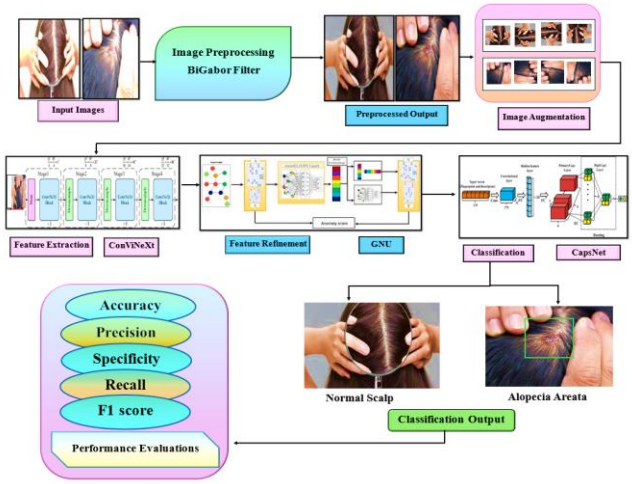
ABSTRACT: Colorectal polyp classification (CPC) is essential for the early diagnosis and prevention of colorectal cancer (CC). However, existing methods often struggle to accurately classify polyps due to variations in size, shape, texture, illuminations and imaging artifacts in colonoscopy images. To address these challenges, a novel deep learning based COPN-NET is proposed for CPC. First, the input colonoscopy images are denoised to remove image noise and retain the crucial structural information while preserving the boundaries of the polyps using an Adaptive Wiener Star Filter (AWSF). To enhance the diversity of the data set and the model's ability to generalize, data augmentation methods are used like flipping, rotating, scaling, or adjusting the brightness of the data. The improved images then fed into the lightweight feature extraction ability of MobileNet and the powerful representation learning ability of RegNet together to form a MobileRegNet architecture. The extracted deep features are fed to a Deep Belief Network (DBN) for classification into Normal, Adenoma, and Cancer. The proposed framework enhances the feature representation and classification results. Experimental results show that COPN-NET is able to obtain an accuracy (AC) of 99.08%, precision (PR) of 96.64%, recall (RE) of 95.71%, F1-score (F1) of 96.17%, and specificity (SP) of 95.61%.



2. SCALP CONVICAP: AN INTELLIGENT CONVINEXT FRAMEWORK FOR HAIR AND SCALP DISEASE DETECTION USING HYBRID CONVNEXT–TRANSFORMER LEARNING WITH GRAPH AND CAPSULE NETWORKS

Bastin Rogers Cross Joseph, Arthi Pandiyan

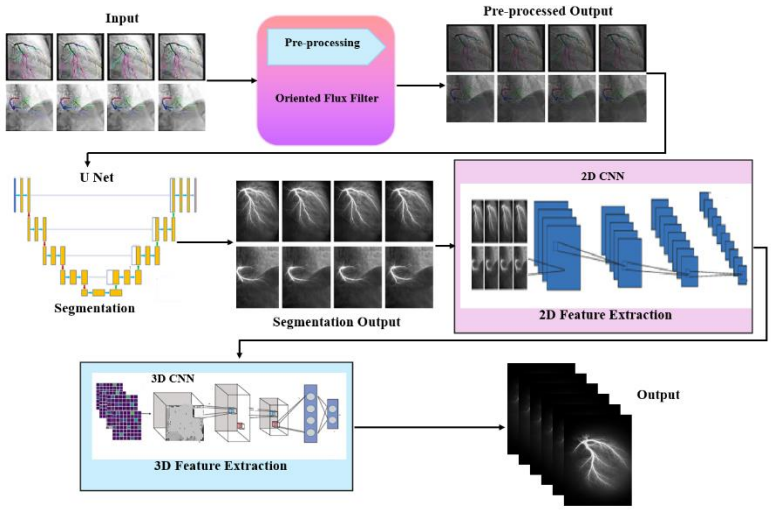
ABSTRACT: The determination of hair and scalp diseases is a challenging dermotological activity which requires accurate and automated image-based analysis to make early diagnosis and to treat the patient in the right way. Conventional manual diagnosis is lengthy, saubjective and limited by the fact that it is restricted by large amounts of scalp image. This study aims art resolving these problems by introducing a new scalp. Deep learning system ConViCap that is a blend of ConvNeXt and Vision Transformer (ConViNeXt) in order to collect local texture details as well as global contextual information. The framework uses BiGaBor pre-processing, graph-based feature refinement (GNN), and Capsule Network classification (CapsNet). For the experimental analysis, the proposed model attains an overall accuracy of 99.47% and an F1 score of 95.47% for efficient hair and scalp disease detection. The proposed Scalp ConViCap model enhances overall accuracy by 7.51%,21.28%' 8.21%, and 9.62% compared to Xception with ReLU, ViT-B/16, EfficientNet-based CNN, and R-CNN with CLAHE, respectively.



3. CARDIO-3DNet: CORONARY ARTERY RECONSTRUCTION USING DEEP LEARNING FOR ADVANCED MEDICAL IMAGE AND OBJECT-BASED 3D NETWORK

Prince Samuel S, Edwin Singh C

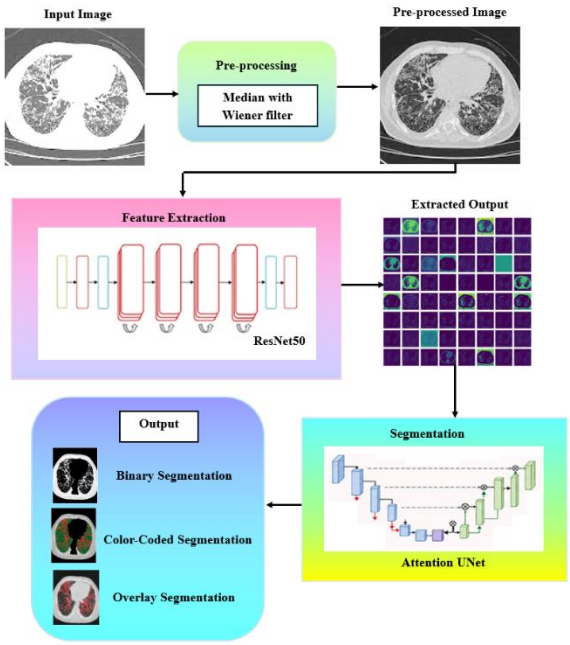
ABSTRACT: The 3D medical image reconstruction (3D MIR) is important in the diagnosis and analysis of coronary artery disease (CAD), as it presents a detailed picture of the vascular structures. Nevertheless, it is difficult to reconstruct coronary arteries from 2D angiographic images in the presence of noise, low contrast, complex topology of the vessel and loss of spatial information. The current methods are inefficient in preserving the fine vessel structures and continuity, which results in less accuracy in the reconstruction process. In this paper, an advanced DL-based CARDIO-3DNet for 3D coronary artery reconstruction technique has been proposed by incorporating the advanced feature learning and image processing techniques. Preliminary filtering is done with the Optimally Oriented Flux (OOF) filter to obtain better vessel structures, and the coronary arteries are segmented with U-Net to obtain accurate extraction results. Then a 3D Convolutional Neural Network (3D CNN) is used to implement efficient 3D feature extraction and reconstruction. The proposed method is intended to enhance the continuity of the vessels, maintain the spatial distribution, and produce accurate 3D models of coronary arteries. The significance of this work lies in integrating vessel enhancement deep segmentation and hybrid 3D feature learning within a single framework. The proposed method provides improved reconstruction accuracy and can support early diagnosis and clinical decision-making in CAD analysis. The performance of the proposed CARDIO-3DNet is assessed using measures such as accuracy, precision, recall, specificity, and F1-score. Experimental results show that the model has an accuracy of 99.02% and an F1-score of 97.23%, showing that it is effective in 3D medical picture reconstruction of coronary arteries. Moreover, the proposed CARDIO-3DNet increases the AY by 0.79%, 0.52%, 0.39%, and 0.13% over AlexNet, ShuffleNet, SqueezeNet and DenseNet respectively.



4. AUD PFS: ATTENTION U-NET BASED DEEP LEARNING FRAMEWORK FOR ACCURATE PULMONARY FIBROSIS SEGMENTATION IN MEDICAL IMAGES

Godlin Atlas L, Vaishnavi V

ABSTRACT: Pulmonary fibrosis (PF) is a chronic lung disorder in which the lung tissue becomes permanently scarred of early detection and accurate segmentation plays an important role in proper diagnosis and planning of the best treatment. However most existing approaches often provide only quantitative predictions without generating detailed binary, color-coded, and overlay segmentation outputs that can assist clinicians in visualizing fibrosis-affected regions. To address this issue, a novel Deep Learning (DL)-based AUD PFS model for PF segmentation is suggested, which uses CT images from the OSIC Pulmonary Fibrosis Progression Dataset. The hybrid Median with Weiner (MedWe) filter is used to improve the CT image and to remove the noise in the images. ResNet50 is used to extract the feature from the CT image for reliable segmentation and Attention UNet is employed for segmenting the CT images of PF as Binary segmentation, color-codded segmentation and Overlay segmentation. The proposed AUD PFS is evaluated using the following metrics: accuracy, precision, recall, specificity, F1-score, Dice index, and Jaccard index. From the experimental analysis, the proposed AUD PFS model attains an overall accuracy of 99.02% and F1-score of 97.23% for efficient PF segmentation. Moreover, the proposed AUD PFS model improves the overall accuracy by 1.53%, 0.02%, 13.85%, 9.11% and 5.17% better than ResNet18-based U-Net, nnU-Net, HCR-DL model, CNN, and AE-IPF respectively.



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