LITERATURE SURVEY

Automatic lesion segmentation using atrous convolutional deep neural networks in dermoscopic skin cancer images-Ranpreet Kaur, Hamid GholamHosseini, Roopak Sinha, Maria Linden: BMC Med Imaging 2022 May.

Melanoma is the most dangerous and aggressive form of skin cancer, exhibiting a high mortality rate worldwide. Biopsy and histopathological analysis are standard procedures for skin cancer detection and prevention in clinical settings. A significant step in the diagnosis process is the deep understanding of the patterns, size, color, and structure of lesions based on images obtained through dermatoscopy for the infected area. However, the manual segmentation of the lesion region is time-consuming because the lesion evolves and changes its shape over time, making its prediction challenging. Moreover, it is challenging to predict melanoma at the initial stage as it closely resembles other skin cancer types that are not malignant as melanoma; thus, automatic segmentation techniques are required to design a computer-aided system for accurate and timely detection. As deep learning approaches have gained significant attention in recent years due to their remarkable performance, therefore, in this work, we proposed a novel design of a convolutional neural network (CNN) framework based on atrous convolutions for automatic lesion segmentation. This architecture is built based on the concept of atrous/dilated convolutions which are effective for semantic segmentation. A deep neural network is designed from scratch employing several building blocks consisting of convolutional, batch normalization, leakyReLU layer, and fine-tuned hyperparameters contributing altogether towards higher performance.

Efficient skin lesion segmentation using separable-Unit with stochastic weight averaging-Peng Tang, Qiaokang Liang, Xintong Yan, Shao Xiang, Wei Sun, Dan Zhang, Gianmarc Coppola: Computer Method Programs Biomed 2019 Sep.

Efficient segmentation of skin lesions in dermoscopy images can improve the classification accuracy of skin diseases, which provides a powerful approach for dermatologists in examining pigmented skin lesions. However, the

segmentation is challenging due to the low contrast of skin lesions from a captured image, fuzzy and indistinct lesion boundaries, huge variety of interclass variation of melanomas, the existence of artifacts, etc. In this work, an efficient and accurate melanoma region segmentation method is proposed for computer-aided diagnostic systems. A skin lesion segmentation (SLS) method based on the separable-Unit with stochastic weight averaging is proposed in this work. Specifically, the proposed Separable-Unit framework takes advantage of the separable convolutional block and U-Net architectures, which can extremely capture the context feature channel correlation and higher semantic feature information to enhance the pixel-level discriminative representation capability of fully convolutional networks (FCN). Further, considering that the over-fitting is a local optimum (or sub-optimum) problem, a scheme based on stochastic weight averaging is introduced, which can obtain a much broader optimum and better generalization.

Skin Cancer Diagnosis Based on Neutrosophic Features with Deep Neural Network-Sumit Kumar Singh, Vahid Abolghasemi, Mohammed Hussein Anisi:2022august.

Recent years evidenced an increase in the total number of skin cancer cases, and it is projected to grow exponentially. This paper proposes a computer-aided diagnosis system for the classification of a malignant lesion, where the acquired image is primarily pre-processed using novel methods. Digital artifacts such as hair follicles and blood vessels are removed, and thereafter, the image is enhanced using a novel method of histogram equalization. Henceforth, the pre-processed image undergoes the segmentation phase, where the suspected lesion is segmented using the Neutrosophic technique. The segmentation method employs a thresholding-based method along with a pentagonal neutrosophic structure to form a segmentation mask of the suspected skin lesion. The paper proposes a deep neural network base on Inception and residual blocks with a softmax block after each residual block which makes the layer wider and easier to learn the key features more quickly. The proposed classifier was trained, tested, and validated over PH2, ISIC 2017, ISIC 2018, and ISIC 2019 datasets. The proposed segmentation model yields an accuracy mark of 99.50%, 99.33%, 98.56%, and 98.04% for these datasets, respectively. These datasets are augmented to form a total of 103,554 images for training, which make the classifier produce enhanced classification results. Our experimental results

confirm that the proposed classifier yields an accuracy score of 99.50%, 99.33%, 98.56%, and 98.04% for PH2, ISIC 2017, 2018, and 2019, respectively, which is better than most of the pre-existing classifiers.

Deep Learning Approaches Towards Skin Lesion Segmentation and Classification from Dermoscopic Images-Ramsha Baig, Maryam Bibi, Anmol Hamid, Sumaira Kausar, Shahzad Khalid:2020

Automated intelligent systems for unbiased diagnosis are the primary requirement for pigment lesion analysis. It has gained the attention of researchers in the last few decades. These systems involve multiple phases such as pre-processing, feature extraction, segmentation, classification, and post-processing. It is crucial to accurately localize and segment the skin lesion. It is observed that recent enhancements in machine learning algorithms and dermoscopic techniques reduced the misclassification rate therefore, the focus on computer-aided systems increased exponentially in recent years. Computer-aided diagnostic systems are reliable sources for dermatologists to analyze the type of cancer, but it is widely acknowledged that even higher accuracy is needed for computer-aided diagnostic systems to be adopted practically in the diagnostic process of life-threatening diseases. Skin cancer is one of the most threatening cancers. It occurs by the abnormal multiplication of cells. The core three types of skin cells are Squamous, Basal, and Melanocytes. There are two wide classes of skin cancer; Melanocytic and non-Melanocytic. It is difficult to differentiate between benign and malignant melanoma, therefore dermatologists sometimes misclassify benign and malignant melanoma. Melanoma is estimated as the 19th most frequent cancer, it is riskier than Basel and Squamous carcinoma because it rapidly spreads throughout the body. Hence, to lower the death risk, it is critical to diagnose the correct type of cancer in the early rudimentary phases. It can occur on any part of the body, but it has a higher probability to occur on the chest, back, and legs.

Superpixel-Oriented Label Distribution Learning for Skin Lesion Segmentation-Qiaoer Zhou, Tingting He, Yuanwen Zou: Diagnostic(Basel)2022 April.

Lesion segmentation is a critical task in skin cancer analysis and detection. When developing deep learning-based segmentation methods, we need a large number of human-annotated labels to serve as ground truth for model-supervised learning. Due to the complexity of dermatological images and the subjective differences of different dermatologists in decision-making, the labels in the segmentation target boundary region are prone to produce uncertain labels or error labels. These labels may lead to unsatisfactory performance of dermoscopy segmentation. In addition, the model trained by the errored one-hot label may be overconfident, which can lead to arbitrary prediction and model overfitting. In this paper, a superpixel-oriented label distribution learning method is proposed. The superpixels formed by the simple linear iterative cluster (SLIC) algorithm combine one-hot labels constraint and define a distance function to convert it into a soft probability distribution. Referring to the model structure of knowledge distillation, after Superpixel-oriented label distribution learning, we get soft labels with structural prior information. Then the soft labels are transferred as new knowledge to the lesion segmentation network for training. Our method on ISIC 2018 datasets achieves a Dice coefficient reaching 84%, sensitivity 79.6%, precision 80.4%, improved by 19.3%, 8.6%, and 2.5% respectively in comparison with the results of U-Net. We also evaluate our method on the tasks of skin lesion segmentation via several general neural network architectures. The experiments show that our method improves the performance of network image segmentation and can be easily integrated into most existing deep learning architectures.