

CNN ANALYSIS FOR MAMMOGRAM DISEASE DETECTION

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Abstract:

Mammography is a method for the diagnosis and screening of the human breast using low-energy X-rays. Mammograms tend to detect breast cancer early, usually by detecting standard masses, or by detecting microcalcifications. A descriptive analysis of mammogram diagnosis using Convolutional Neural Network (CNN) for spectral detection is presented in this study. Initially, the color components are separated as red, green and blue. Only green channel is used for analysis because green is sensitive for humans. Finally, CNN is used for mammogram color spectral detection. The performance of proposed system is analyzed by CNN in terms of accuracy.

Keywords: Mammogram detection, Spectral detection, Color channel Separation, Convolutional neural network

Introduction:

Pre-processing, extracting, selecting and classifying features. Cutting and resizing is used as a method for preprocessing [1]. The next step is Texture, waving and PCA characteristics, extracted as a mammogram and improved cuckoo search algorithms for optimal divided characteristics. The curvelet coefficients are seen separately in some coefficient classes. For each category of coefficients, certain statistical characteristics are determined [2]. These statistical characteristics are paired with the characteristics derived from the mammogram.

In a mammogram classification application, the performance of the considered features are measured [3]. As a supervised learning in the classification a deep neural network classification was used. It provides a method of mapping non-separable inputs into a new set of separable features, which can be used by a supporting vector system along with common "uncrossed" features [4].

A newly-developed multi-support vector recurrent removal tool for the selection of features [5]. The first SVM will be applied to mammary gland and fatty segmentation functions. The histogram is then extracted from the first SVM's Score Diagram [6]. The second SVM is used to train several classification in the histogram, which then classify the density of mammograms.

A CNN analysis for mammogramspectral detectionis presented in this study. The rest of the paper is organized as follows: The methods and materials of mammogram detection are described in section 2. In section 3 the experimental results and discussion are described. The last section concludes the mammogram spectral detection system.

Methods and Materials:

Initially, in the mammogram input images green color components is separated. Then separated color components are classified by using CNN. Figure 1 shows the mammogram color spectral detection using CNN.

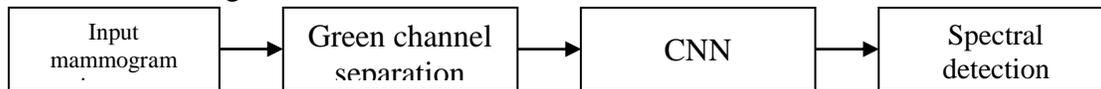


Figure 1 Mammogram spectral detection using CNN

Green channel separation

The RGB color model is an additive color scheme where a wide variety of colors can be combined with the red, green and blue light. The original names of the pattern are the three-primary additive colors, red, green and blue. The main aim of the RGB color pattern, although often used in traditional photography, is to sensing, representing and viewing images in electronic devices, such as televisions and computers. The RGB color model had already had a solid behind it theory before the electronic era, based on human color perception. RGB is a standard based on the product color, while the color factor and response to each of the R , G and B levels vary from manufacturers to fabricators, even even on the same product. RGB is the color model for different devices. Therefore, without any kind of control, an RGB value doesn't represent the same color across devices.

CNNClassification:

CNN is a deep neural learning class. The image recognition of CNNs represents a significant advancement [7]. They are most used to analyze visual images and often work in the image classification behind the scenes. It uses 2-Dimensional (2D) convolution layers and CNN learned characteristics with input data. So, this type of network is ideal for 2D images processing. In addition, CNNs use very little preprocessing compared to other image classification algorithms. This means that the filters that are made by hand in other algorithms can be learned [8]. CNNs are available for tons of applications, from the recognition of images and videos, the classification of images and recommending systems for natural language and the analysis of medical images.

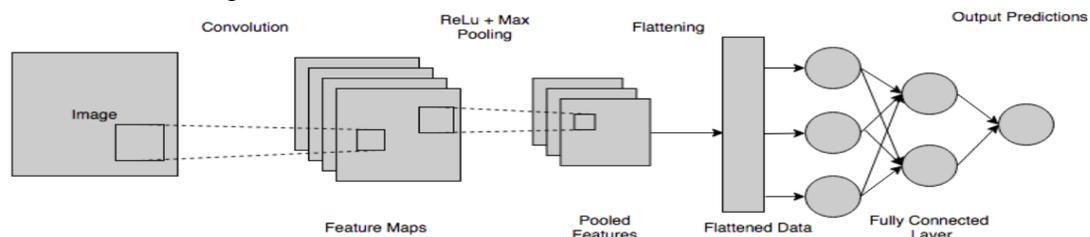


Figure 2 CNN architecture

Results and Discussion:

At first, the mammogram input images the red, green and blue color components are separated. The green channel is used for performance because it is sensitive to human eye. The separated color components are classified by using CNN. Figure 2 shows the sample mammogram image in the dataset.

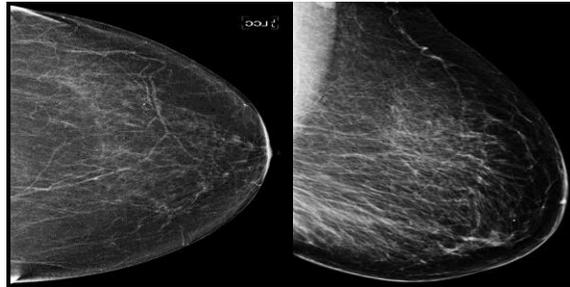


Figure 2 Sample images in database

The input mammogram image is converted into red, green and blue color components are separated by using color space method. The CNN is used for prediction. The Green color component performs the classification because green color is highly sensitive for human eye. The red, green and blue color sample features are separated from original images. The CNN model is used for prediction. The performance of CNN models is shown in figure 4.

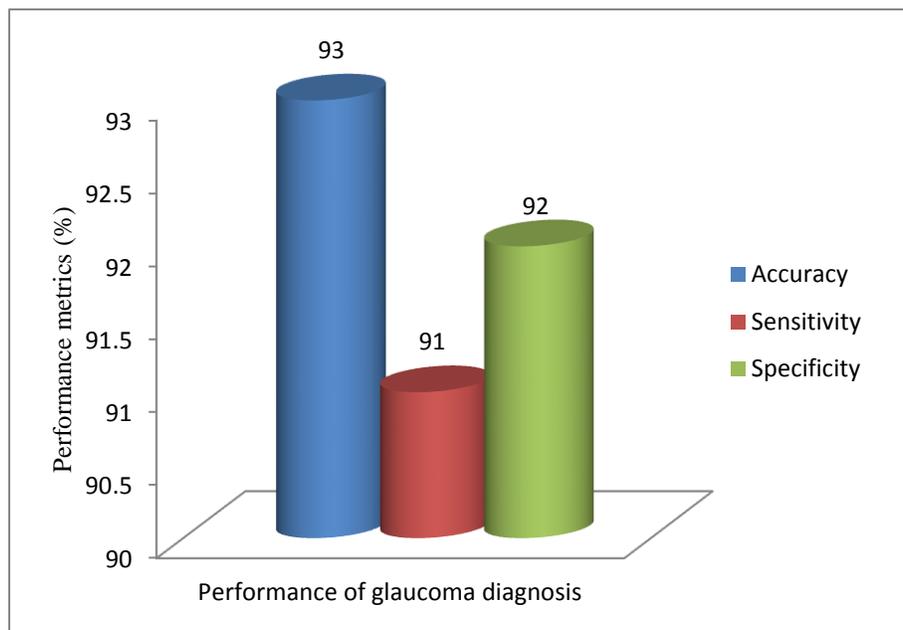


Figure 4 Performance of CNN

From the above figure, it is clearly observed that the system performs the classification accuracy of 93% and its sensitivity and specificity are 90% and 91% by using color channel separation and CNN classifier.

Conclusion

The CNN analysis for mammogramspectral detection is discussed. Initially, the red, green and blue color channels are separated from the input fundus images. Then the separated green channels is given to CNN for prediction. The system yields the classification accuracy of 93% and its sensitivity and specificity are 91% and 92%. The experimental results show the better classification accuracy by using color spaces and CNN classifier.

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