Retraction

Retraction: ResNet: A convolutional Neural Network for detecting and diagnosing of coronavirus pneumonia (IOP Conf. Ser.: Mater. Sci. Eng. 1084 012011)

Published 18 November 2022

This article has been retracted by IOP Publishing following an allegation that this article may contain tortured phrases [1]. IOP Publishing has investigated and agrees the article contains a number of nonsensical phrases that feature throughout the paper, masking overlap with previously published work [2], to the extent that the article makes very little sense. This casts serious doubt over the legitimacy of the article and/or expertise of the authors in this topic.

IOP Publishing wishes to credit PubPeer commenters [3] for bringing the issue to our attention.

The authors agree to this retraction.

[1] Cabanac G, Labbe C, Magazinov A, 2021, arXiv:2107.06751v1

[2] Angeline R, Mrithika, M., Raman, A., Warrier, P. 2020, Pneumonia Detection and Classification Using Chest X-Ray Images with Convolutional Neural Network. In: Smys, S., Iliyasu, A.M., Bestak, R., Shi, F. (eds) New Trends in Computational Vision and Bio-inspired Computing. ICCVBIC 2018. Springer

[3] https://pubpeer.com/publications/5CE53DABC125D116FC6B848CA1837B

Retraction published: 18 November 2022
ResNet: A convolutional Neural Network for detecting and diagnosing of coronavirus pneumonia

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Abstract:
In this paper, ResNet a Convolutional Neural Network for detecting and diagnosing the lung disease Covid-19 pneumonia infection automatically. For identifying, Chest X-rays are widely used for diagnosis of pneumonia disease which affects the lungs. This paper provides an approach to detect and diagnose Covid-19 pneumonia and classify the chest X-ray images into two classes either Covid-19 pneumonia or normal utilizing CNN. This is done by training the CNN to differentiate between the normal and pneumonia chest X-ray images using a deep learning platform Pytorch. Image preprocessing technique has been applied in order to enhance the image accuracy. Python and OpenCV have been used.

Keywords: Covid-19 Pneumonia detection - Classification - Image processing - Convolutional neural network – ResNet

1. INTRODUCTION
Pneumonia is a dangerous disease that affects the lungs of human beings. Alveoli present in the top of the lungs with air, when an ordinary individual inhales through an individual influenced with pneumonia is loaded up with discharge, restricting the entry of oxygen of the individual in this Covid-19 pneumonia infection. Many elderly people and also having high or low blood pressure, diabetic affects some diseases consistently because of preventable medical problems, for example, Covid-19 pneumonia. It is one of the most driving reasons for death among elders and people having blood pressure, diabetic and other diseases [1]. Likewise, it influences the kids who are under 9 years. Pneumonia is resolved to have the help of chest X-rays and early finding to recuperate them from the sickness. Chest X-rays of child or elderly patients impacted by pneumonia have a cloud like appearance in both the lungs while the strong chest X-rays appear clear. The end should moreover be conceivable with the help of significant learning. It is an advancement, especially in the field of wellbeing informatics [2, 12]. Various frameworks and models of significant learning are used to look at the infection of Covid-19 pneumonia. In this paper, chest X-ray pictures are portrayed into two classes—either Covid-19 pneumonia affected lungs or ordinary lungs. The CNN association is set up to isolate Coronavirus pneumonia and regular chest X-rays. The association inputs chest X-ray pictures and yields the class anticipated and accuracy of characterization.
2. RELATED WORKS

In the existing work, a precise blueprint on past examinations in lung disease recognizable proof and recognition, have been done using CNN. ChexNet, a 121-layer CNN, chest images are given as input and yields the probability of pneumonia close by a warmth guide of domains that is infected by Covid pneumonia. Dataset containing images of chest that are infected with 14 different lung infections are classified using ChexNet [3]. Modified area of Tuberculosis, pneumonia, and cell breakdown in the lungs is performed resulting in isolating required features from the from chest X-beams. The portrayal of chest X-beam is done using feedforward, counterfeit neural association [4]. CNN is used for detection of tuberculosis with an AUC of 0.99, that consists of AlexNet and GoogleNet. Pre-readied and lacking models were seen as where the AUC of the pre-arranged model was more conspicuous [5]. Lesions in the chest are identified by CNN and Imagenet. Best results are obtained from Picode and decaf [6]. The framework for lesion detection is set up that involves power law channel and median filter to remove and resume noses and feature extraction is improved using the technique of gabor channel to obtain feature vectors. Better classification results obtained from feed forward neural networks[7]. Accuracy of 92% and 82% specificity is obtained in classifying the infected and non-infected image classification involving CNN model of ResNet-50[8].Pneumonia due to Covid is recognized using picture planning techniques from chest X-ray images. The extent of the sound lung line to amount to the lung district is gained and analyzed for results. Histogram balance, altering, lung limit ID , and the threshold is performed on the photos [9].The request of chest ailments has been performed using a thought guided convolutional neural association that combines area and overall information [10].Radiographs are used to identify infected thoracic areas by a supported course method[11].

3. SOFTWARE TOOLS USED

For the purpose of detection and diagnosing infected regions we have used pytorch in the proposed system. Pytorch is based on the principles of machine learning and it is also open source. It is mainly utilized in computer vision projects. To code Python form 3 has been utilized. OpenCV detection is used in the proposed system.(Fig. 1).

Covid-19 Pneumonia Detection and Classification Using Chest X-Ray Images[11]

![ResNet-50 Architecture](Fig. 1)

4. SYSTEM ARCHITECTURE

4.1 Residual Neural Network

A residual network or ResNet are profound neural organizations. Profound convolutional 58 neural organizations have incredible outcomes for picture order errands. However, as the profundity of an organization builds, exactness gets soaked and afterward corrupts
quickly. Inclination signal vanishes with profundity yet character association in ResNet help proliferate the slope through the organization. The Resnet have high accuracy when compared with other CNN networks. ResNet-50 is utilized in the current proposed system for the classification of the images of the chest X-ray. ResNet-50 has a top1 mistake of 23.85 and top-5 blunder of 7.13. Each ResNet block is 3 layers profound for ResNet-50. It is got by supplanting every 2 layer block in ResNet-34 with 3 layer bottleneck block [12].

5. METHODOLOGY

This methodology section explains in detail about the methods of CNN and image processing utilized in the proposed system for the detection.

5.1 Dataset Description

The dataset which has been used consists of more than 5000 X-ray pictures of the chest. They are of the below 5-year-old patients who belong to Guangzhou Women and Children's Medical Center, Guangzhou[11]. The dataset is a combination of both Pneumonia infected and non-infected images. The images portrays away from with no territories of shady opacification in the picture (Figs. 2 and 3) referred from [11].

Fig. 2 Normal chest X-ray

Fig. 3 Pneumonia chest X-ray
5.2 Image Pre-processing

Pre-processing is done mainly to enhance the given information and to improve the features quality. Which helps in clear differentiating of the infected image from the non-infected images. Enhancement of the pre-processed image is done by the technique of Histogram equalization. The distinction and force of the images are improved by this technique. The distribution of intensity is modified by this technique for the adjustment of the contrast. Normalizing an histogram is a technique consisting in transforming the discrete distribution of intensities into an histogram of probabilities. After consistently 81 appropriating the force esteem results are obtained. The images of histogram and that of the histogram that is equalised is depicted in the below given figures (Figs. 4 and 5).

![Fig. 4 Histogram image](image1)

![Fig. 5 Equalised histogram](image2)

5.3 Classification Using CNN

The objective is to give input containing images of those infected by Covid-19 pneumonia and also those of non-infected. And to obtain the images that are infected as output after the CNN classification is applied to the images. The test
data set contains images of newly taken X-ray pictures that are used along with the training data set.

5.3.1 K-Fold Cross Validation

Cross validation is a technique which utilizes a confined proportion of data for setting up a model. In this method there will be subsets formed from the data set which is taken first. Out of those $K$ subsets, one is chosen for the purpose of testing model approval. Remaining $k-1$ subsets used for data retrieval. The method of cross validation is done for $K$ times. For approval purposes all the $k$ subsets are concisely used one time. Which are then averaged to get the final single estimated output. The dataset of the images is divided into five folds (Figs. 6, 7 and 8) referred from [11].

Fig. 6 Original image

Fig. 7 Histogram equalised image
5.3.2 Training

The dataset that comprises the images of both the non-infected images and also those of pneumonia infected images, which are divided into parts of five. For the purpose of training the algorithm and also for the validation purposes. The CNN is given input for the classification in order to detect and diagnose the infected images with high accuracy. The exactness or accuracy is observed. After the normal of the exactness of every one of the five folds, the output of 102 precision is obtained.

5.3.3 Testing

From the dataset some images are used for testing purposes other than those which are taken for validation purposes. The exactness of the algorithm utilized that is of CNN is found out using the testing method. The exactness of classification ability to distinguish the images that fall under the pneumonia infected section from those that are the images of normal chest X-rays are identified here. That is the capability of correctly predicting the outcome. The output we got here defines exactness.

6 RESULTS

The results obtained are 76% precision in detecting in classification of the images infected with pneumonia and normal images. 0.94 exactness is obtained. 0.001 of learning rate is observed. The age was 25 and the movement size used was 8. It is observed that CNN has been an efficient method of classification with high accuracy of detection. The exactness can be improved using high advanced algorithms like ResNet-152. Other advanced feature extraction and segmentation can be implemented for the extraction of the exact infected region. Clinical methods used by skilled radiologists are high chances to be inaccurate and early detection is not possible. But by implementing the proposed method involving CNN results in better detection of the disease in very less time with great accurate results. Early detection increases the chances of curing at a very high rate.
7 FUTURE SCOPE
Lot of scope for the improvements that can be in the medical research field using deep learning techniques. The accuracy and exactness in identifying the exact region that is infected is more efficient when it is done by the automatic method involving deep learning algorithms like CNN compared to the traditionally followed clinical methods by radiologists where there are high chances for the results to be inaccurate. The output results can be improved further by implementing more advanced algorithms that are complex and very highly accurate in classification. CNN can be used to investigate explicit sicknesses to accomplish the most extreme exactness of expectation. Further a lone image and the association can be set up to perceive and separate all the issues accurately. With better analysis there are high chances to be cured from the disease.

8 CONCLUSION
From these investigations, the project can presume that the grouping of pneumonia images of the chest should be possible viably with the assistance of CNN. Finally, numerous thoracic pneumonia just as other general illnesses can be identified with the assistance of profound learning. With additional investigations and exploration about the structures that can be actualized, AI can end up being a helpful procedure in recognizing infections and can possess a focal situation in the medical care industry.

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