

Pneumonia Detection from Chest X-ray Using Mask R-CNN

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Abstract: The pneumonia is a lung disease or lung infection that affect the alveoli region severely. According to WHO million children were died in 2017 by pneumonia and approximately 15% of all death of children under the age of five years. It easily infects the adults over the age of 65 and a person with pre-existing health problem. This infection spreads when healthy person contacts with infected person. Vaccine is the only option to prevent from pneumonia. In this paper we are using convolutional neural network to find the pneumonia infection from chest X-Ray. We use deep learning to determine the presence of purulent material in a determined location from the chest X-ray. There is a possibility of developing advanced deep learning model by the appearance of new dataset to focusing on detection and diagnosis of pneumonia. In future this method will help the medical practitioners to quickly identify and cure pneumonia.

Keywords: Pneumonia detection, Chest X-ray, Detection of accuracy.

1. Introduction

Pneumonia is a lung infected disease that affect inflames air sacs in lung and fill with fluid or pus. In 2017, 1.4 million people were infected with pneumonia in America. More than 50,000 people were died. In recently half million people were died America and 2 million people were died worldwide due to covid-19 Pneumonia. It was identified by the chest X-ray. Doctors see the lung particles, heart, blood vessels to verify the confirmation of pneumonia. Now-a-days no. of people affected by pneumonia gets increased as well as the testing time and treatment processing timing also increased. In this paper we improving the testing method of Pneumonia to identify the infected particles accurately at less no of time and that help to start the diagnosis process quickly. In this testing process Conventional neural network and deep learning play a vital role in identifying Pneumonia.

2. Literature Survey

A. S. Lundervold, [1] Using machine learning and neural network medical images are processed and it was partially analysed in particular area which was mentioned earlier in dataset. They particularly focused on deep learning in MRI.

G. Litjens, [2] use deep learning algorithm in conventional network for the process of analysing medical image i.e. MR image. They survey the use of deep learning for object

detection, registration, image classification, segmentation and other tasks. This are used in some application areas such as neuro, breast, cardiac, retinal, abdominal, musculoskeletal.

M. I. Razzak, [3] Detecting disease using deep learning by image analysis. The machine learning and artificial intelligence are help to diagnosis the disease. This method is composed of conventional algorithms without learning CNN they used it with natural image for analysing.

A. Esteva, [4] Detecting skin cancer using image by the appearance of skin lesions. The dataset contains lakhs of clinical image and their disease name. they train a Conventional neural network to detect skin cancer from the dataset. Artificial intelligence is used in classifying the skin cancer.

A. Rezvantalab, [5] Detecting different types of skin disease with the capability of conventional neural network. The dataset contains thousands of images from 8 diseases. Deep learning is used to find the skin disease with effective result.

U. A. H. Khan, [6] Detecting prostate cancer using deep neural network in the field of machine learning-based analysis of pathology image with prostate tissue images. They use ImageNet dataset and breast histopathology dataset to detect cancer from transfer learning.

X. Wang, [7] Thorax disease can be identified by chest x-ray using the conventional neural network. The patients x-ray images are stored in dataset. Accurate result was obtained by deep learning.

3. Proposed Method

This method has some new contributions and advantages compared to the previous methodologies to improve analyzing.

1. This method use Mask Region based Convolutional neural network.
2. This method uses Features maps to get best prediction outcome.
3. Same identifier is used for X-ray of the same patient.
4. Record for Each patient in the dataset has at least one frontal X-ray and one lateral X-ray.
5. To have available patient's clinical information for making an accurate diagnosis.

Mask R-CNN is a deep neural network has an ability the solve computer vision problem. It is use to separate image into

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an object bounding boxes, masks and classes. It generates proposals about a region of an object as an input image, then it predicts the class of object and refine boundary box and make a mask in pixel level. Here we use Chest X ray as image for detecting Pneumonia.

This method uses Features maps for detecting Pneumonia from the Chest X-ray. Features map is used to identify the different features present in the Chest X-ray like Selected region on lungs, heart with the help of convolutional neural network to detecting the Pneumonia accurately.

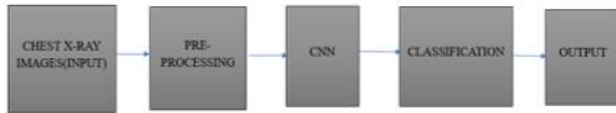


Fig. 1. Detection process using chest X-ray

We make some features in the dataset to improve the performance of this method. In the dataset same identifier is used for X-ray of the same patient because of some privacy policies. Currently each sample is identified with a different unique identifier even if they come from the same patient.

Existing methodology has only frontal captures in a dataset, so it losing a very valuable information and with which professionals normally have to carry out their diagnoses. There we make a little bit change in record for Each patient in the dataset has at least one frontal X-ray and one lateral X-ray that improve detecting Pneumonia from the X-ray image.

In our new method The patient's clinical information can make and available it in a dataset, because cases of pneumonia are usually preceded by a history of fever and cough, nausea,

vomiting. So, having access to this above information - when it comes to making an accurate diagnosis - would give us a more accurate diagnosis. The above mentioned upgrades are used to improve the method to detect pneumonia from the Chest x-ray image in a less number of time with more accurate diagnosis.

4. Conclusion

This paper has presented an approach to detect Pneumonia from chest X-ray with a better accuracy. These detections will be used to find the infection rate of the lung caused by pneumonia. In our paper we suggested some new methods to detect pneumonia with a better accuracy in quick manner.

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