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Pneumonia Detection Using X-Ray

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Abstract -*Pneumonia is an infection that can lead to a fatal outcome, it is caused because of various bacteria, fungi, and viruses due to this inflammation in air sacs is caused. To diagnose pneumonia, a chest X-ray is used by the medical practitioners as the best imaging modality and it can be managed effectively with medicines and proper treatment. The visual analysis of a patient's X-ray chest radiogram by a knowledgeable doctor takes about five to fifteen minutes. once cases are targeted, this may doubtless place tremendous pressure on the doctor's clinical diagnosis. We used TensorFlow and Keras as our main libraries and performed in the Jupyter notebook. CNN (ConvNet) Algorithm is used for the detection as it is better than others, as we studied in different papers. This CNN Algorithm contains Conv2D and Maxpooling2D layers which are used to reduce the error by fitting a function appropriately on the given training set and avoiding the overfitting of images. We downloaded the dataset from Kaggle which has around 5,800 chest X-Ray images.*

***Key Words*:CNN Algorithm, Pneumonia Detection, Tensor Flow, X-Ray, Diagnose Pneumonia, Bacteria, Viruses**

1. INTRODUCTION

Pneumonia is an infection in one or each lung. Bacteria, viruses, and fungi cause it. The infection causes inflammation within the air sacs in your lungs, creating it troublesome to breathe. To diagnose pneumonia, a chest X-ray is used by the medical practitioners as the best imaging modality and it can be managed effectively with medicines and proper treatment. The current system to detect pneumonia is not very précised, so we propose a system that will give more accuracy and the type of pneumonia.

2. LITERATURE REVIEW

In [1], Tatiana Gabruseva, Dmytro Poplavskiy, Alexandr Kalinin, IEEE 2020:" Deep Learning For Automatic Pneumonia Detection." The main aim of this proposed research paper is to provide a simple and effective algorithm for the localization of lung opacities region.

In [2], V. Sirish Kaushik, Anand Nayyar, Gaurav Kataria, and Rachna Jain, Research Gate, 2020: "Pneumonia Detection Using Convolution Neural Networks(CNNs)." This paper consists of the usage of the CNN algorithm. CNN classifier model 3 with three convolutional layers are 92.31%, 98%, and 94%, respectively, which are quite high compared to other models that were trained.

In [3], Gaurav Labhane, Rutuja Pansare, Saumil Maheshwari, Anupam Shukla, Ritu Tiwari, IEEE, 2020: "Detection Of Pediatric Pneumonia From Chest X-Ray Images Using CNN And Transfer Learning." The models proposed here for the detection of pediatric pneumonia on the frontal chest x-ray images using CNN and Transfer learning approaches have significant results.

In [4], Zebinjiang, IEEE(ICBAIE), 2020: "Chest X-Ray Pneumonia Detection Based On Convolution Neural Network." A number of convolutional neural networks are used to deal with chest x-ray pneumonia detection tasks.

In [5], Sheikh Rafiul, Islam, Santi P. Maity, Ajoy Kumar, Ray and Mrinal Mandal, IEEE(CCECE), 2019: "Automatic Detection Of Pneumonia On Compressed Sensing Images Using Deep Learning." Here is an automatic computerized system for detecting pneumonia using a CS-based DL model. The study shows that the use of DL in the CS framework reduces the required observations for detecting pneumonia.

3. SYSTEM CONFIGURATION

The Purpose of Pneumonia detection system is for research purposes which would we helpful in medical sector. It contains models which describes that a particular patient's x-ray is Pneumonia positive or not. It also suggests some basics remedies for patients to be followed if detected pneumonia positive.Developing a user-friendly web-based system for people. The dataset used in this project is imported from Kaggle. Dataset consist of 5216 chest X-rays with 3875 images having Pneumonia and 1341 images shown to be normal.

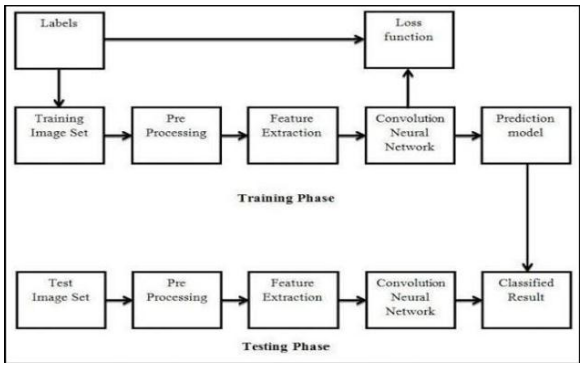


Fig 3.1 System Architecture Daigram

4. METHODOLGY

In the First Step: We choose an image as an input in which we want to predict the object.

In the Second Step: We perform object recognition which will connect to the Tensor flow which contains images of different objects used for training.

In the Third step: CNN (convolution Neural Network) model. CNN would be with two convolutional layers, pick out a special combination of activation features and classifiers for comparison purposes. Check the system with coaching datasets severally.

In the fourth step: The input image is given as an input parameter which converts the image into pixels. Next Input is executed which converts the pixel image into a tensor.

In the final step: This tensor image is given as an input parameter to classify functions that predict the output based on the probability from which we consider the highest probability value as the best-predicted result. The final output will be shown as Pneumonia/Normal.

4.1. DATA FLOW DIAGRAM

Data flow diagrams are used to graphically represent the flow of information in a very business data system. DFD describes the processes that are concerned in a very system to transfer information from the input to the file storage and reports generation. data flow diagrams may be divided into logical and physical. The logical information flowchart describes the flow of data through a system to perform certain functions of a business. The physical information flowchart describes the implementation of the logical data flow.

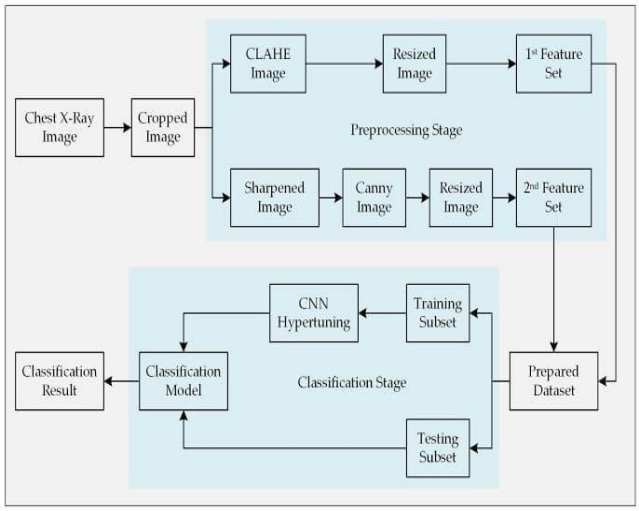


Fig 4.1 Data Flow Diagram

4.2. UML Diagram

A UML diagram is a diagram supported by the UML (Unified Modeling Language) with the aim of visually representing a system at the side of its main actors, roles, actions, artifacts, or classes, so as to higher perceive, alter, maintain, or document data concerning the system.

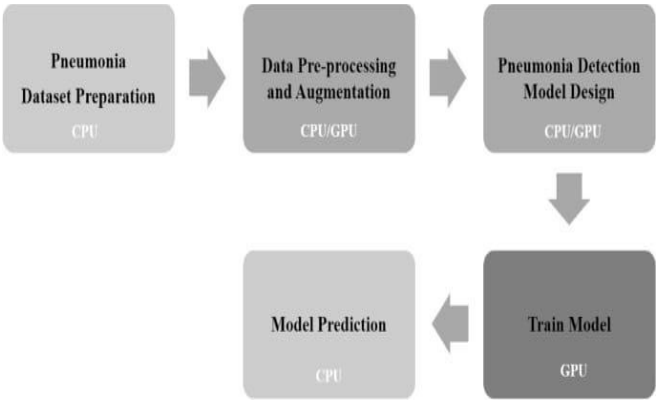


Fig 4.2UML Diagram

4.3. FLOWCHART

A flow diagram is an image of the separate steps of a method in sequent order. It's a generic tool that will be custom-made for a large sort of functions and may be used to describe varied processes, like a producing method, an administrative or service method, or a project set up.

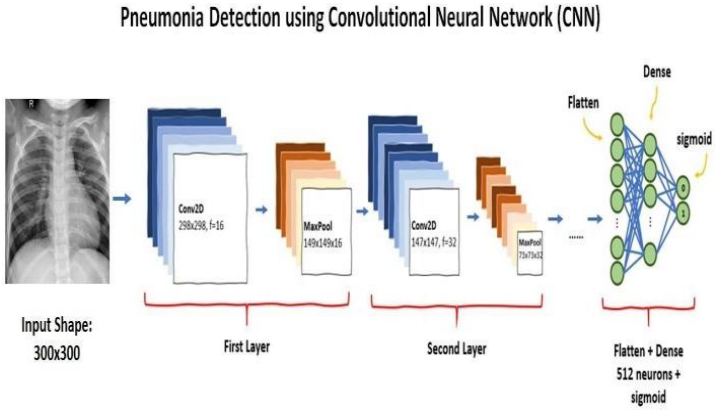
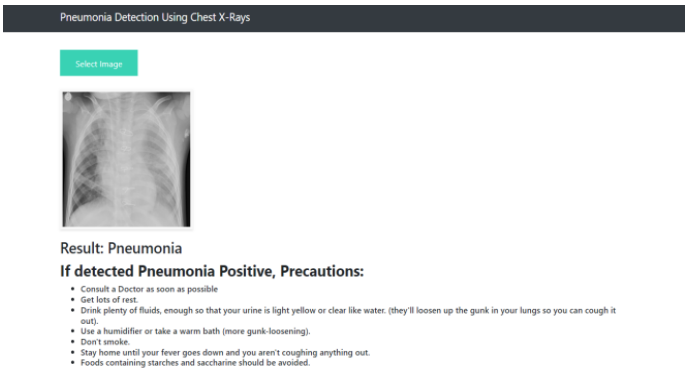


Fig 4.3 Flow Chart

5. RESULT



Here we successfully got the prediction for the pneumonia, when inserted pneumonia infected patient's chest X-ray. From our System, we tend to get an accuracy of eighty-six. 86% (~90%).

6. FUTURE SCOPE

In the future, we will additionally classify and observe its varieties that are infectious agents or microorganisms by adding a lot of datasets of respiratory disease varieties. Further, we are able to conjointly offer necessary steps and remedies to be taken if the patient is detected as pneumonia infected.

7. CONCLUSION

The main aim of the planned resolution is to implement the model having the best accuracy and bottom loss error for respiratory illness Detection. The rule can sight whether or not the given x-ray of a collection of lungs has pneumonia or not. On applying this CNN model with a pair of layers of Conv2D and MaxPooling2D.

8. REFERENCES

[1] Gaurav Labhane, Rutuja Pansare, Saumil Maheshwari, Anupam Shukla,Ritu Tiwari" Detection of Pediatric Pneumonia from Chest X-Ray Images using CNN and Transfer Learning" IEEE 2020

[2] Tatiana Gabruseva, Dmytro Poplavskiy, Alexandr Kalinin" Deep Learning for Automatic Pneumonia Detection" IEEE 2020

[3] V. Sirish Kaushik, Anand Nayyar,Gaurav Kataria and Rachna Jain"Pneumonia Detection Using Convolutional Neural Networks (CNNs)" ResearchGate 2020

[4] Sheikh Rafiul Islam, Santi P. Maity, Ajoy Kumar Ray and Mrinal Mandal "AutomaticDetection of Pneumonia on Compressed Sensing Images using Deep Learning" IEEE(CCECE) 2019

[5] Zebinjiang "Chest Xray pneumonia detection based on convolutional neural network"(ICBAIE) 2019