

Survey on Pneumonia detection using X-Rays

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Abstract— Pneumonia detection system is an application which provides a platform for users to detect whether the pneumonia is positive or negative. The main purpose of our project is its automation. It reduces the human efforts in detecting pneumonia. It is feasible for both doctor as well as for normal people also. User just have to upload the photo of x-ray and our application will detect pneumonia. User can see the report generated by this application and can forward it to doctor for confirmation. The record of the user are stored properly in the database.

Keywords: *Cross Platform application, Pneumonia detection system, consultation service, Report generation.*

I. INTRODUCTION

Pneumonia is an infection that swell the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty breathing. A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia.

Treatment depends on whether bacteria, viruses, or fungi are causing your pneumonia. If bacteria are causing your pneumonia, you usually are treated at home with oral antibiotics. Most people respond quickly to treatment. If your symptoms worsen you should see a doctor right away. If you have severe symptoms or underlying health problems, you may need to be treated in a hospital. It may take several weeks to recover from pneumonia.

When you visit your doctor to see if you have pneumonia, he'll ask about your symptoms. Then he may run a number of tests to get an idea of what's going on, including.

Listening to lungs, with a stethoscope, for a crackling or bubbling sound. Chest X-ray. Blood test to check white blood cell count. Sputum tests (using a microscope to look at the gunk you cough up). A pulse oximetry test, which measures the oxygen in your blood.

Pneumonia can range in seriousness from mild to life-threatening. It is most serious for infants, young children, people older than age 65, people with health problems or weakened immune systems. More than 1 million adults are hospitalized with pneumonia and around 50,000 die from the disease every year. Chest X-rays are recurrently the best available method for diagnosing this type of diseases.

Pneumonia is the leading cause of death among children in developing countries, including India. Who estimate the one in three newborn infant deaths is due to pneumonia. Finding ways to automate diagnostics we are going to develop an application that can detect pneumonia from chest X-ray. Here we are going to present a model that can automatically detect pneumonia from chest X-ray. The app will take x-ray image as an input and then predict the presence of pneumonia.

The main purpose of our project is its automation. It reduces the human efforts in detecting pneumonia. It is feasible for both doctor as well as for normal people also. Easy to handle and having much future scope likewise we can detect other diseases by this.

A. Objectives:

- To accurately detect pneumonia through this application.
- To reduce efforts of patient by providing doctor consultation after generating report through application.
- To automate the diagnosis process of pneumonia

II. LITERATURE SURVEY

“Radiologist Level Pneumonia Detection on Chest X-Rays with deep learning” Katie Shpanskaya and team work on a paper which was published on 25th November 2017. In this we found they develop an algorithm that can detect pneumonia from chest X-ray at a level exceeding practicing radiologist. So, we found that we can make a mobile app which would detect whether the patient is pneumonia positive or not.

“Computer-aided detection in chest radiography based on artificial intelligence” Chunli Qin and Demin Yao work together on 22nd August 2018. They had done the predication of diseases using image processing approach. That approach has a limitation, that it is good for desktop use only. Rather than it we can create a mobile application which can take an X-ray image as an input and by matching it with the datasets, we can detect the presence of pneumonia.

“Detection of pneumonia clouds in chest X-ray using image processing approach” Abhishek Sharma, Daniel Raju and Sutapa Ranjan they describe their views in a paper which was published on 23rd–25th November 2017

After reading this paper we found that this project requires at very high level of computer intelligence and Computer-aided detection for diseases prediction instead of doing prediction from datasets. After reading all the above mention papers we get to know that all the algorithms that have mention there have will have some limitations either the limitations of use or the flexibility of that project.

“Real-time survey on pneumonia detection system from Chandak Radiology Laboratory Dr. Suresh Chandak (Consultant Radiologist & Sonologist)”

We visited to the hospital on 23rd august 2019. He explained us about the pneumonia detection and its type. Then he told us that we can detect its type but not its stage. Type can be detected through the spots found in the x-ray but for stages there are different tests.

III. PROPOSED WORK

The purpose of our project is to automate the Pneumonia diagnosis process and reduce human efforts . The complete flow of the system and functional modules of the system are as follows:

A. Flow of the System:

There is separate login section for Doctor and Patient (user). Each section verifies the user and checks whether the user is authenticated user or not. Every new user needs to register first then only can use the system. After login each user will be redirect to their respective profiles where they have various tabs of their responsibilities.

The Patient will upload the image of the x-ray and the system will predict whether the patients report is Pneumonia positive or negative. After thereport is generated patient can forward that report to the doctor. Patient can also view their profile and generated report.

Doctor can verify the report sent by the patient and give confirmation whether the reports are positive or negative.

Admin will work as an intermediary in between Doctor and Patient. Admin can view details of both Patient and Doctor. And will check whether they are authenticated user or not. After performing the task both Doctor and Patient can logout from their profile.

From the below given diagram we can see how the system will work . In the system architecture we have User , Doctor , Server , Firebase , Admin. Connectivity between each of them is shown in the diagram.

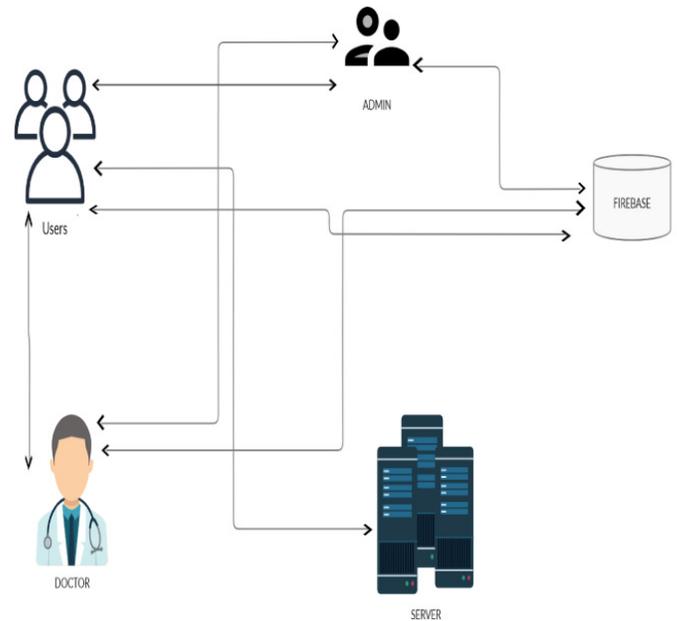


Fig. 3.1 System Architecture for Pneumonia Detection

B. Functional Module:

The whole system is divided into four modules. They are User module, Doctor module, Admin module, Prediction module.

1) User module:

There will be separate registration page for patients. After the registration, patient can login to their profile. The patient will upload the image of the x-ray and then the report is generated in which it will show whether the reports are pneumonia positive or negative. They can send the generated reports to the doctor for confirmation.

2) Doctor module:

There will be separate registration page for doctor. After the registration, doctor can login to their profile. Doctor can verify the report sent by the patient and give confirmation whether the reports are positive or negative.

3) Admin module:

The Admin can directly login without any registration. There will be separate login page for the Admin Login. Admin will be able to add or remove unauthorized users. There will be separate registration form for patient and the doctor. After login they can directly jump on their profile.

4) Prediction module:

In this module the uploaded image get processed.

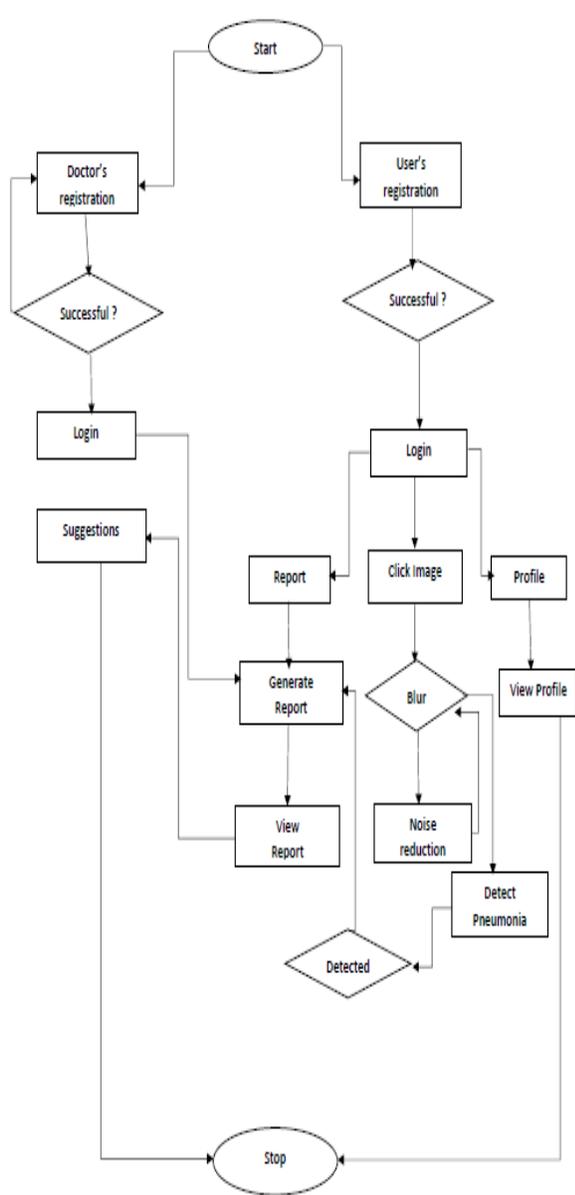


Fig. 3.2 Flowchart for Pneumonia Detection

IV. CONCLUSION

This survey helps in developing the system for detecting the Pneumonia from chest x-ray. As we see in the previous work there are some kinds of limitations such as, they had done the predication of diseases using image processing approach. That approach has a limitation, that it is good for desktop use only. They develop an algorithm that can detect pneumonia from chest X-ray at a level exceeding practicing radiologist. So, this survey helps us to develop a mobile application through which the user can able to see the detection of Pneumonia with the help of chest x-ray. Also, the user will get the suggestions from doctor regarding the situation.

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