

Good day! My name is Surya Karthik Cirium, and I will be providing you with information on how we can detect pneumonia using an xray, as well as a short discussion on radiology!

Pneumonia can range in seriousness from mild to life-threatening. It can occur in young and healthy people, but it is more dangerous for older adults above 65 years, infants, patients with other diseases, and those with low immune systems. Therefore it is very important to be able to detect with no errors made. One sure fire way of detecting pneumonia is by taking a chest xray. An xray will help detect pneumonia as well as identify it's location. However, it can not tell you what kind of germ is causing the pneumonia. On an average, xrays cost about Rs 250- Rs 2000 in India. As they are cheap, they are probably the best way to confirm any anomaly with the body. The doctor will look for white spots in the lungs (called infiltrates) that identify an infection. It also helps in detecting any complications which might arise such as abscesses. Pneumonia may also be treated using a procedure known as Thoratcentesis, which utilises an xray almost regularly. In the end, xrays and body imaging are just small parts of a larger medical discipline known as radiology.

Radiology is the medical discipline that uses medical imaging to diagnose and treat diseases within the bodies of animals and humans. A variety of imaging techniques such as X-ray radiography, ultrasound, and computed tomography are used to diagnose or treat diseases. Radiographs are produced by transmitting X-rays through a patient. The X-rays are projected through the body onto a detector; an image is formed based on which rays pass through (and are detected) versus those that are absorbed or scattered in the patient (and thus are not detected). The basic technique to analyze the images produced is optical density evaluation. It is then described that a region has a different optical density, e.g. a cancer metastasis to bone can cause radiolucency. The development of this is the digital radiological subtraction. It consists in overlapping two radiographs of the same examined region and subtracting the optical densities. The advantage of this technique is the precise determination of the dynamics of density changes and the place of their occurrence. A simple experiment to understand radiology is as follows :-

1. Take a bowl (empty) and take a mug filled with water.
2. Hold the bowl above a table and take the mug and splash the water from it all over the place with the bowl.
3. You will notice that (upon ignoring the few drops of water sticking to the bowl from surface tension) the water will fall everywhere else except the area covered by the bowl.
4. This creates a shape on the table which is easily

identifiable as a bowl.

5. Now, imagine the bowl is your bone, and the water are xrays.

6. Easily enough, an idea of radiology is developed, though somewhat basic, it suffices.

With those basic discussions on radiology aswell as xrays being used to treat pneumonia, I now pass the baton to Kamran, who will provide you with the meat of our topic ; Deep Learning and using it to prevent Pneumonia.