IIT-Palakkad develops ultrasound for COVID-19 screening

- The IIT, Palakkad, has developed an automated lung ultrasound (LUS) for COVID-19 screening and monitoring through cloud-based image analysis and scoring system.
- The app, the first of its kind in India, is now available for clinicians to perform automated analysis by just uploading the ultrasound video.
- Motivated by the promising results that showed the relevance and importance of LUS in COVID-19 patients, the IIT team conducted LUS analysis of normal, viral, and bacterial infected lungs, using image processing and neural networks and developed an automated LUS analysis tool.
- Following a simple protocol of LUS, acquires the lung images and transfers the images to the cloud (pulseecho.in/alus/). The images are analysed over the cloud and scores are assigned according to certain criteria either for the type of infection or its severity.
- He says the methodology will be extremely useful in time-critical COVID-19 working conditions where clinicians have time limitations in manually evaluating ultrasound videos of all patients.
- According to Dr. Panicker, the approach is not only restricted to COVID-19 detection but also to identifying other lung infections such as pulmonary oedema, pulmonary embolism, pneumonia, pneumothorax, COPD or asthma with the availability of clinical data.
- Also, early chest computerised tomography (CT) has been recommended for screening suspected COVID-19 patients.
- However, the high contagiousness of COVID-19 and the risk of transporting unstable patients make chest CT a limited option for those who have contracted the disease.
- LUS has the added advantage of ease of use at point-of-care (portability), repeatability, absence of radiation exposure, and low cost.
- In the past few weeks, he says LUS has been proposed as the single imaging-based screening and monitoring approach for the safety of healthcare practitioners.
- However, LUS is not very commonly adopted in India and ultrasound, by nature itself, requires specific experience and skill.
- Dr. Prasad says the uploaded images are classified into healthy lung, viral infection, and bacterial infection. But in the case of severity of infection, the images have been classified into levels of increasing severity such as normal lung characterised by A lines and healthy pleura, slightly infectious lung with A + B lines, infectious lung with only B lines or heavy B patch, and serious lung infection characterised by lung consolidations and air bronchograms.
- Currently, the classification of infection type has an accuracy, sensitivity and specificity of 96%, 95% and 97% respectively, whereas the severity classification has accuracy, sensitivity and specificity of 97 %, 92% and 98% respectively.