

Automatic detection of diagnosis information in lung ultrasonography using artificial intelligence

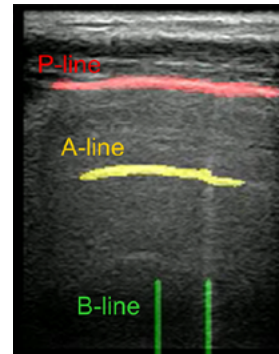
UCHIDA Takeyoshi, TANAKA Yukimi

Lung diagnostics via ultrasonography, known as lung ultrasonography (LUS), is useful for diagnosing lung lesions in conditions such as pneumothorax and pneumonia. LUS is a special diagnosis tool that uses the movement of pleura and artifacts derived from pleura to diagnose lung lesions. Use of this tool has led to a chronic shortage of skilled clinical practitioners who can correctly interpret diagnosis information in LUS videos, thereby hindering widespread use of LUS.

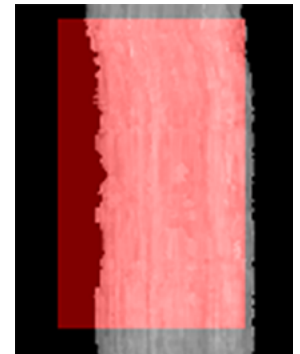
In order to support and educate inexperienced clinicians, we studied artificial intelligence (AI) systems which can be used to detect diagnosis information in LUS and solve problems associated with chronic shortages of skilled practitioners. We successfully developed an AI system which automatically detects diagnosis information such as the P-line (position of pleura), A-line (multiple reflections between ultrasound probe and pleura), and B-line (diagnosis information of pneumonia). In addition, conversion of lung sliding (pneumothorax diagnosis information) videos into two-dimensional data has successfully enabled automatic, accurate, and rapid lung sliding detection by our AI system. Inexperienced clinicians can perform LUS examinations while using diagnosis information from our AI system as a reference. Our AI system can help to mitigate the shortage of LUS medical experts and can also be applied to educational purposes.

Reference: T. Uchida et al., *Heliyon* **10**, e34700, 2024
<https://doi.org/10.1016/j.heliyon.2024.e34700>

Automatic detection of diagnosis information in lung sonography by our developed AI



Automatic detection of P-line, A-line, B-line by AI system



Automatic detection of lung sliding by AI system