



**Associate professor Marek Bundzel, PhD.**

**Technical University in Košice, Slovakia**

**Department of Cybernetics and Artificial Intelligence**

My professional life revolved around AI technologies since the 90's, especially around ANNs, Deep Learning, Evolutionary Optimization. My main focus is now on computer vision, biomedical and geographical (archaeological) data analysis. I was fortunate to work with very interesting people at very interesting places - from the comfort of Tokyo to the jungles of Guatemala. My recent activities were related to the development of a new rehabilitation device, to the detection of pathologies in lung ultrasound, to the analysis of aerial Lidar data from northern Guatemala and to automatic translation of Maya glyphs.

I was a member of two archaeological expeditions into the rain forests of northern Peten in Guatemala, in 2021 and 2023.

[marek.bundzel@tuke.sk](mailto:marek.bundzel@tuke.sk)

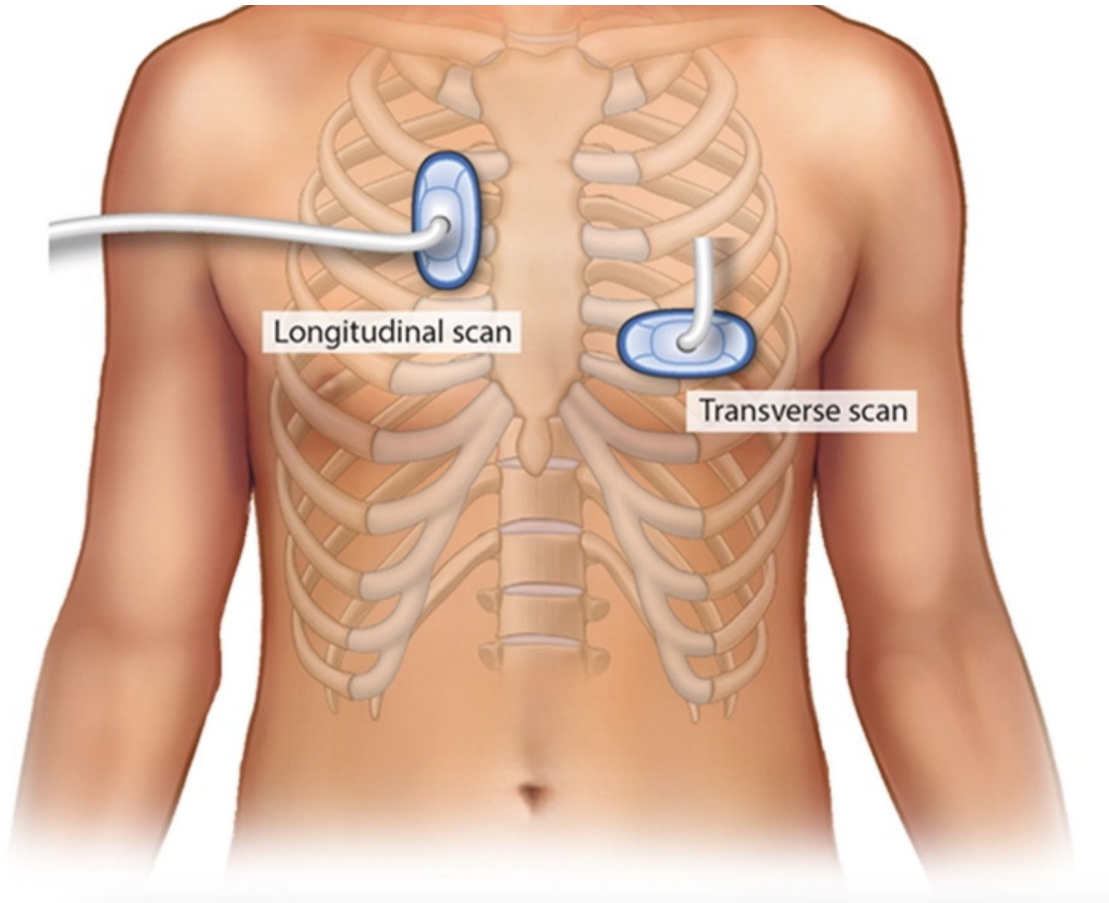


**DCAI**

Department of Cybernetics  
and Artificial Intelligence

# APVV 20-24-0454 -SUPPORTING THE MEDICAL DIAGNOSTIC PROCESS THROUGH A SOFTWARE APPLICATION USING ARTIFICIAL INTELLIGENCE MODELS

- USG data processing with deep learning.
- Continuation of APVV project APVV-20-0232 for basic research.
- Partners: TU Košice, Thoracic Surgery Clinic Martin, GlobalLogic Košice

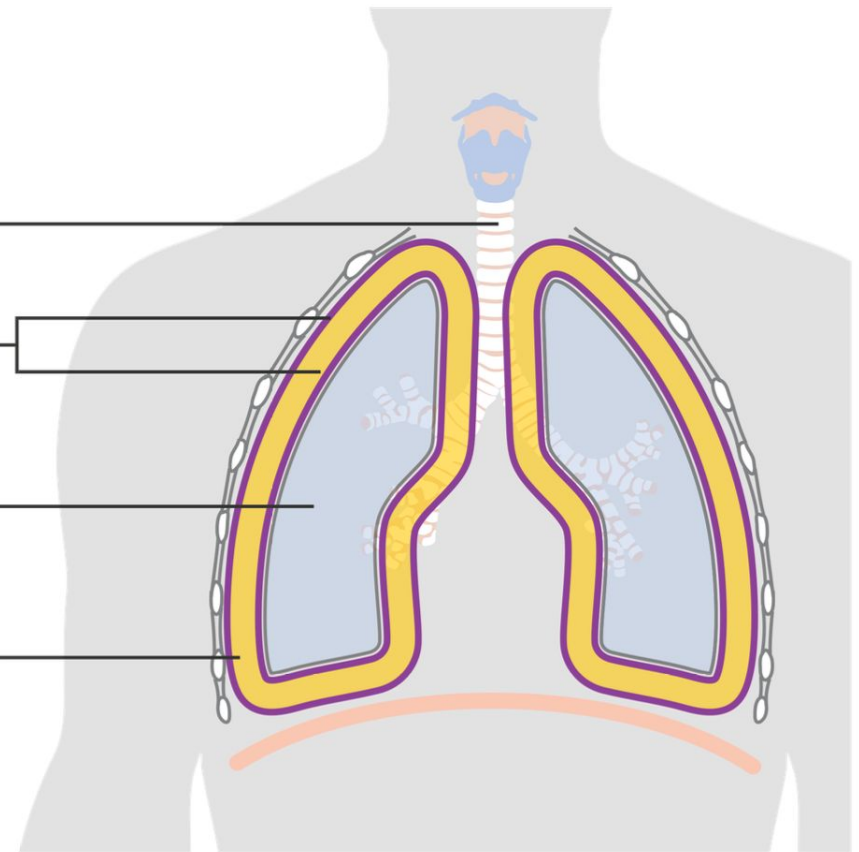


Trachea  
(windpipe)

Pleura  
(lung lining)

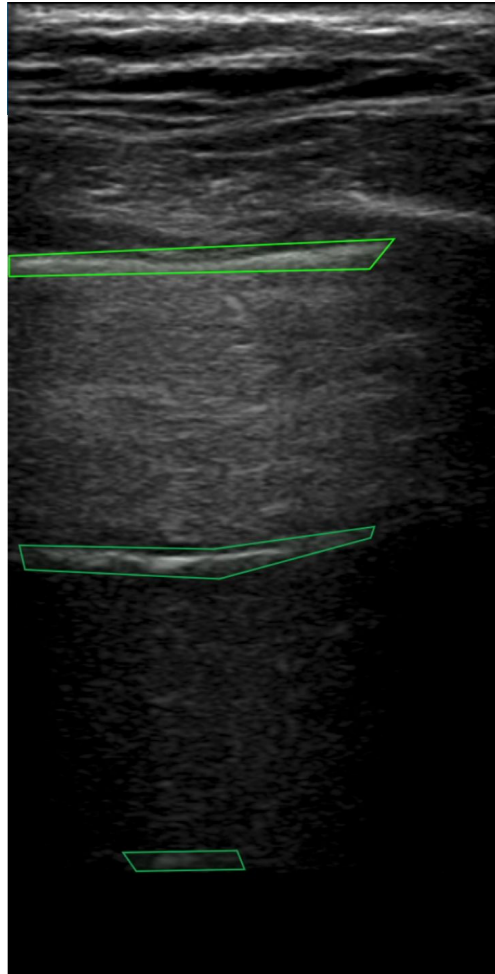
Lung

Pleural space

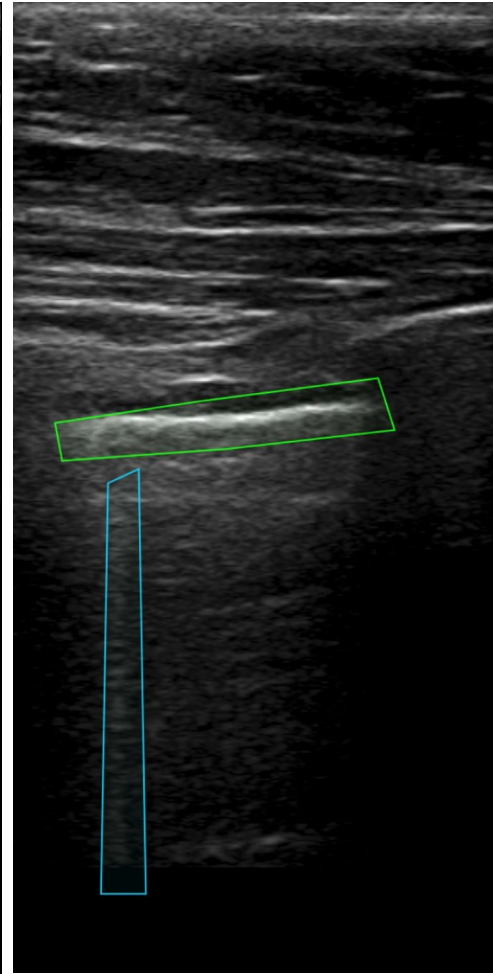


# LUS signs - static

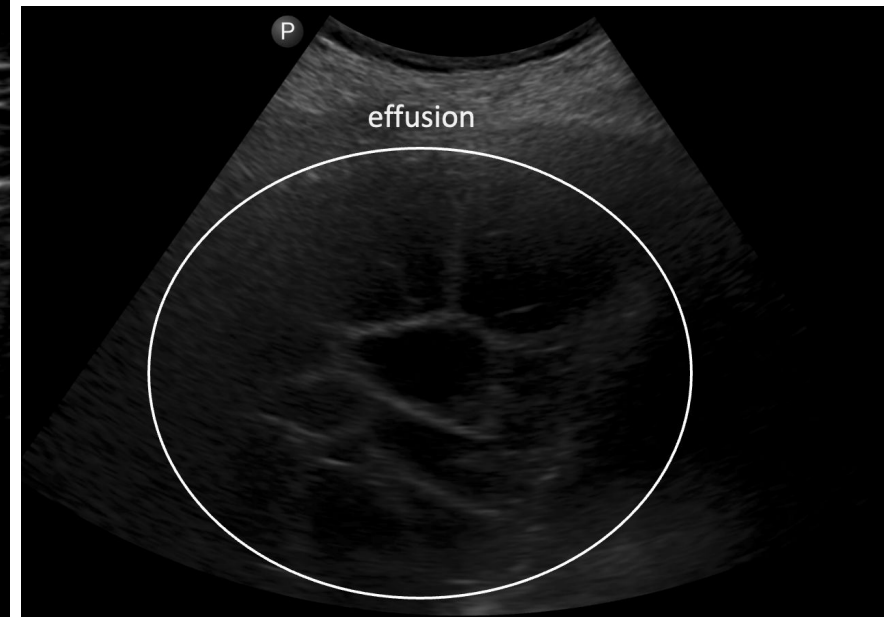
- sign is possible to spot on a single frame.



pleura + a lines



pleura + b lines



pleural effusion

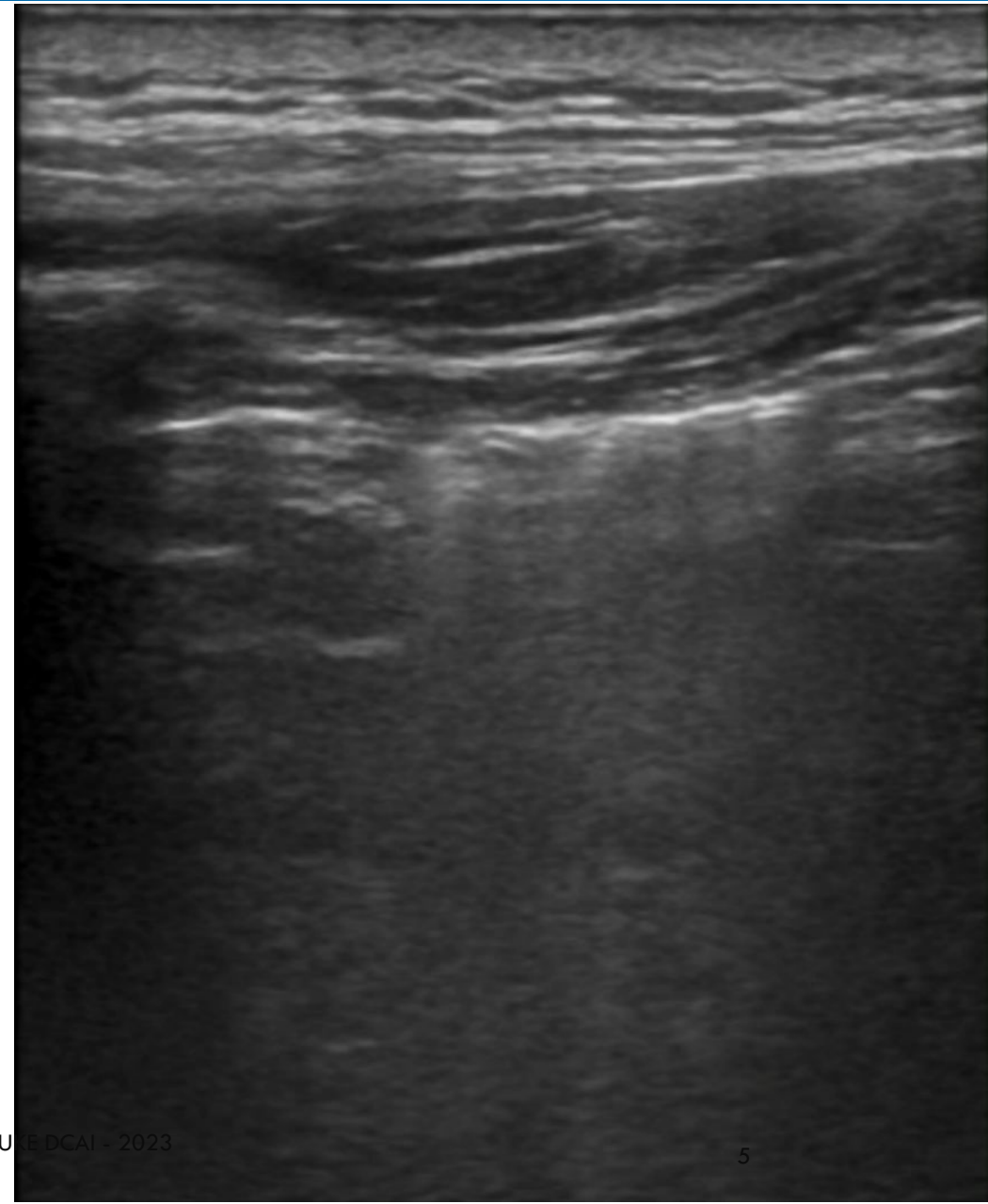
# LUS SIGNS – TEMPORAL

## Lung sliding:

- refers to the movement of the visceral pleura (lung sliding present, lung sliding absent)
- spotted under the pleura line.
- visible during breathing (inhalation, exhalation).

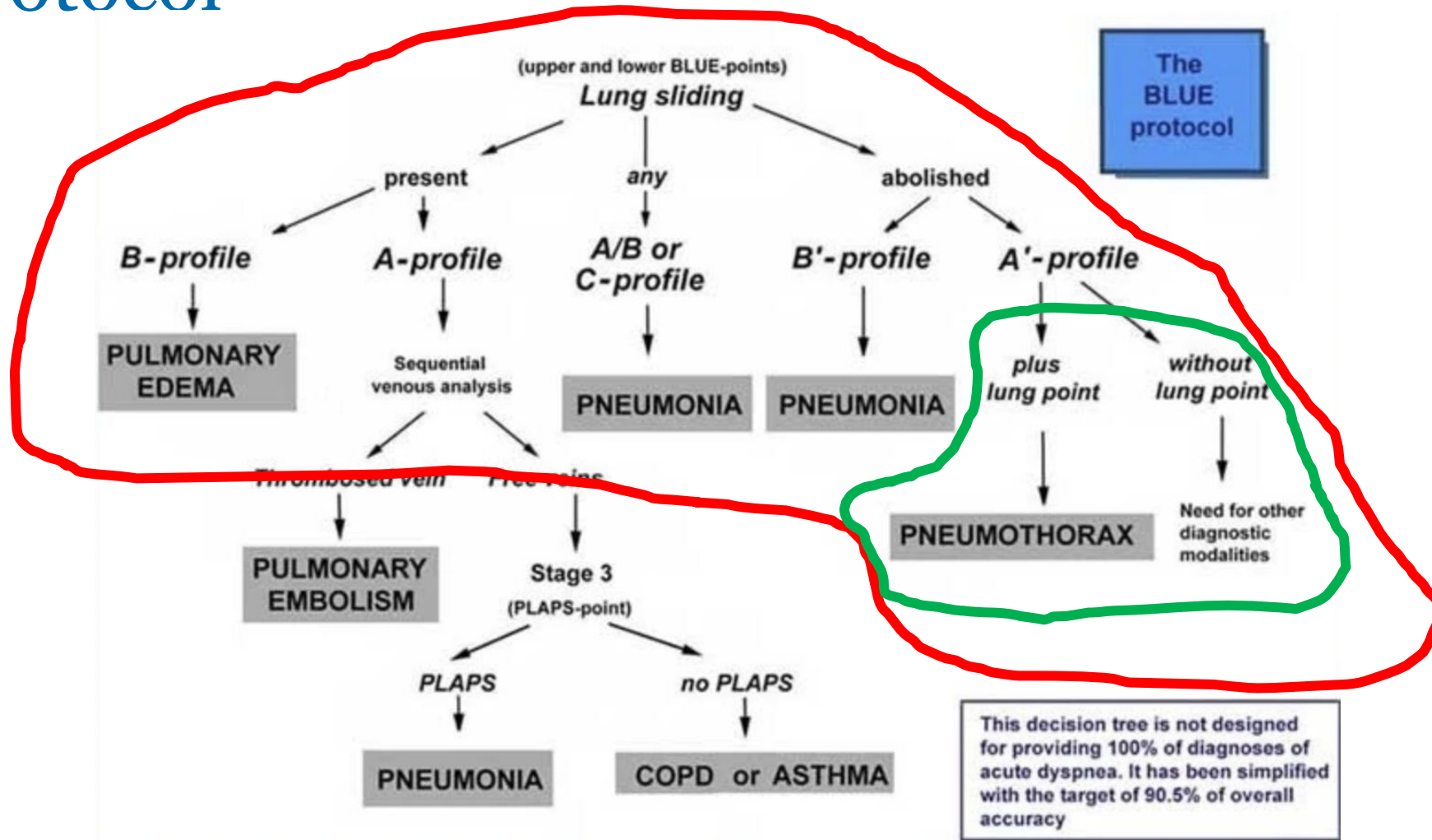
## Lung point:

- the place where the absence and presence of lung sliding meet.
- critical in diagnosing pneumothorax.
- not evaluable from a single frame.
- can be identified on m-mode imaging

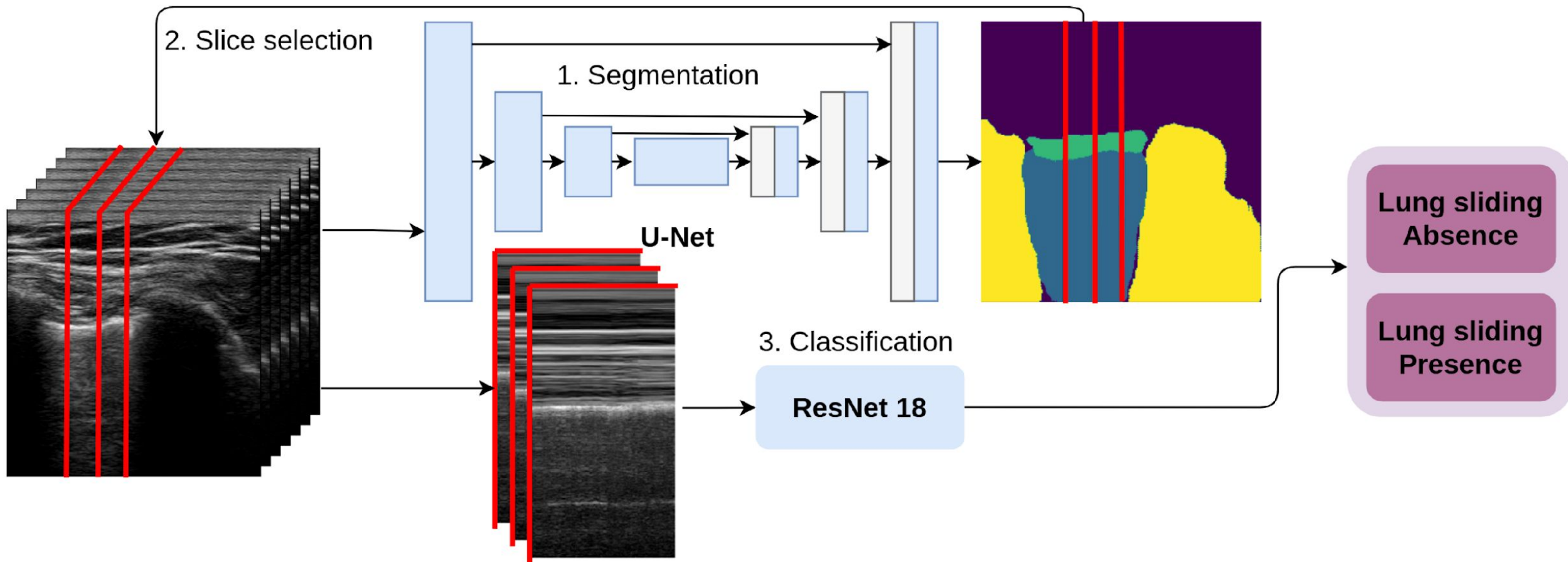




# Blue protocol



# LUNG SLIDING, ACC.~ 80%



THANK YOU 🥰