THORAXSCAN · STUDENT GUIDE

Reading finding heatmaps

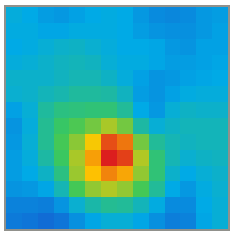
What ThoraxScan's finding heatmaps show, where you will find them, and how to use them responsibly while learning chest X-ray interpretation.



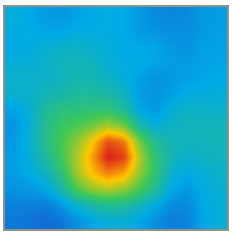
Blue: little or no evidence for the finding — Red: most evidence for the finding

> **Key idea:** each heatmap shows where the model found the evidence for *one* finding. It points you to where to look; **it does not outline a lesion or confirm disease.** It is a learning aid, not a diagnosis, and it never replaces your own image review.

1. What the map is



The 196 values



As displayed (smoothed)

1. **One map per finding.** The model's last feature map covers the X-ray as a 7×7 grid; each finding's map is smoothed to 14×14, so it has 196 values. The example is the sample case's Cardiomegaly map, centred on the heart.
2. **Class activation map (CAM).** The model scores a finding by averaging that grid with the finding's own weights. Applying the same weights cell by cell shows which parts of the image raised the score.
3. **Scaled per finding.** Negative evidence is set to zero and each map is scaled from 0 to 1. Warmer (red) means more evidence for that finding *relative to the rest of this image*.
4. **Smoothed for display.** ThoraxScan blends the colors between cell centers so the overlay reads as a smooth heatmap. The data underneath is still those 196 values; the smoothing adds no detail.

What the colors do and do not mean

On the map	Meaning
Red / warmer areas	Where the model found most of its evidence for the selected finding *in this image*.
Blue / cooler areas	Little or no evidence for that finding. This does **not** mean the area is normal.
Comparing two images or two findings	Not meaningful. Each map is scaled on its own, so a red area is not "stronger" than red on another map.

> **Read it with the probability.** A heatmap shows *where* the evidence is, not *how likely* the finding is. A finding with a low probability can still have a bright map, because every map is scaled to its own peak. Heatmap values are not

probabilities.

2. Where you will see it

Attention maps page

Opened from the main menu. It explains the method and shows a sample chest X-ray with the model's real heatmaps for its likely findings. Switch findings to see how each map moves.

Learning Mode (ungraded practice)

1. Choose or drop a local chest X-ray (JPEG or PNG, up to 6 MiB).
2. Select **Analyze**. The model runs in your browser, and your image stays in browser memory.
3. The analysis result shows the findings and a **Finding heatmap**. Choose a likely or possible finding under the image to see its map.

Tip: write down your own observations *before* you select Analyze, so you can compare them honestly afterwards.

Assigned activities

1. Review the case X-ray and submit your final evaluation.
2. AI feedback is **locked until you submit**. After submission it shows "Analysis pending" until the analysis runs and is released.
3. Once released, the **AI feedback** panel shows the findings and the **Finding heatmap**. If analysis fails, select **Retry analysis**.
4. Your professor's evaluation, grade and comments remain the assessment. Use the map for reflection.

Professor submission review

Professors see the **Finding heatmap** next to the case X-ray while reviewing student submissions, with every finding available to choose. They can use it to discuss where students looked for a finding. Analyses saved before heatmaps were added still show the older **Relative global attention** map.

Overlay controls

Control	Use it to
Finding	Choose which finding's heatmap to show. Likely findings come first, then possible ones.
Show heatmap overlay	Toggle the heatmap off to see the original X-ray unobstructed.
Overlay opacity (default 55%)	Fade the colors so the anatomy underneath stays visible.
Method and 14×14 data	Expand to read the exact 196 normalized values for the selected finding, by row and column.

> **No map shown?** If no finding met its threshold, there is no finding to map. If you see "*This model release does not export attention data,*" the active model version does not produce heatmaps. The prediction results are still

available either way.

3. How to read it

1. Observe	2. Locate	3. Compare	4. Qualify
Describe what is visible on the X-ray yourself.	For each finding, state where its map is warmest, using anatomical location words.	Check the model's focus against your own observations.	Note agreement or mismatch, and don't treat the map as proof.

Do	Avoid
Use the map as one visual cue alongside the original image, the probability and your course knowledge.	Calling a red area a confirmed abnormality.
Describe location carefully, e.g. "the Pleural Effusion map is warmest over the left costophrenic angle."	Assuming blue areas are disease-free.
Treat a mismatch as a reason to re-check the image.	Reading the map as an outline of the lesion's size or edges.
Keep reviewing the whole image, including cool areas.	Comparing color intensity between different images or findings.

Discussion prompts

- For each likely finding, which anatomy or region does its map highlight?
- Does that region match where you would expect that finding, and can you see it on the X-ray?
- What did you observe outside the highlighted area?
- Where does your interpretation differ from the model's evidence, and what should you re-check?

4. Use limits

ThoraxScan is an assistive learning tool for Radiologic Technology students. Its AI output, including finding heatmaps, is for educational use only. It is not a diagnosis and must not guide clinical decisions or patient care. Follow your instructor's directions and course-approved interpretation methods.

> **Quick reference.** One map per finding · 14×14 grid, 196 values · class activation map · scaled per finding · red = more, blue = less evidence *in this image* · smoothed for display · read with the probability · not a lesion outline.

LEARN DIFFERENT. LIVE DIFFERENT.