

XCoOp: Supplementary Material

Table A1. Examples of hand-crafted clinical concept-driven prompts.

| Disease category (dataset) | Clinical prompt examples |
|---|--|
| normal/benign/non-neoplastic... (Derm7pt, SkinCon) | a photo of {cls_name}, benign and regular. a photo of {cls_name}, it is a benign tumour. a photo of {cls_name}, it is not neoplastic. ... |
| Melanoma (Derm7pt) | a photo of melanoma, atypical pigment network, irregular dots and globules, blue-whitish veil, vascular structures, etc. |
| Malignant (SkinCon) | a photo of malignant tumor, with plaque, crust, nodule, erosion, scar, friable, brown (hyperpigmentation), erythema, etc. |
| Normal (Pneumonia, IU X-ray) | a photo of normal lung, with clear lung fields, normal mediastinal silhouette, etc. |
| Pneumonia (Pneumonia) | a photo of pneumonia, with alveolar consolidation, air bronchograms, pleural effusion, obscured cardiac or diaphragmatic borders, etc. |
| Cardiomegaly (IU X-ray) | a photo of cardiomegaly, with enlarged cardiac silhouette, prominent pulmonary vasculature, increased cardiothoracic ratio, etc. |
| Opacity (IU X-ray) | a photo of opacity, with pleural-based opacity, lobar, segmental, or subsegmental opacities, peripheral ground-glass opacities, etc. |

🗣️ Q: What are the useful visual concepts to distinguish a melanoma in an image?

🗣️ A: There are several visual concepts that can be useful in distinguishing a melanoma in an image:

1. **Asymmetry:** Melanomas tend to have an irregular shape, with one half of the mole not matching the other half.
2. **Border:** The border of a melanoma may be uneven or notched, with a jagged or blurry edge.
3. **Color:** Melanomas can have a variety of colors, including shades of brown, black, red, pink, or white.
4. **Diameter:** Melanomas are typically larger than a pencil eraser (6mm), but they can be smaller.
5. **Evolution:** Any changes in the size, shape, color, or elevation of a mole over time could be a sign of melanoma.

Fig. A1. The sample output of GPT4 for melanoma, which is completely consistent with the widely accepted *ABCDE* rule. It is noteworthy that we adopt the concepts from *7-point checklist* for melanoma provided in *Derm7pt* dataset in our method.

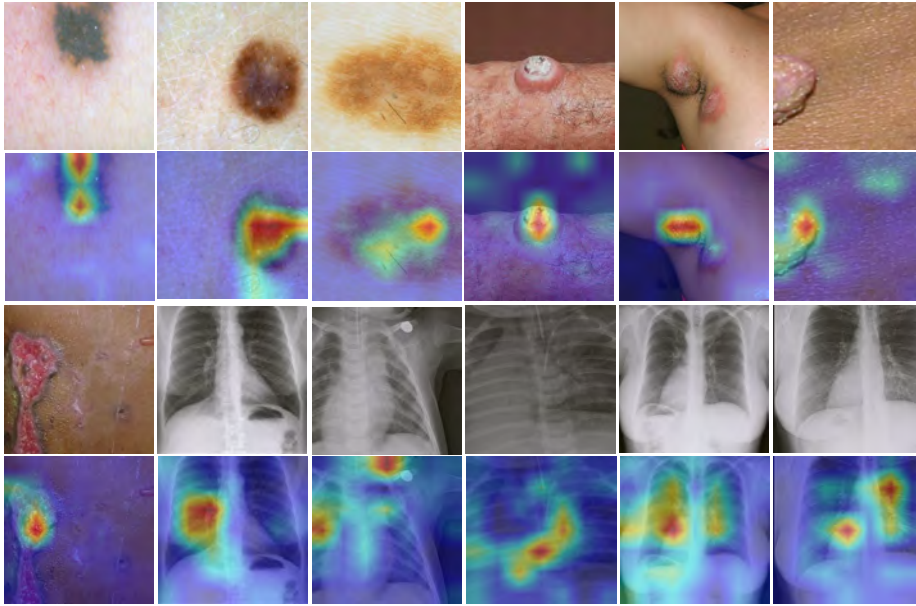


Fig. A2. More image-prompt similarity visualization results.

Table A2. Details about the used datasets and implementations.

| Dataset | Concept labels | Categories & Settings | Hyperparameters |
|-----------|----------------|---|------------------|
| Derm7pt | ✓ | Classes include <i>normal</i> and <i>melanoma</i> . Only the dermoscopic images are considered. The melanoma scores and a threshold $thres = 1$ are used to categorize the images. | $\lambda' = 0.2$ |
| SkinCon | ✓ | Classes include <i>non-neoplastic</i> , <i>benign</i> , and <i>malignant</i> . Only the F17k part is considered. The dataset is split into training set, validation set and test set according to the proportion of 70%, 15% and 15%, respectively. | $\lambda' = 0.1$ |
| Pneumonia | ✗ | Classes include <i>normal</i> and <i>pneumonia</i> . We adopt the official dataset splitting. | $\lambda' = 0.2$ |
| IU X-ray | ✗ | Classes include <i>normal</i> , <i>cardiomegaly</i> , and <i>lung opacity</i> . We filter out the lateral chest x-ray, leaving only frontal images. We further filter out diseases and leave the three main classes. | $\lambda' = 0.2$ |