LaSO: Label-Set Operations networks for multi-label few-shot learning Supplementary Material

Here we present some more visual examples of LaSO networks results. We apply the LaSO networks trained on 64 MS-COCO categories to images from MS-COCO validation set (unseen during training). As in figure 4 of the paper, we use retrieval to visualize the synthesized feature vectors as the image with the closest feature vector in the validation set. We demonstrate results obtained using the learned LaSO operation, the analytic LaSO variant, and also (for reference) retrieval using the inputs to the operation, self excluded. We demonstrate example results for using LaSO to perform the label set intersection $A \cap B$ (Figure 1), union $A \cup B$ (Figure 2), subtraction $A \setminus B$ (Figure 3), and hybrid $A \setminus (B \cap C)$ (Figure 4) operations.

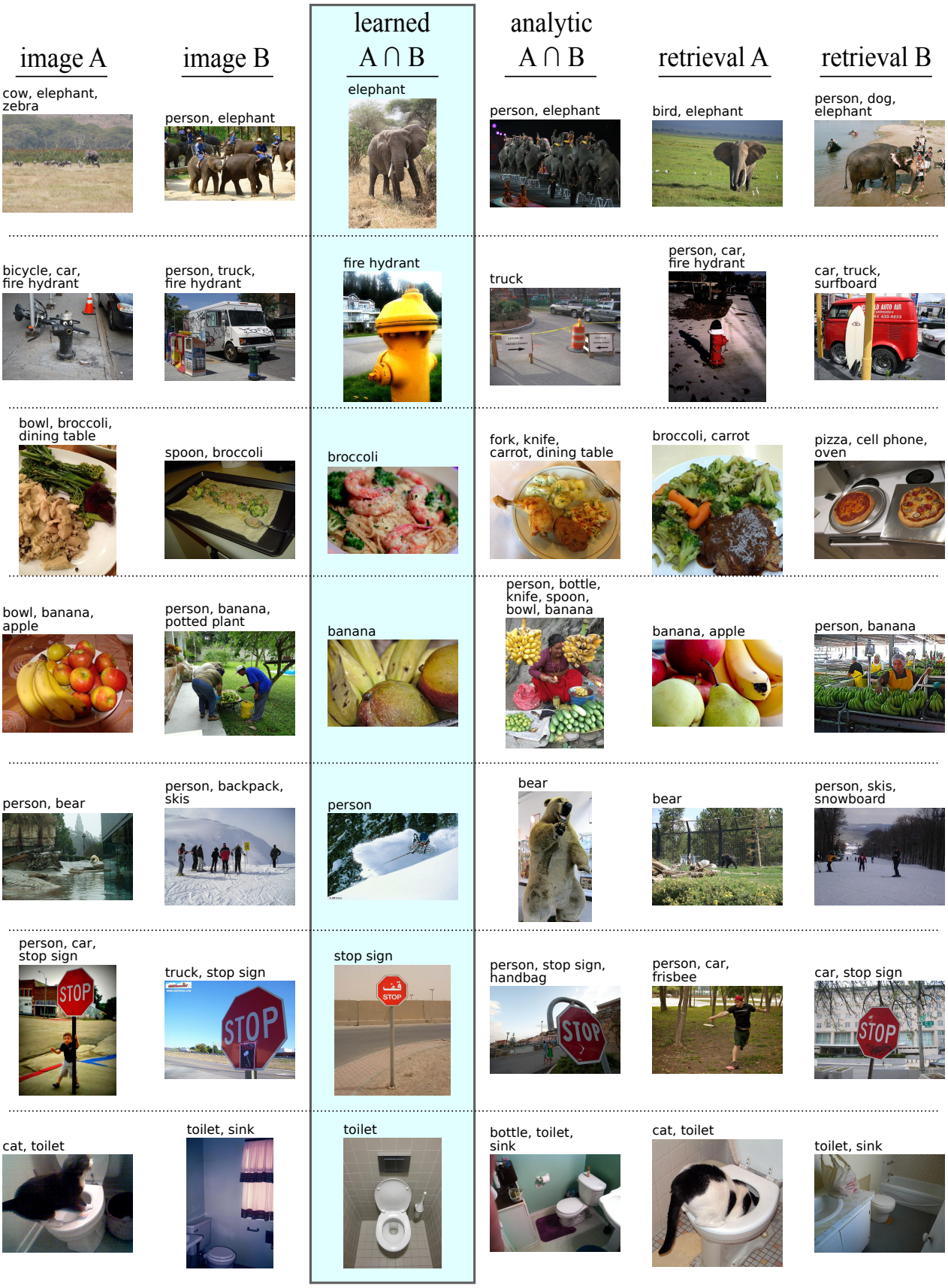

Figure 1. Examples of label set intersection $A \cap B$ operation results using LaSO and alternatives. Learned LaSO result is framed in cyan box. True labels of the images are shown above them. 'Retrieval A' and 'retrieval B' are provided for reference and depict the nearest neighbors to the corresponding operation input images in feature space.

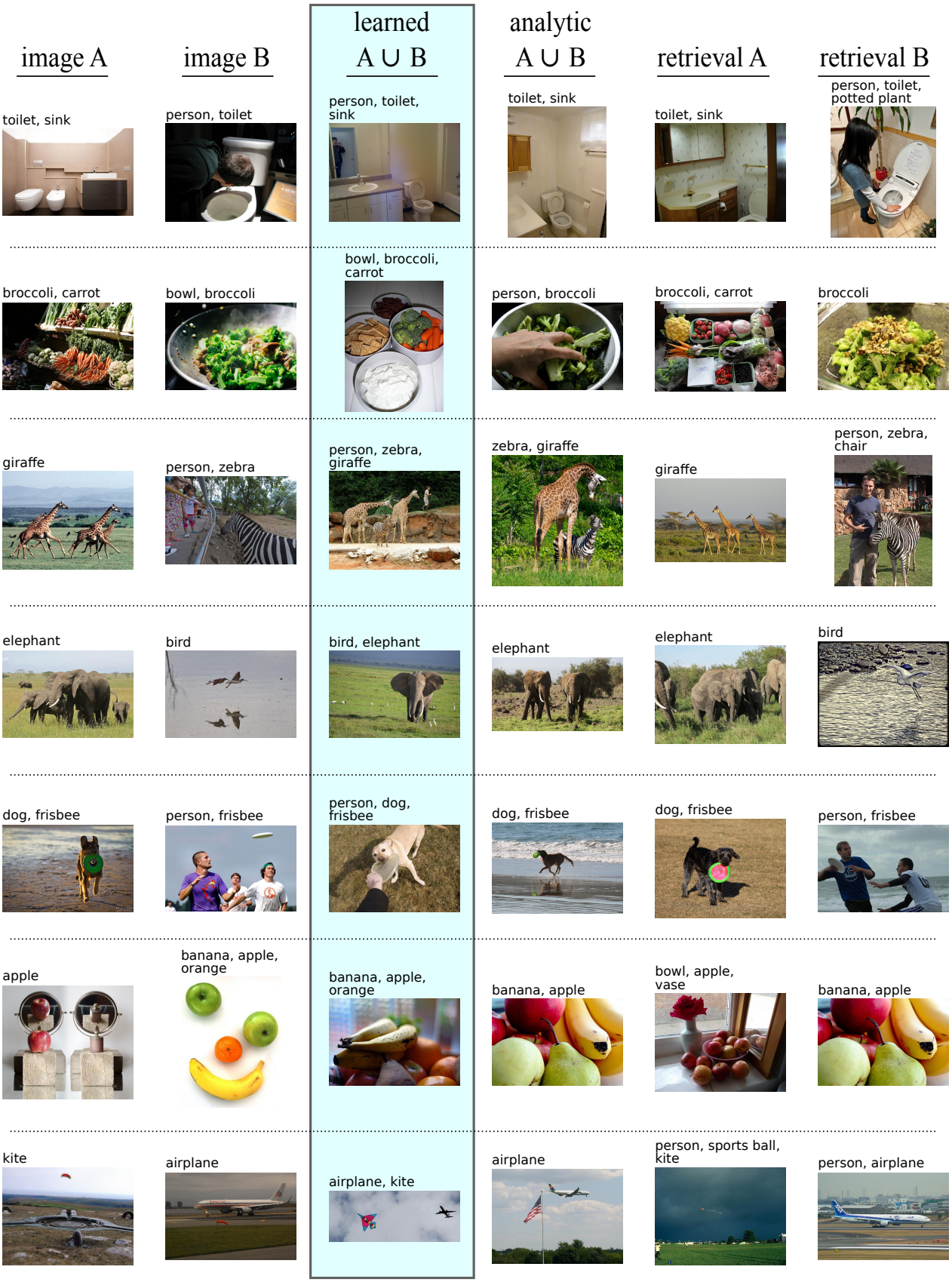

Figure 2. Examples of label set union $A \cup B$ operation results using LaSO and alternatives. Learned LaSO result is framed in cyan box. True labels of the images are shown above them. 'Retrieval A' and 'retrieval B' are provided for reference and depict the nearest neighbors to the corresponding operation input images in feature space.

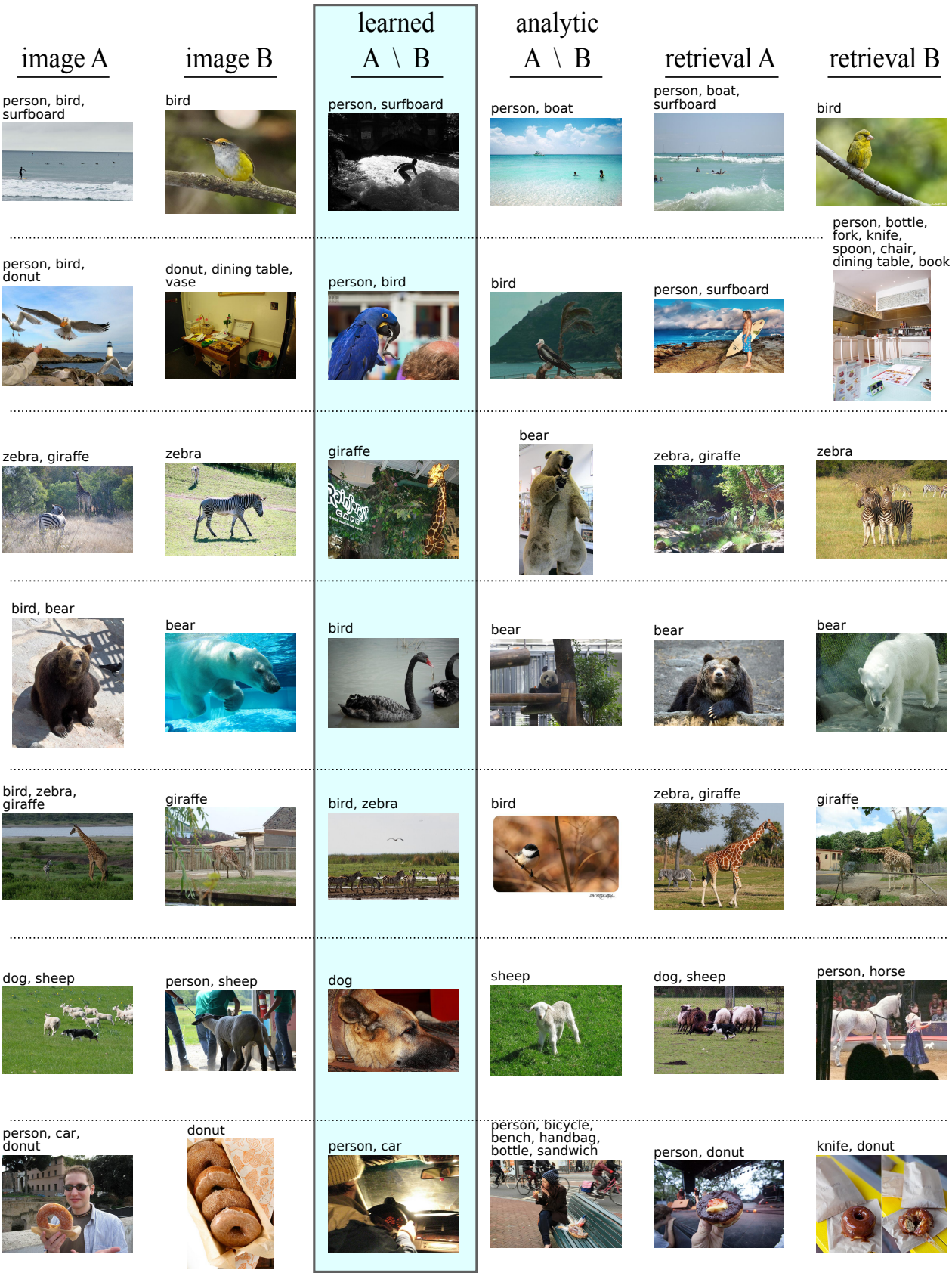

Figure 3. Examples of label set subtraction $A \setminus B$ operation results using LaSO and alternatives. Learned LaSO result is framed in cyan box. True labels of the images are shown above them. 'Retrieval A' and 'retrieval B' are provided for reference and depict the nearest neighbors to the corresponding operation input images in feature space.

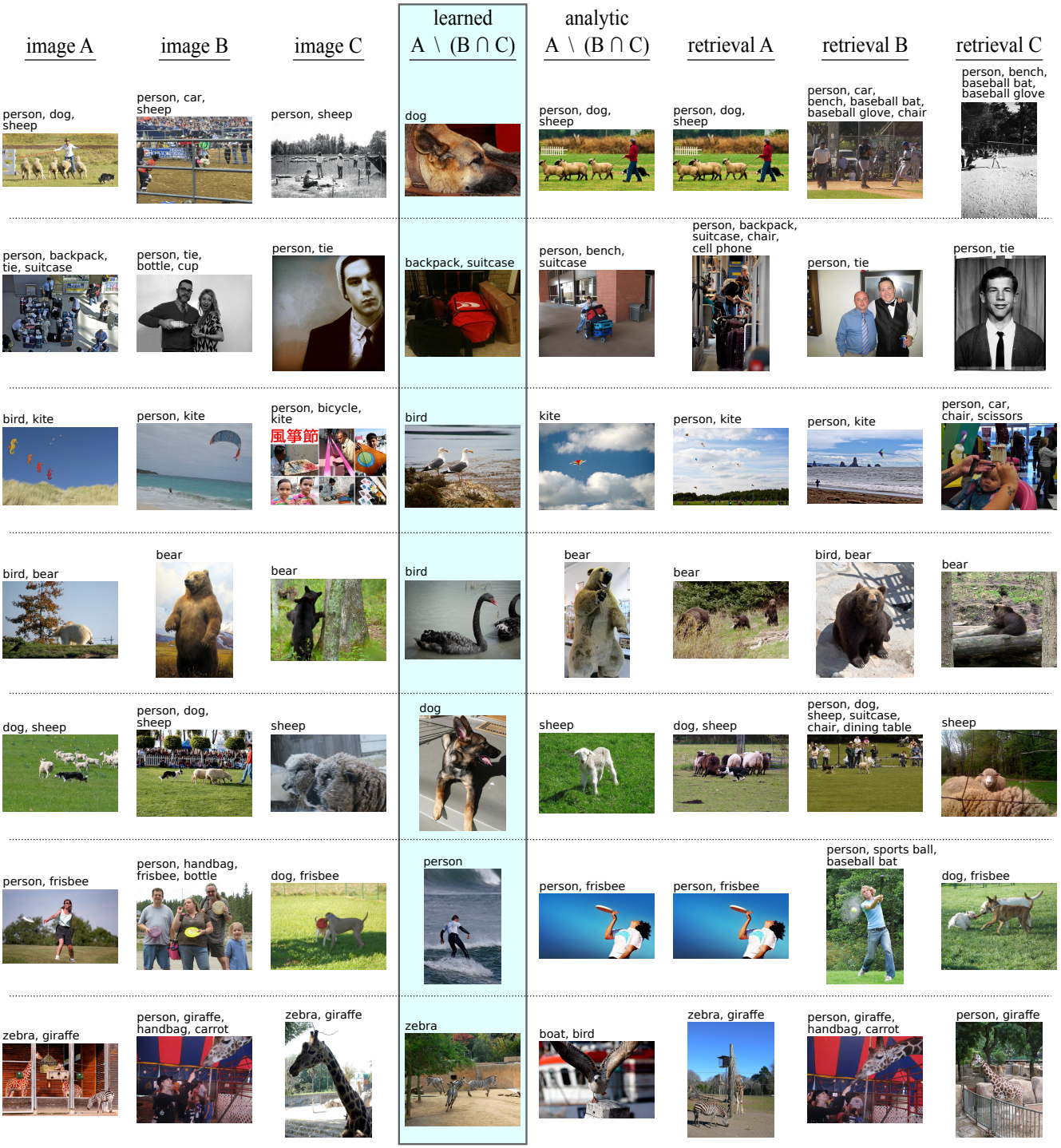

Figure 4. Examples of label set hybrid $A \setminus (B \cap C)$ operation results using LaSO and alternatives. Learned LaSO result is framed in cyan box. True labels of the images are shown above them. 'Retrieval A', 'retrieval B', and 'retrieval C' are provided for reference and depict the nearest neighbors to the corresponding operation input images in feature space.