# Supplementary Material: Modeling Inter and Intra-Class Relations in the Triplet Loss for Zero-Shot Learning

## A. Illustrative examples for the flexible semantic margin

We provide illustrative examples of the closest and farthest classes from a few reference classes from the CUB dataset, namely *Laysan Albatross*, *Least Auklet* (both present in Figure 1 of the main paper), *Red-legged Kittiwake*, *Vesper Sparrow* and *Artic Tern* in figures 4, 5, 6, 7 and 8.

The distances are computed using the process described in Section 3.2 of the main paper. They are computed using all 200 classes from CUB, contrary to the (G)ZSL method used to obtain the experimental results in Section 4, where only 150 seen classes are taken into account during training.

On average, closest and farthest classes seem to be reasonably consistent with what one would intuitively expect. Interestingly, classes *Fish Crow* and *American Crow* appear very often among the most similar classes, even for very different reference classes. This is likely due to their central position in the semantic space.


Figure 4. Top 4 most *(middle)* and least *(bottom)* similar classes to class *Laysan Albatros (top)*.

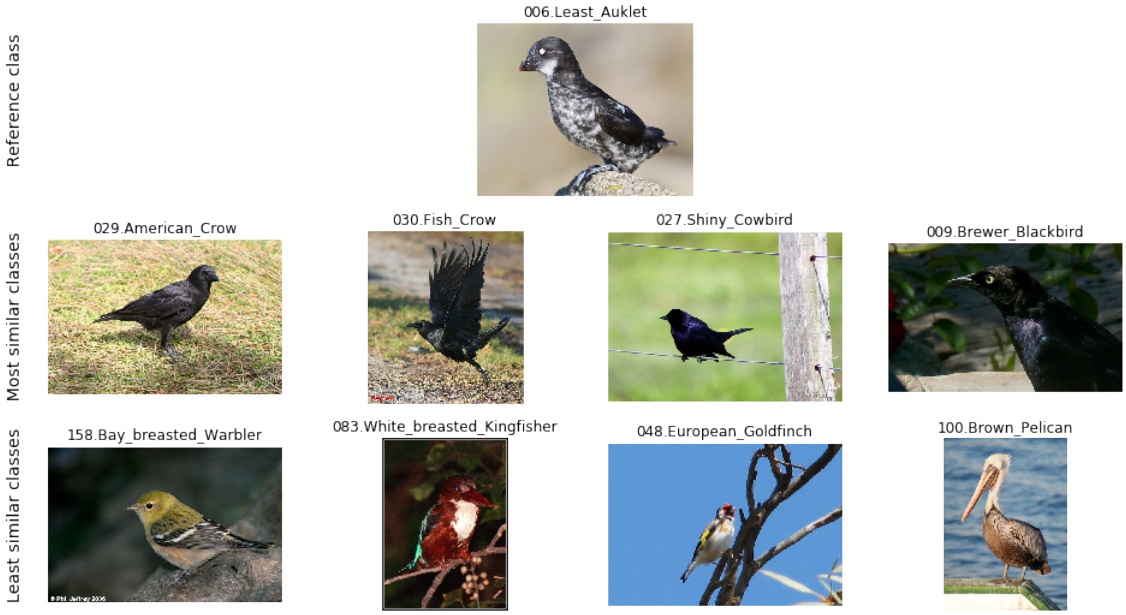


Figure 5. Top 4 most *(middle)* and least *(bottom)* similar classes to class *Least Auklet (top)*.

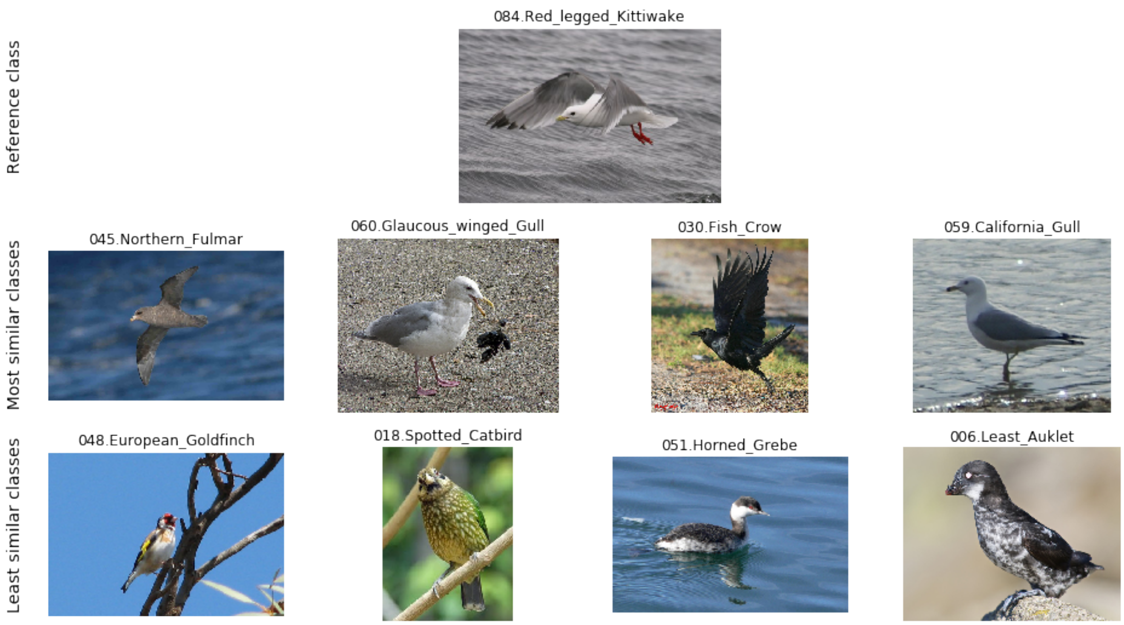


Figure 6. Top 4 most *(middle)* and least *(bottom)* similar classes to class *Red-legged Kittiwake (top)*.

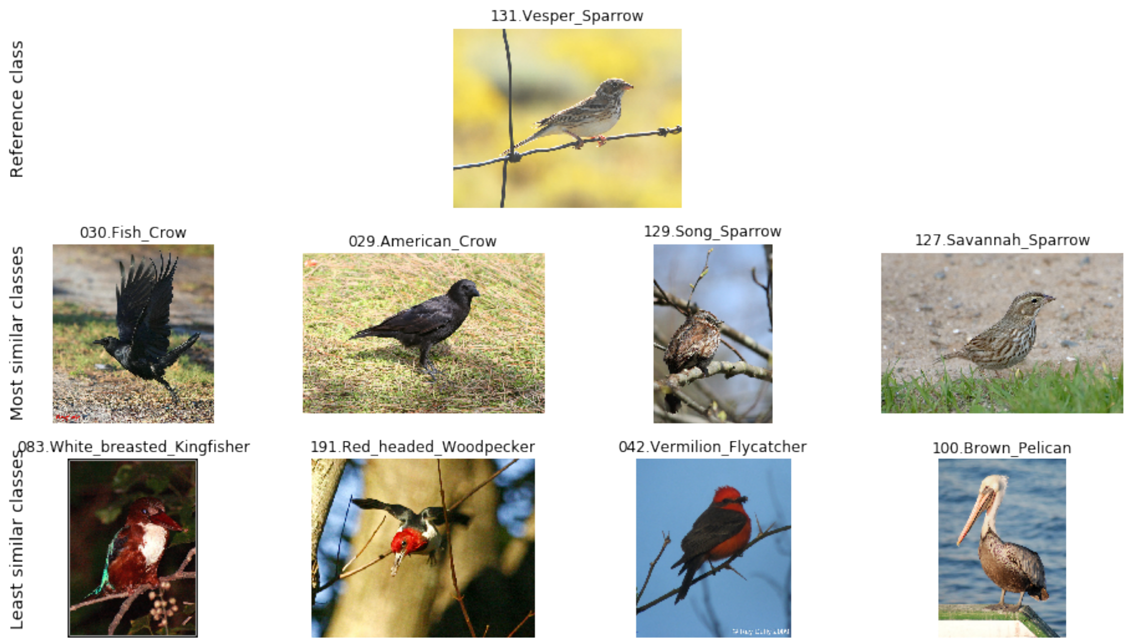


Figure 7. Top 4 most *(middle)* and least *(bottom)* similar classes to class *Vesper Sparrow (top)*.


Figure 8. Top 4 most *(middle)* and least *(bottom)* similar classes to class *Artic Tern (top)*.

## B. Illustrative examples for the relevance weighting

We also provide most and least relevant samples as measured by the relevance weighting scheme described in Section 3.4 of the main paper for a few classes from CUB, again classes *Laysan Albatross*, *Least Auklet*, *Red-legged Kittiwake*, *Vesper Sparrow* and *Artic Tern* in figures 9, 10, 11, 12 and 13.

We again use all samples from the CUB dataset, contrary to the (G)ZSL method used to obtain the experimental results in Section 4, where only certain samples from seen classes are taken into account during training.

Again, most and least relevant samples for each class seem to be reasonably consistent. In particular, the nestling from Figure 1 is considered to be an outlier (Figure 9). Other images considered as irrelevant include images of low quality (low resolution, over-saturated...), with atypical background or taken from unusual angles, *e.g.* focused only on a specific part of the bird.

It should be noted that if all images are relevant for a given class, some relevant images will be included in the "least relevant" examples. However, we consider that having a relevant image considered as irrelevant is not as detrimental as having an irrelevant image considered as relevant.

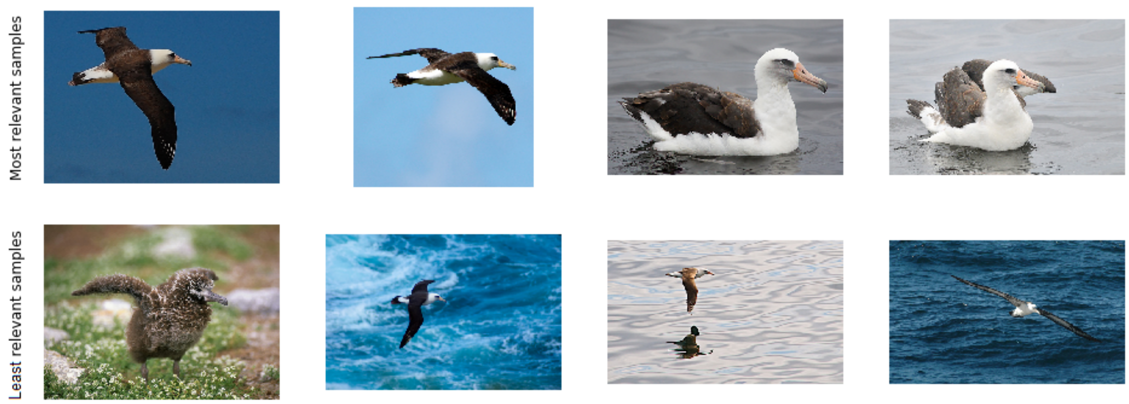


Figure 9. Top 4 most *(top)* and least *(bottom)* relevant samples for class *Laysan Albatros*


Figure 10. Top 4 most *(top)* and least *(bottom)* relevant samples for class *Least Auklet*


Figure 11. Top 4 most *(top)* and least *(bottom)* relevant samples for class *Red-legged Kittiwake*


Figure 12. Top 4 most *(top)* and least *(bottom)* relevant samples for class *Vesper Sparrow*


Figure 13. Top 4 most *(top)* and least *(bottom)* relevant samples for class *Artic Tern*