Supplementary Materials
DiffHarmony++: Enhancing Image Harmonization with Harmony-VAE and Inverse Harmonization Model

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1 ADDITIONAL QUALITATIVE RESULTS

1.1 Harmony-VAE Results

In Figure 1-4 , we present qualitative results of using harmony-VAE . We exhibit original size images and scaled-up views of some specific regions. The columns from left to right are ground-truth real images, masks, composite images, harmonized outcome without using harmony-VAE and harmonized outcome with harmony-VAE . We show samples on 4 subsets of iHarmony4. A large number of examples demonstrate that Harmony-VAE can successfully restore the shape and surface of objects with complex structures without altering their appearance and lighting information (which is already completed by the denoising module).

1.2 iHarmony4 Augmentation Results

In Figure 5-6 , we present qualitative results of data augmentation on Hday2night and HFlickr using inverse harmonization model . The columns from left to right are ground-truth real images, masks, original composite images and 3 random picked generated composite images. It is illustrated that the inverse harmonization model can generate diverse and high-quality samples, thereby significantly enhancing model performance on both datasets through the blending of augmented data.

1.3 Human Harmony Data Samples

In Figure 7-8 , we present data samples of our newly constructed Human Harmony dataset . The columns from left to right are ground-truth real images, masks and 3 random picked generated composite images. From the given samples, it is evident that the Human Harmony dataset typically contains large foreground objects, and the model can generate various candidate composite images for further selection by the final harmony classifier.

Figure 1: Qualitative results of using harmony-VAE.

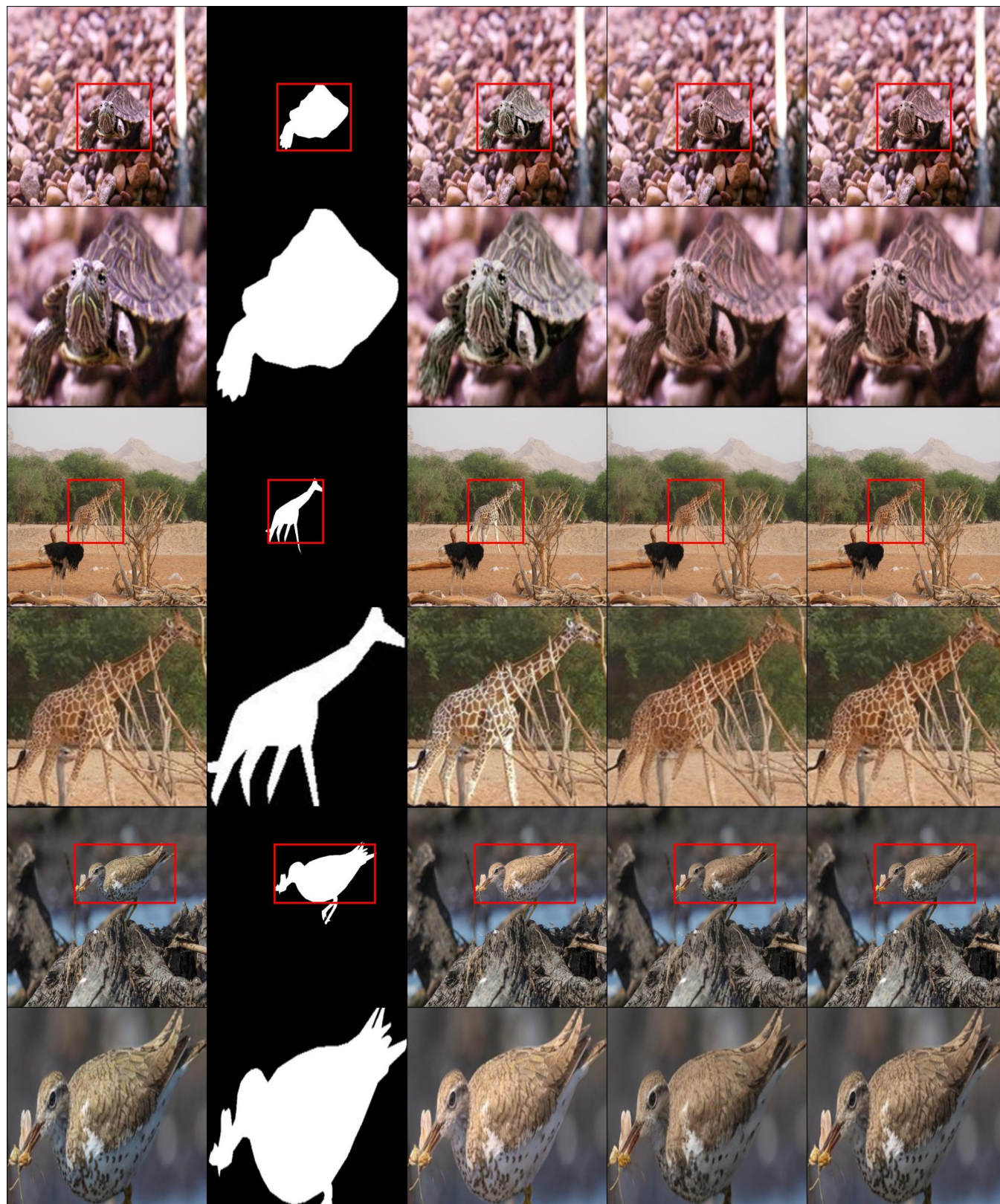**Figure 2: Qualitative results of using harmony-VAE.**

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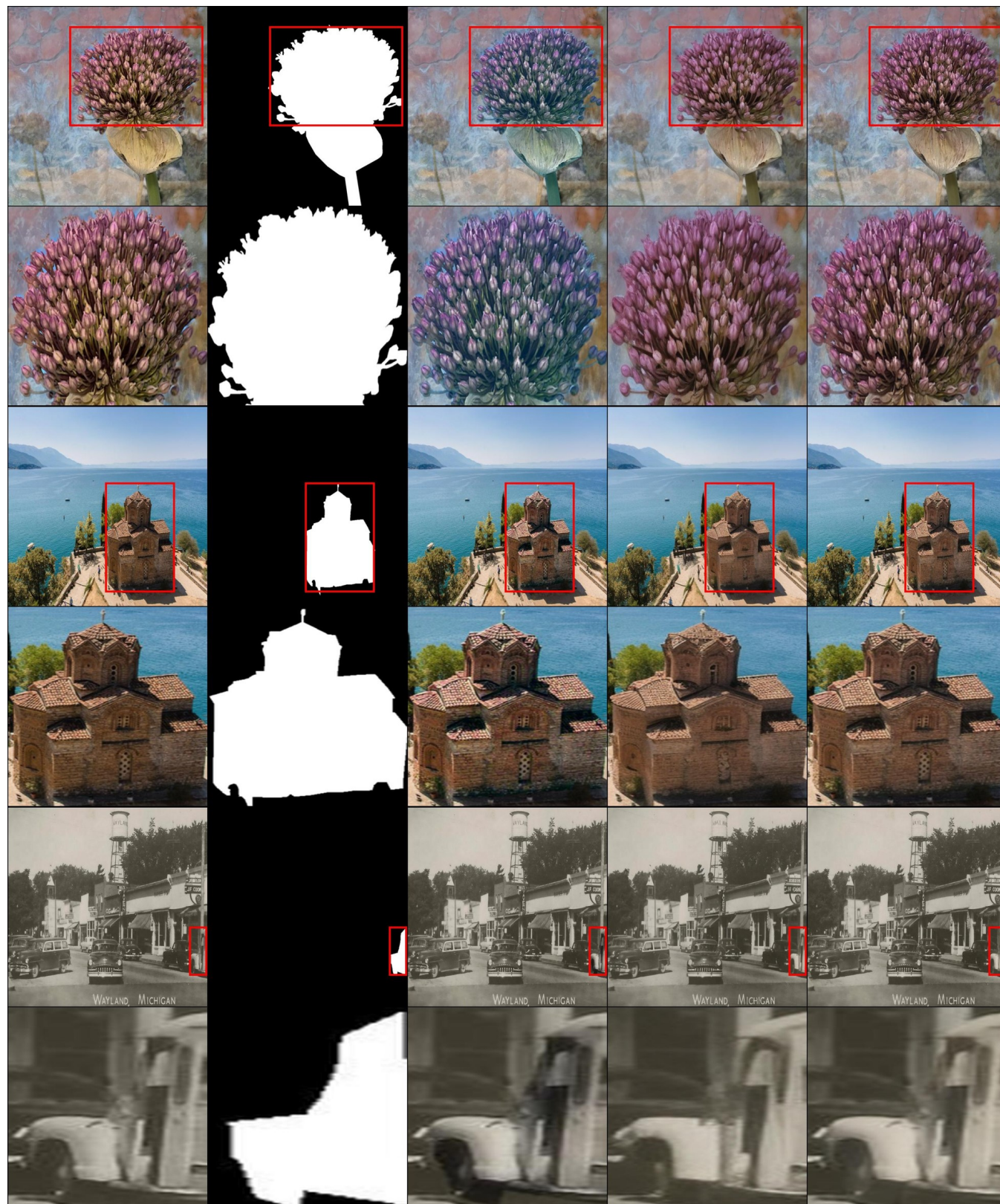**Figure 3: Qualitative results of using harmony-VAE.**

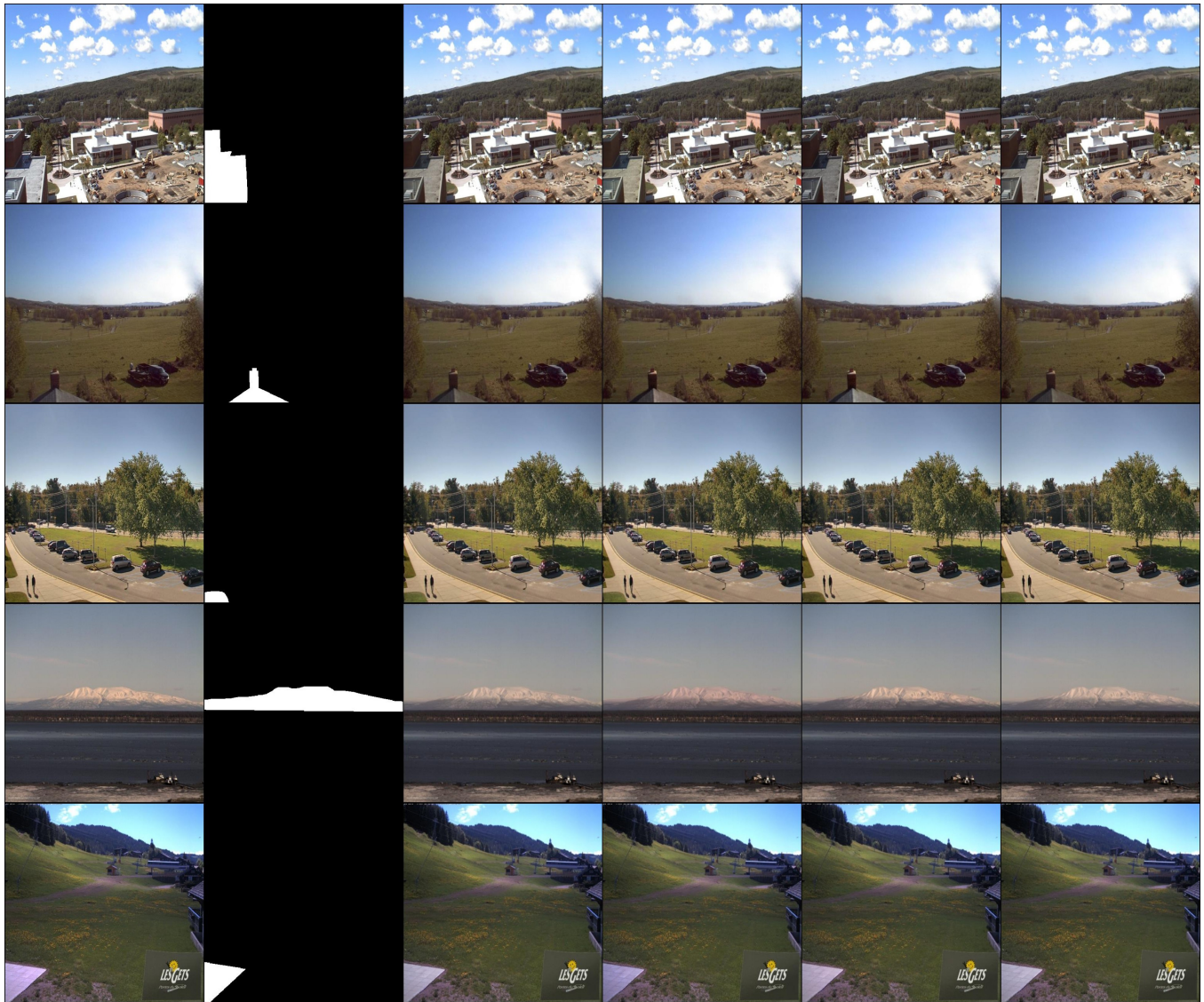**Figure 4: Qualitative results of using harmony-VAE.**

Figure 5: Augmentation samples using inverse harmonization model on Hday2night.
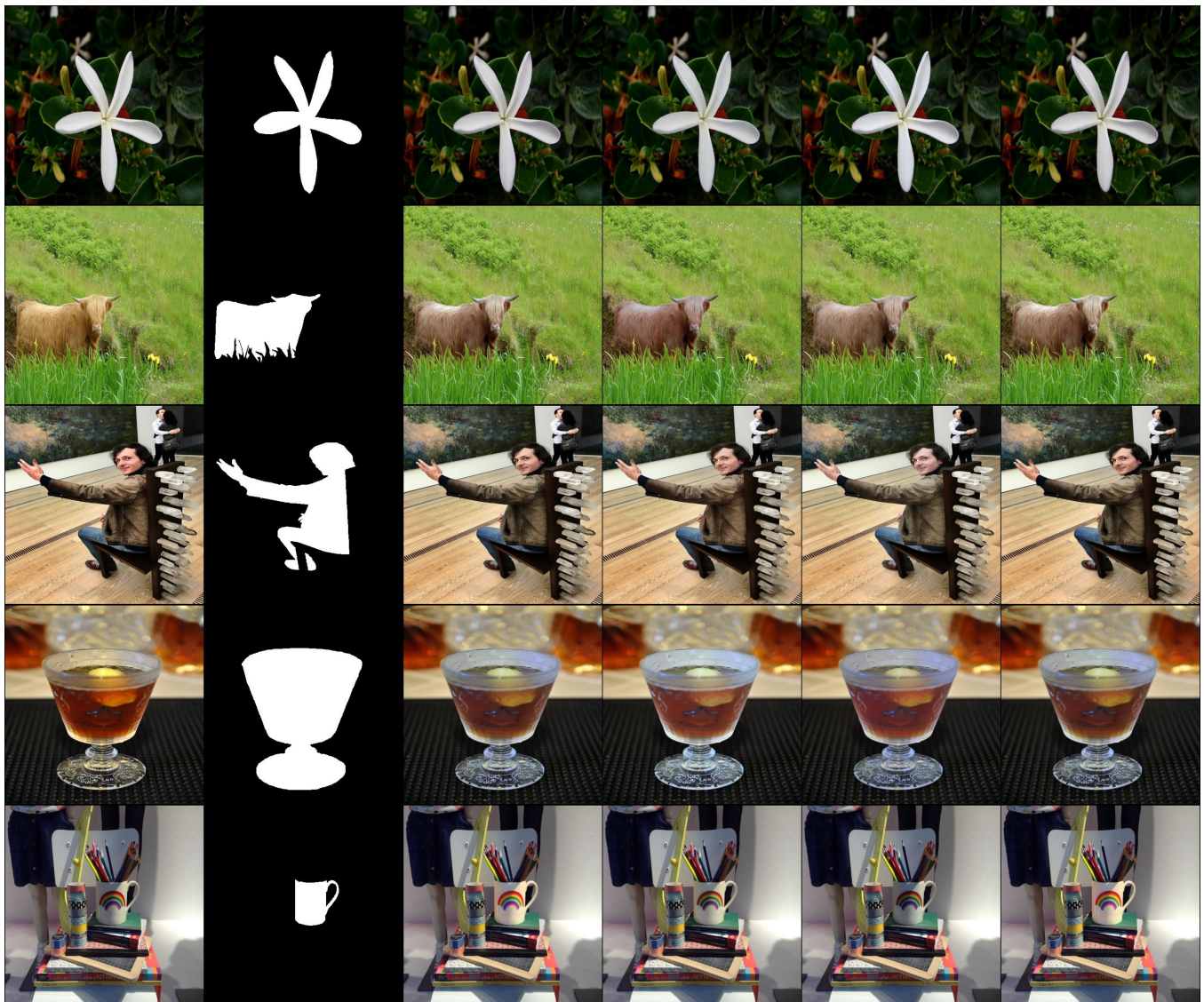
Figure 6: Augmentation samples using inverse harmonization model on HFlickr.

Figure 7: Samples on Human Harmony dataset.

Figure 8: Samples on Human Harmony dataset.