User Studies for Data-Driven Object Manipulation in Images
ID:paper1058

This supplemental file provides the high resolution results and detailed statistics of the user study for "Data-Driven Object Manipulation in Images". In this user study, ten subjects were selected. Nine of them are novice to both our system and Adobe Photoshop, they are all undergraduate students majoring in computer science. Each of them is given 20 minutes instruction of the provided tools. The other is an artist professional in Adobe Photoshop.

We perform six tasks, where all the subjects are required to manipulate the objects according to a verbal description. Eight novice subjects use our manipulation tools, and the other 2 use PS. We measure the quality of each manipulation by a subjective score ranging from 1 to 5. Scores: 5 = very good, photo-realistic; 4 = good, but with slightly noticeable artifacts; 3 = obvious artifacts, but still acceptable; 2 = very obvious artifacts, not quite acceptable; 1 = very bad, unacceptable. Each manipulation is presented to five evaluators (not selected as subjects) and their average score is used. **The evaluators do not know which manipulation comes from which subject.** We list manipulation results and statistics below.

Task I: Banana Peel

In this task, the subjects have to manipulate the source image according to a verbal description of 'complete the banana peel at the right end'. The subjects are required to generate a result as good as they can achieve. The source image is shown in Figure 1(a).

Task II: Snail's Body

In this task, the subjects have to manipulate the source image according to a verbal description of 'complete the body of the left snail'. The subjects are required to generate a result as good as they can achieve.The source image is shown in Figure 1(b).

Task III: Spout

In this task, the subjects have to manipulate the source image according to a verbal description of 'complete the spout of the teapot'. The subjects are required to generate a result as good as they can achieve. The source image is shown in Figure 1(c).

Task IV: Pattern of Vase

In this task, the subjects have to manipulate the source image according to a verbal description of 'change the pattern of the vase'. The subjects are required to generate a result as good as they can achieve. The source image is shown in Figure 1(d).

Task V: Boat

In this task, the subjects have to manipulate the source image according to a verbal description of 'add sails to the boat'. The subjects are required to generate a result as good as they can achieve. The source image is shown in Figure 1(e).

Task VI: Elephant

In this task, the subjects have to manipulate the source image according to a verbal description of 'complete the nose of the elephant'. The subjects are required to generate a result as good as they can achieve. The source image is shown in Figure 1(f).
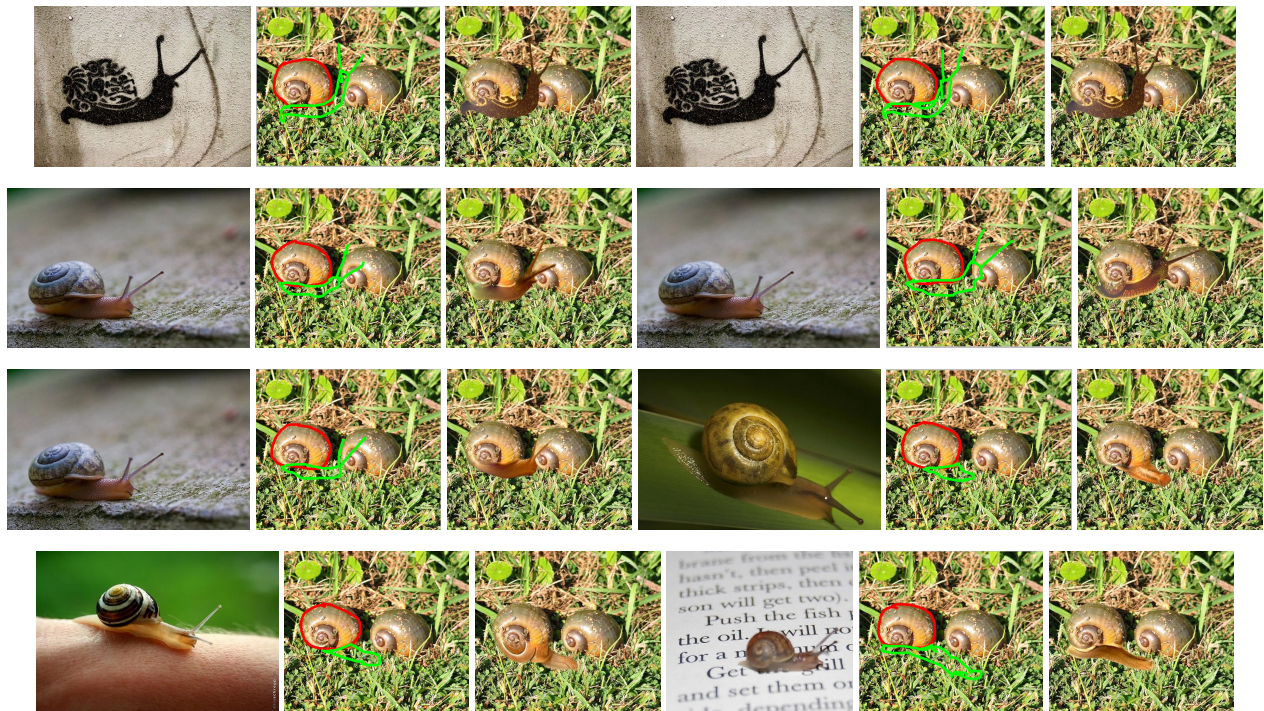
Figure 1: Source Images.

Task I Results

Figure 2: Manipulation Task I: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.

Figure 3: Manipulation Task I: Results produced using PS by professional artist(left) and novice subject (right).

Task II Results

Figure 4: Manipulation Task II: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.
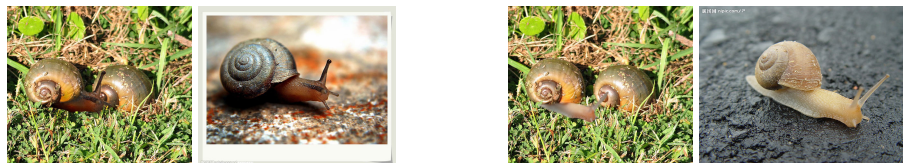

Figure 5: Manipulation Task II: Results produced using PS by professional artist(left) and novice subject (right).

Task III Results

Figure 6: Manipulation Task III: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.

Figure 7: Manipulation Task III: Results produced using PS by professional artist(left) and novice subject (right).
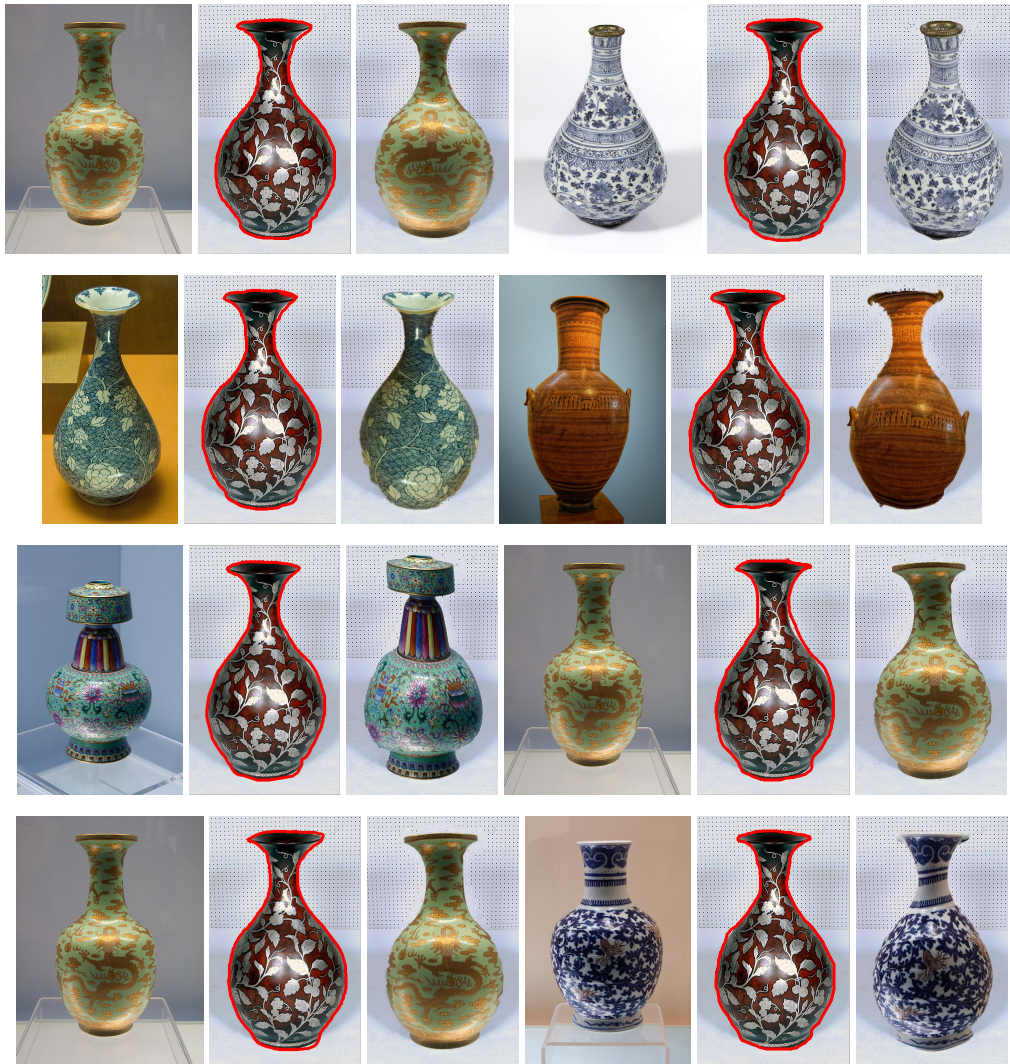
Task IV Results

Figure 8: Manipulation Task IV: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.

Figure 9: Manipulation Task IV: Results produced using PS by professional artist(left) and novice subject (right).
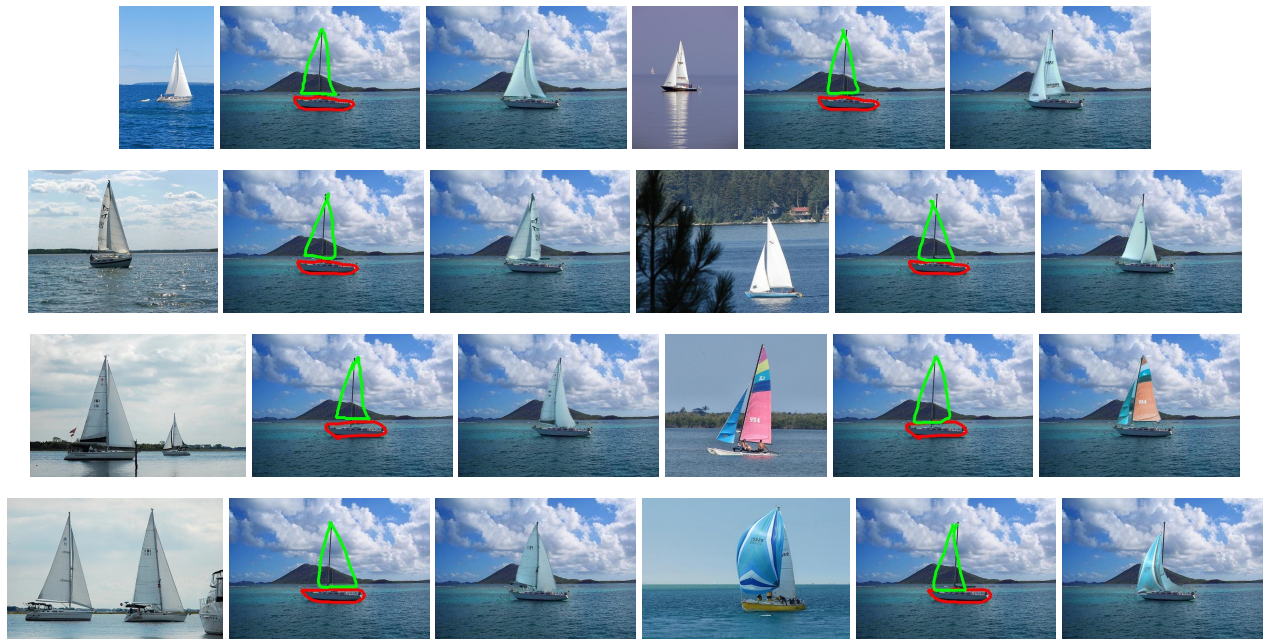
Task V Results

Figure 10: Manipulation Task V: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.

Figure 11: Manipulation Task V: Results produced using PS by professional artist(left) and novice subject (right).
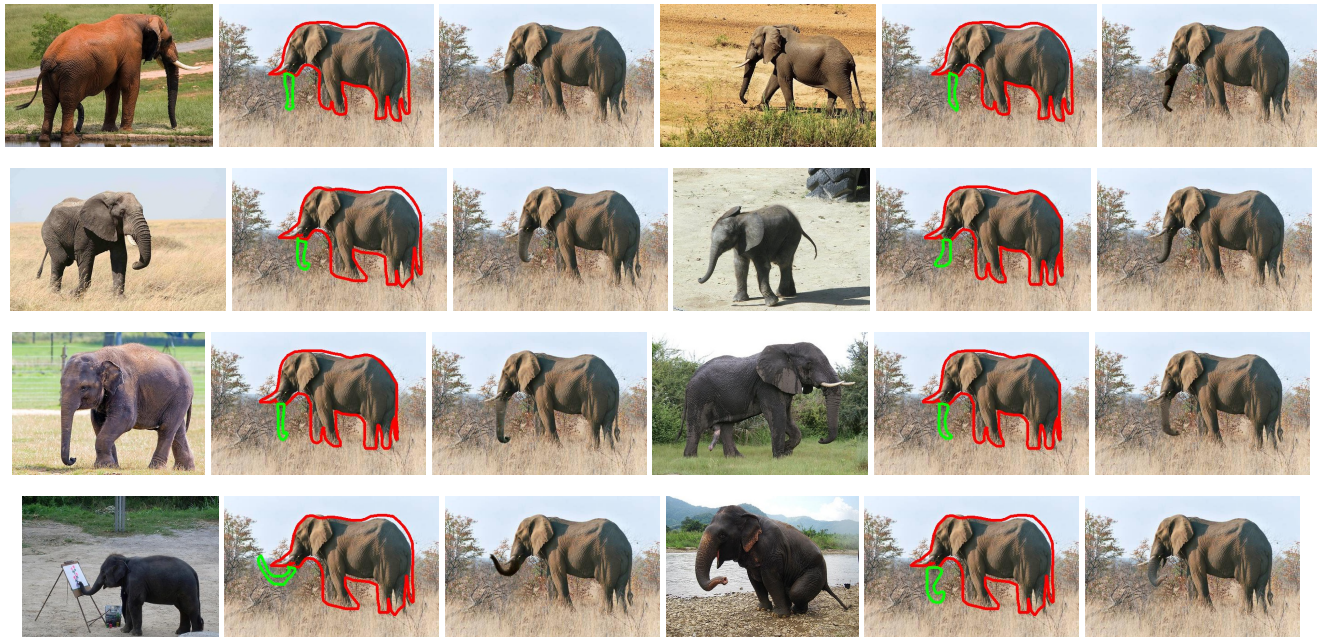
Task VI Results

Figure 12: Manipulation Task VI: Results produced by 8 novice subjects using our system. For each subject, there are three images. From left to right: target image, user sketch, manipulation result.
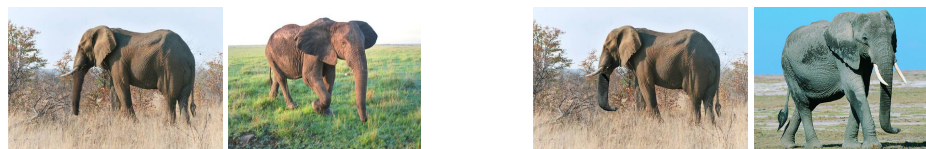

Figure 13: Manipulation Task VI: Results produced using PS by professional artist(left) and novice subject (right).

Statistics

	Subjects	1	2	3	4	5	6	7	8	PS Pro	PS Novice
Task I	Score	3.4	3.2	3.4	4.4	4.6	3.4	3.4	2.4	4.4	1
	Time (sec)	50	40	50	50	90	60	40	70	7min	12min
Task II	Score	3	3.8	4.2	3.4	2.8	3.6	3.6	3.6	4.8	2.2
	Time (sec)	30	60	100	40	50	80	50	30	8min	11min
Task III	Score	4.4	2.8	3.4	2	3.2	3	3.2	3.8	4.6	2.8
	Time (sec)	40	60	30	90	40	80	30	40	11min	15min
Task IV	Score	3	3	3	3	3.4	2.2	3	2.6	3.2	1.2
	Time (sec)	60	60	30	80	30	60	50	80	15min	17min
Task V	Score	4.2	3.7	3.5	3.8	3.2	4.0	3.3	3.8	3.1	2.7
	Time (sec)	30	30	20	40	30	50	40	50	8min	10min
Task VI	Score	4.5	4.2	3.4	4.3	3.2	2.9	3.7	3.2	3.9	2.7
	Time (sec)	70	50	60	60	40	60	80	70	16min	13min

Table 1: Statistics from the user study. Each column is the data for one subject. 'PS Pro' indicates the professional artist and 'PS Novice' indicates the novice subject using PS. For each task, we show its results in two rows. The first row is the average manipulation quality from five evaluator. The second row is the overall time spent to manipulation the image. The PS user need about 10 minutes to find proper target image from datasets.