Exploring Shape Variations by 3D-Model Decomposition and Part-based Recombination

User Study Instructions

Thank you for participating in our user study. During this study you can test our novel system that allows to create new shapes by blending between database shapes.

Please let the instructor start the program. You should see the user-interface as shown in Fig. 1.

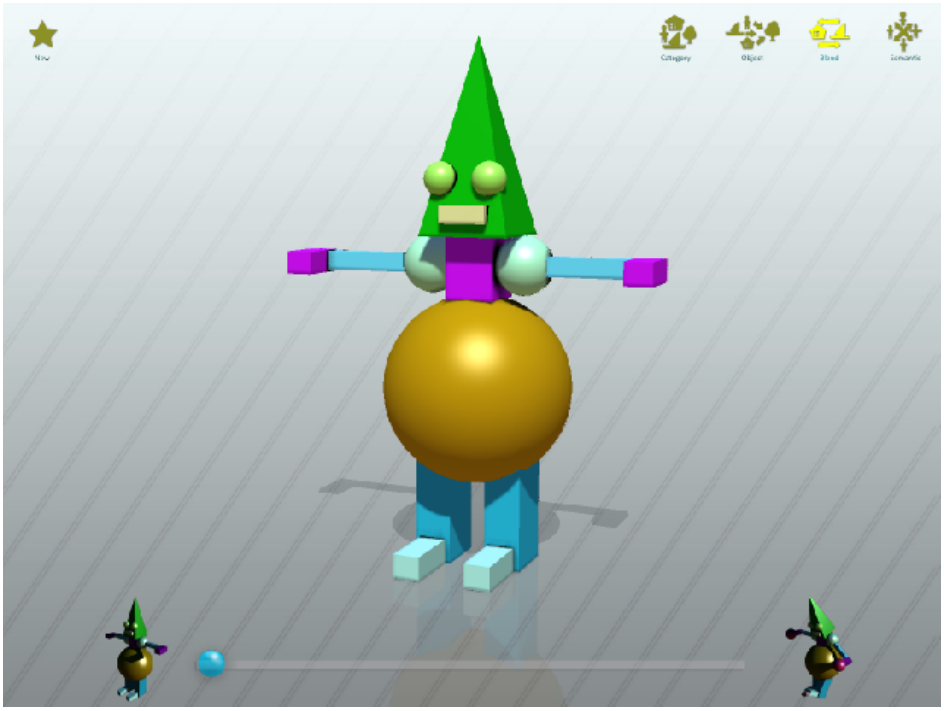

Figure 1: *User Interface*

The user interface has 5 tool buttons at the top of the screen: *New*,*Category*, *Object*, *Blend*, and *Semantic*.

In this user-study we will just use the *New*, *Blend*, and the *Object* tool:

- *New* tool: When this button is pressed small icons of the available shapes in the database are shown. You can left-click on one of these shape icons to select a new shape to begin with. The shape is then loaded from disk, which might take a few seconds.
- *Blend* tool: When this button is pressed small icons of the available shapes in the database are shown. You can left-click on one of these shape icon to select a target shape of a blend operation. Once you have selected a shape a slider bar appears at the bottom of the screen. You can now move the slider to blend between the source and the target shape.
- *Object* tool: When this button is pressed small icons of the available shapes in the database are shown. You can click on one of these shape icon to select a target shape. If you now move the mouse over the source shape, the part of the source shape that will be replaced with a part from the target shape is hi-lighted. Click with the left mouse button to replace that part.

Task 1: Generate a blend between a big and a slim robot

Select the source robot with the *New* tool and the target robot with the *Blend* tool. Use the slider bar to generate a blend that is visually pleasing in your opinion.

You are free to try different combinations. If you have found a blend that you like, let the instructor save the result.

Please note the required time for this task [1]

The system was helpful to solve the given task (1 = Strongly disagree, 7 = Strongly agree).

1 2 3 4 5 6 7 [2]

Task 2: Generate a blend between two air-planes

Use the system to generate a blend between two air-planes. You are free to try different combinations. If you have found a blend that you like, let the instructor save the result.

How useful was the system to achieve the given task?

Please note the required time for this task [3]

The system was helpful to solve the given task (1 = Strongly disagree, 7 = Strongly agree).

1 2 3 4 5 6 7 [4]

Task 3: Using the object tool

Use the *New* tool to select the robot show in Fig. 2. Now use the *Object* tool and try to generate the shape shown in Fig. 3.

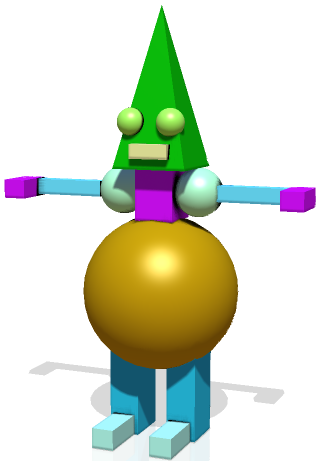

Figure 2: *Start from this shape*

Figure 3: *Generate this shape*

Please note the required time for this task [5]

The system was helpful to solve the given task (1 = Strongly disagree, 7 = Strongly agree).

1 2 3 4 5 6 7 [6]

Thank you very much for participating our user study!

User study results

In this section the statistics of the user study are presented (Fig. 4), as well as the results produced by the participants (Fig. 5 and Fig. 6).

Subject	Task 1 Blend Tool		Task 2 Blend Tool		Task 3 Object Brush	
	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
	Time [mm:ss]	Helpful? [1 - 7]	Time [mm:ss]	Helpful? [1 - 7]	Time [mm:ss]	Helpful? [1 - 7]
1	01:26	6	01:26	7	01:11	7
2	01:05	3	00:35	5	03:27	2
3	02:34	7	01:20	7	03:23	7
4	00:40	6	01:05	5	01:08	7
5	02:20	6	01:31	6	01:13	6
6	01:47	5	02:18	6	01:08	7
7	00:29	7	01:14	7	01:14	7
8	00:59	7	00:47	6	01:01	7
9	02:50	4	03:26	5	01:35	6
10	00:51	5	02:30	6	01:17	7
11	03:00	6	02:22	6	01:37	6
12	01:57	6	01:01	6	01:25	7
13	02:14	7	02:05	6	01:42	5
14	02:15	6	02:22	7	01:30	7
Average	**01:44**	**5.786**	**01:43**	**6.071**	**01:37**	**6.286**
Median	**01:52**	**6**	**01:28**	**6**	**01:21**	**7**
Std Dev	**00:49**	**1.188**	**00:48**	**0.730**	**00:46**	**1.383**

Figure 4: *Results*

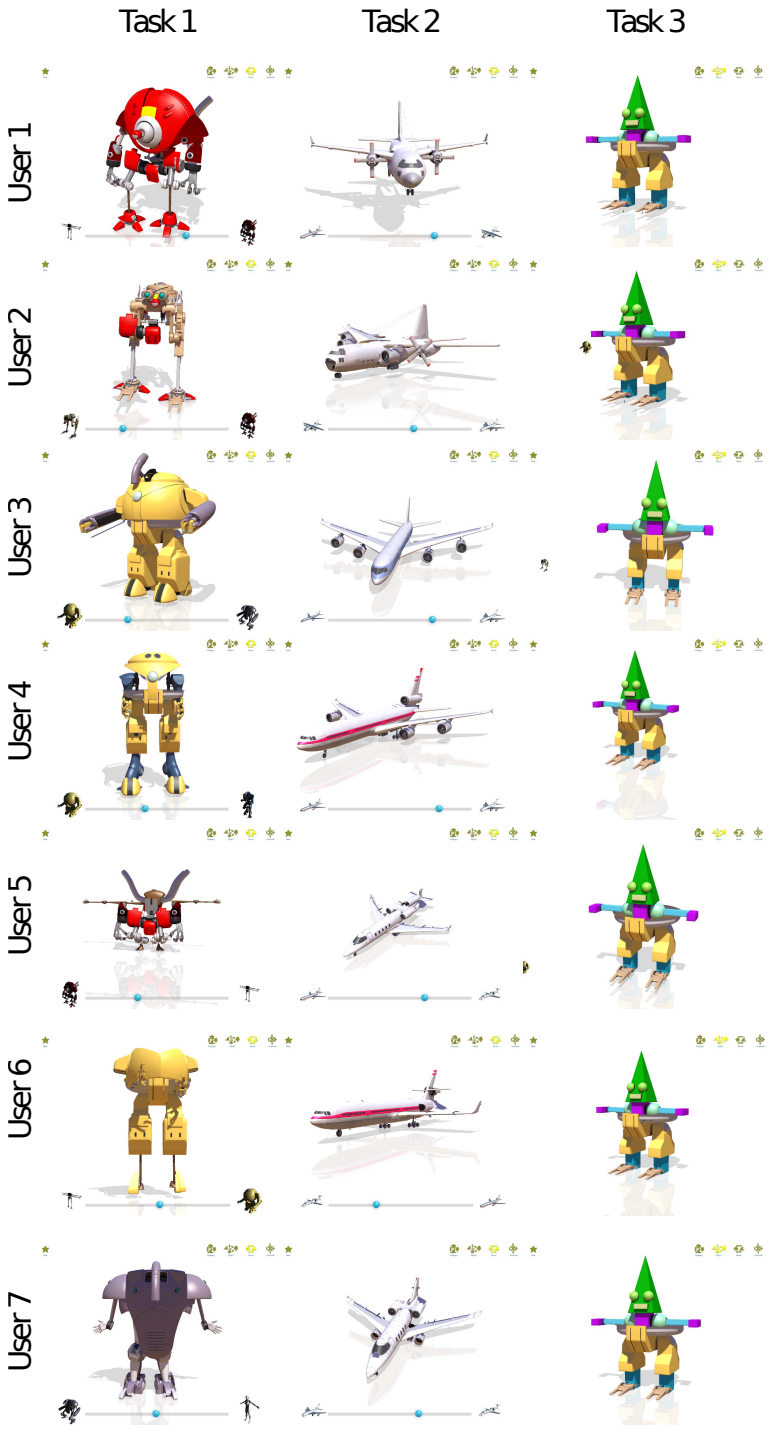

Figure 5: *Results produced by participants 1 to 7 out of 14*

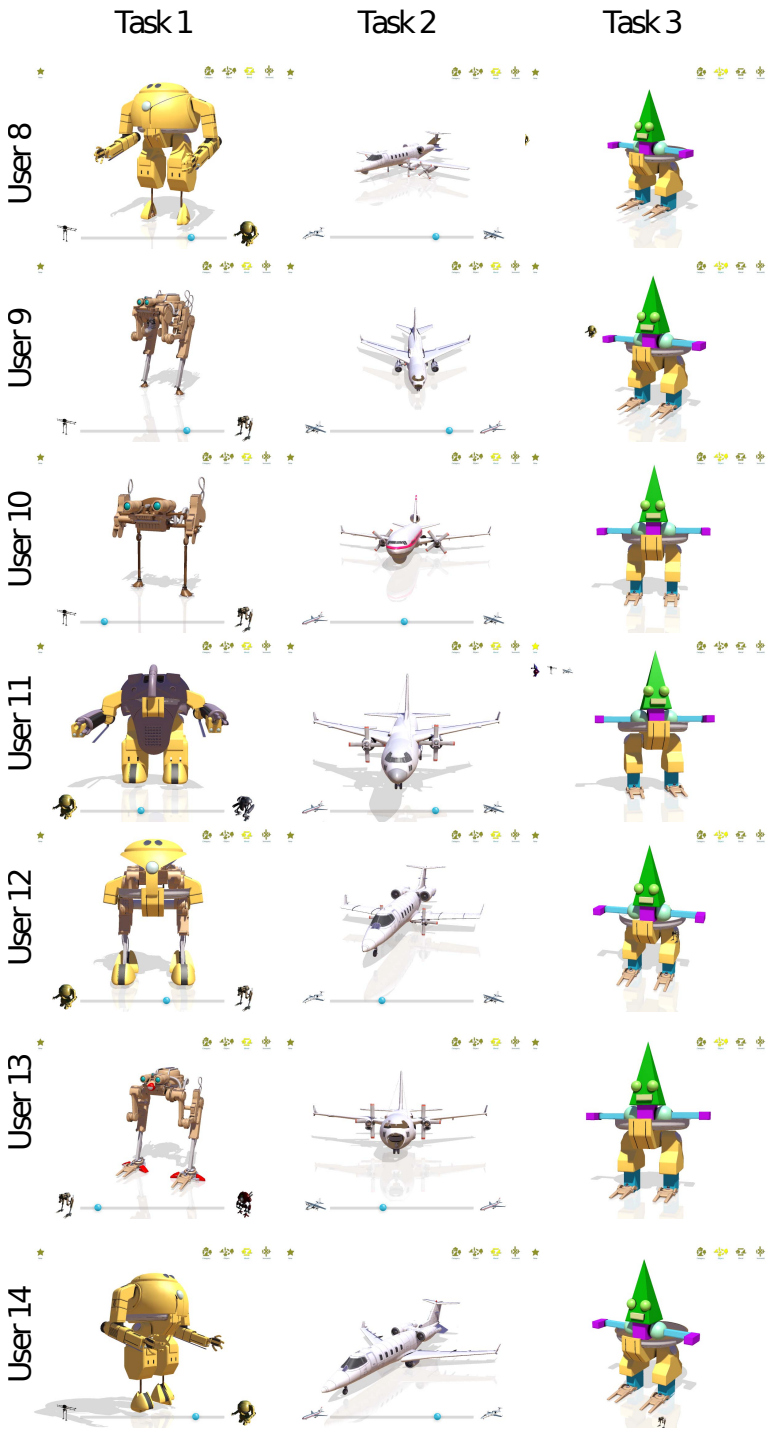

Figure 6: *Results produced by participants 8 to 14 out of 14*