

Supplementary Material

1 Interviews

We conducted interviews with two professional designers for feedback. First, the system was demonstrated to the designer. Then, a brief drawing session was conducted to introduce them to our prototype software. In the following, we provide responses to the interview form we used to collect the designers' answers and finally we show results from the drawing sessions.

Interviewee 1

How comfortable are you with Adobe Illustrator (less, medium, high)?

Medium

What type of design do you usually work with?

Graphical design (print). Product design (cad)

How many years have you worked with Adobe Illustrator?

7 years

In your design, how often do you use/copy parts of the design from sources like Adobe Stock?

Sometimes

In your design, do you prefer to make everything from scratch or would you like some task/parts to be automated?

Automation for universal icons: good to have a starting point which then can be further modified.

How did you find the results from our method? (less, slightly, very impressive)

Playful results and app. But not necessarily good design (whatever that means, good design is always subjective). Could be used to generate ideas in an idea-making process. But a bit lazy way to get ideas. Could help if you are stuck in the creative process.

Do you think there is something our method should do that we did not demonstrate?

The possibility to search for certain forms (not objects) would be nice.

Is the interactive tool, if integrated in applications like Illustrator, something you would use in your design?

Yes, especially for making icons

How do you think this type of tool/framework can facilitate novice designers? Do you think this type of tool can be applicable to other types of software (like web or mobile-based software)?

Absolutely! Games for children (similar to those games where you design an avatar etc). Another idea: The user can collect favorite parts and items from the Internet or from certain web pages and the web-based system can automatically produce interesting objects from those parts.

Interviewee 2

How comfortable are you with Adobe Illustrator (less, medium, high)?

Less.

What type of design do you usually work with?

Interior architectural design and basic graphic design

How many years have you worked with Adobe Illustrator?

10 years but I use the program to just check and edit works done by other team members.

In your design, how often do you use/copy parts of the design from sources like Adobe Stock?

I have never used Adobe Stock. I frequently use Shutterstock as source of vector graphics.

In your design, do you prefer to make everything from scratch or would you like some task/parts to be automated?

At the beginning of my career, I preferred designing from scratch. However, now it would be nice to have some tasks to be, to some extent, automated. My clients like to see a few design options so what I currently do is to have an assistant creating the options for me.

How did you find the results from our method? (less, slightly, very impressive)

I find the results very impressive as it can generate many design options within a few clicks.

Do you think there is something our method should do that we did not demonstrate?

No. Maybe extract a palette of colour options.

Is the interactive tool, if integrated in applications like Illustrator, something you would use in your design?

Yes.

How do you think this type of tool/framework can facilitate novice designers? Do you think this type of tool can be applicable to other types of software (like web or mobile-based software)?

Yes, I think it can facilitate novice designers and also laymen. Yes, I think it can be used for web and mobile applications.

Figure 1: Result from drawing session with Interviewee 1. Time spent: 3 minutes. Topleft: the imagery actually drawn by the designer. The rest was filled in by the software and modified by the designer.

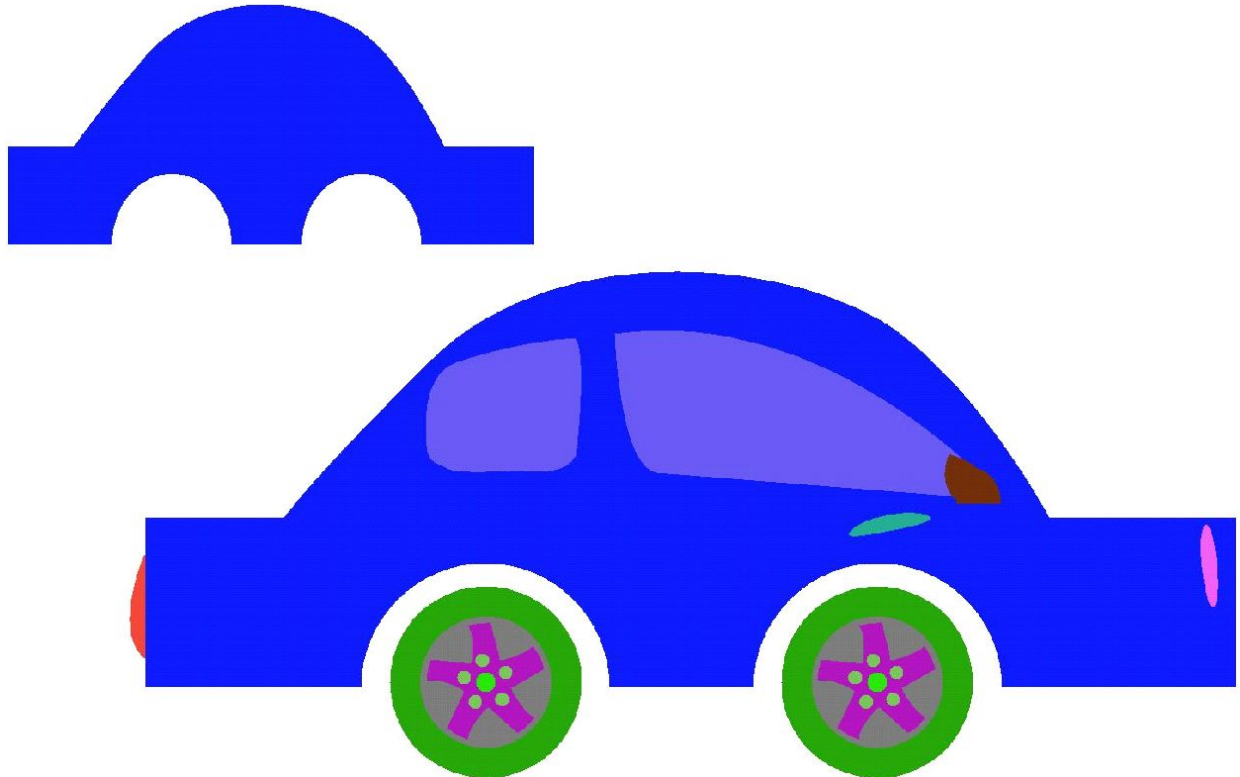
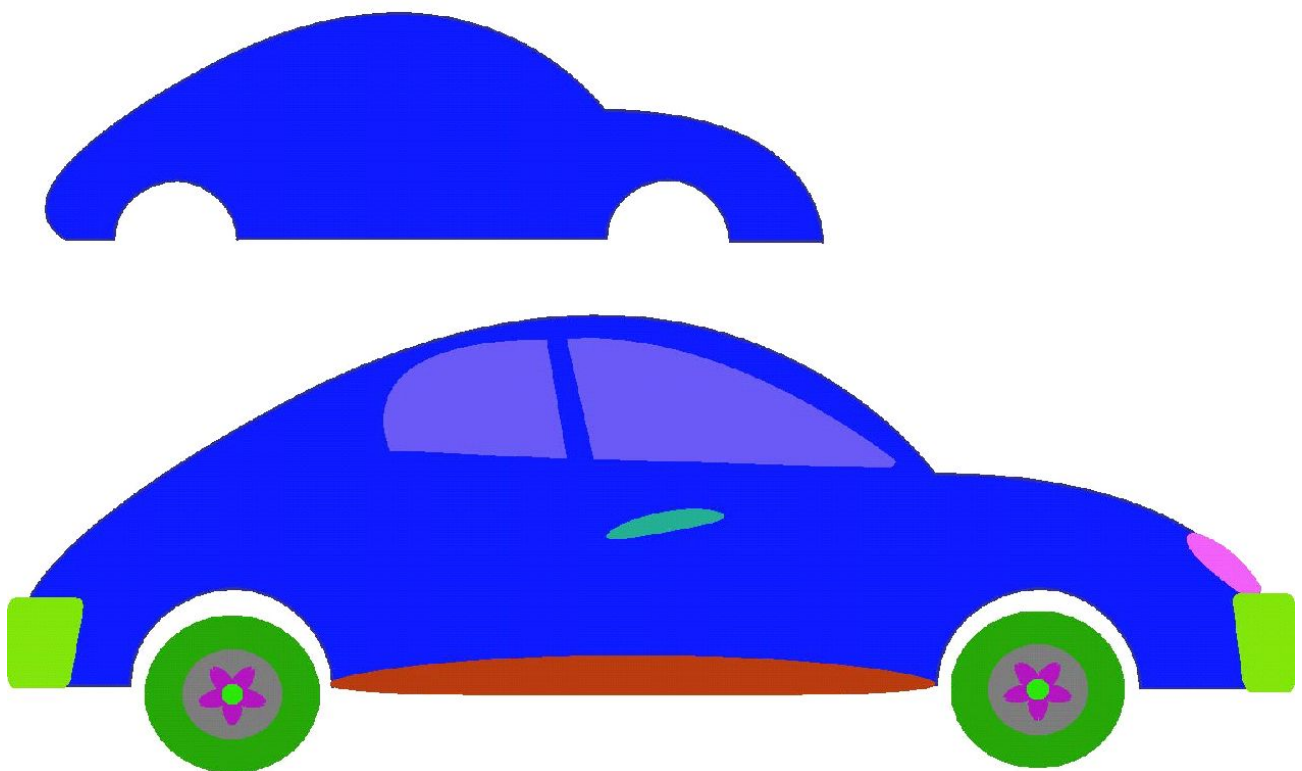


Figure 2: Result from drawing session with Interviewee 2. Time spent: 5 minutes. Topleft: the imagery actually drawn by the designer. The rest was filled in by the software and modified by the designer.



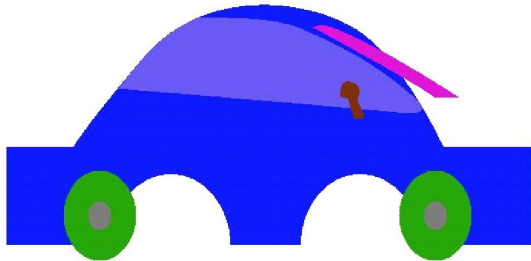
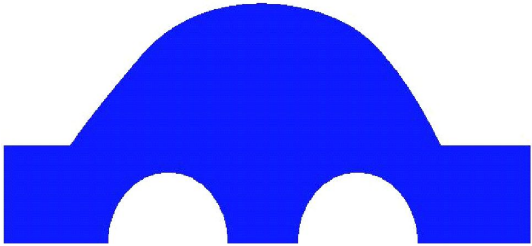
2 Object completion step

The following explains step two for completing object. This problem is particularly challenging for our type of data because child elements are not observed in the reference image *canvas*, thus resorting to the alternative approach for bounding box selection, described in Section 6. Step 2 first identifies unobserved base layers and synthesises them with children. For each unobserved base layer U, the algorithm adds it to the image and adds children to it. The algorithm uses the most probable observed base layer B as reference. First, it finds a sample in the training set with observed U and B with a B that is closest to the observed B in *canvas*. The bounding box (bb) is fetched from the *sample* image (denoted S). Then, bb equals the bounding box of U in S transformed with the same transformation matrix used to fit the bounding box of B in S with the bounding box of B in *canvas*. The other parameters are: domain = *canvas*(parent) and scale = 1.0.

Figure 8 in the paper illustrates two successful completions, where the system finds similar samples in the training data. Figure 3 shows a more challenging case where an implausible result is produced. The designer can, however, easily refine such a results to make a plausible image and the creation process would still be faster than creating the elements from scratch.

Figure 3

Input and object completion



After simple edits

