Bildtrickser Photosketch: Diese Software errechnet Fotos aus Gekritzel - SPIEGEL ONLINE
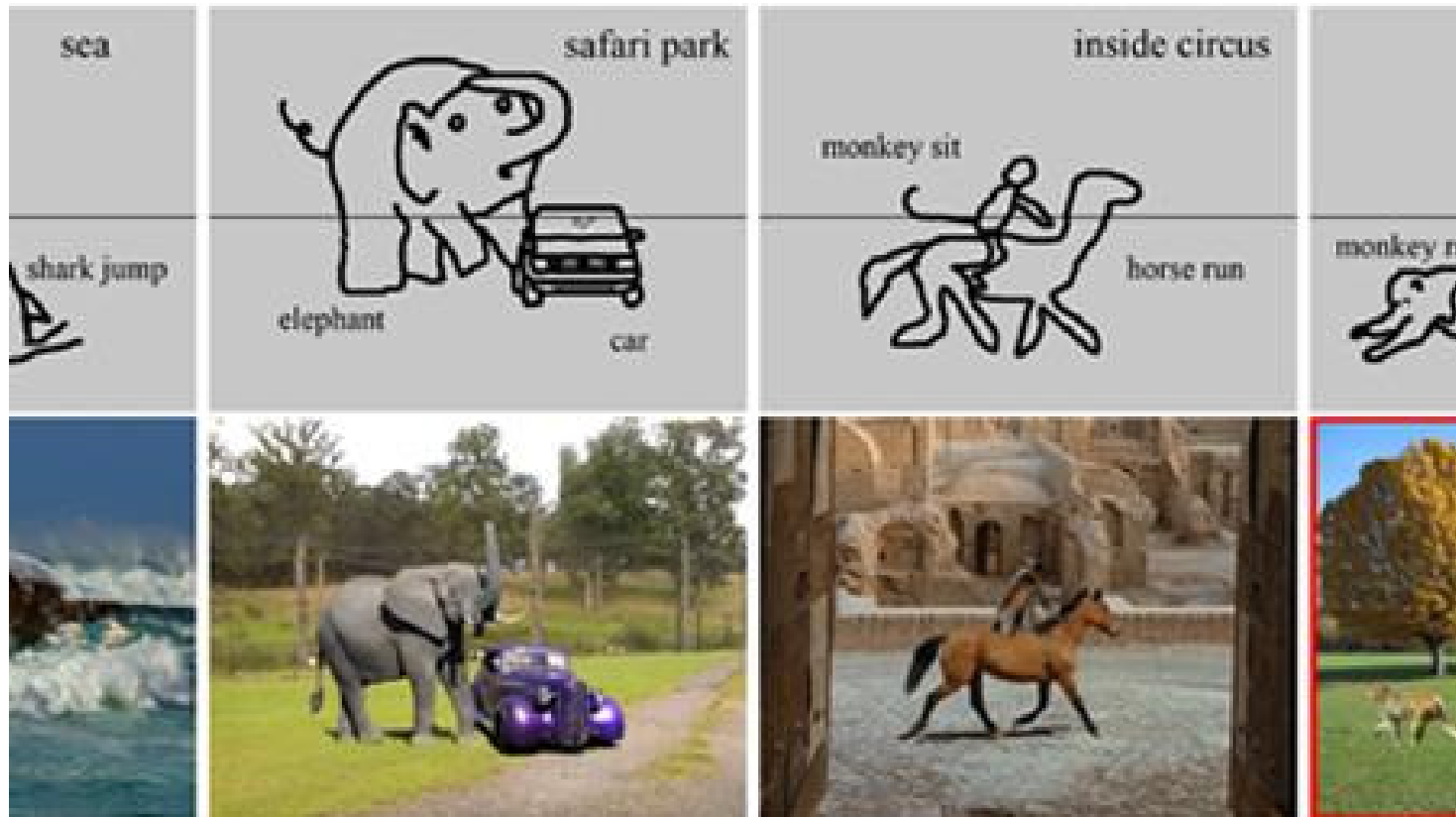
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Draw your own pictures! Researchers have written a program that automatically composes photos from rough sketches: elephants are taking old-timers, sharks are snapping at helicopters. Image processing experts are impressed, even if the software is far from perfect.

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Punkt, Punkt, Komma, Strich - fertig ist die Fotomontage. So ähnlich soll eine Software arbeiten, die eine Gruppe von Informatikern aus China, Singapur und Israel vorstellt. Photosketch nennen sie ihr Programm und genau so funktioniert die Demoversion auch: Der Anwender sieht eine arg vereinfachte Landschaft. In der Mitte ein Horizont, sonst zwei leere Flächen. Wie diese gefüllt werden sollen, bestimmt man mit einem Textfenster: "Tree" zum Beispiel.

Whatever is the focus, the user determines the same principle: Using the mouse, you can draw shapes by hand or get a few ellipses to the

approximate size and position of the desired object. What should be shown instead of these simple scribbles determine text fields. "Man throw", for example, under the stickman in the foreground, under the strange doodle on the right in the middle perhaps "dog jump", and then draw something that the dog should jump. A blob called "Frisbee" for example.

What happens then looks quite impressive in the demonstration of the researchers: The software looks for photos on the Internet for suitable material for a composition. Photosketch selects suitable material independently by means of several algorithms. For example, clusters are formed to a given content. Thus, for example, the images found for the input "Trees" are analyzed and the in this set compared to the majority unusually differently acting. In the other forms for the foreground and the middle, the software also matches the desired position and the shape of the objects as shown in the sketch (see video below).

[PhotoSketch: Internet Image montage](#) from [tao chen](#) on [Vimeo](#) .

Photosketch calculates several compositions from which the user selects the best for him. The various image elements combine Photosketch with the aid of several image processing algorithms, which are supposed to make "seamless compositions", as the researchers write in their essay. The work will be published in December in the specialist magazine "ACM Transactions on Graphics" ([PDF version of the paper](#)) of the US-Computer Society, on the ACM performance show for computer graphics Siggraph Asia in December Photosketch will also be on display.

Photosketch should visualize ideas

The results sometimes look involuntarily comical (elephant comes against a lilac oldtimer), but often quite usable: for example among soccer players, which are mounted between children playing on a meadow. According to Ping Tan, computer scientist at the National University of Singapore and one of the authors of the software, the team has tested the program of image processing novices. 45 picture compositions were produced during this test, according to Tan "about 80 percent of the results were quite neat."

According to Tan, one of the biggest sources of error is the number of elements: "The current version of the software works best if fewer than five different elements are to be combined into one image." We can not create large collages with Photosketch. "

The computer scientist is quite sure that the technology can soon be used in common software. For what? Not for perfect image manipulation. "We want to create a tool that quickly visualizes ideas so you can share them with others", says Tan to SPIEGEL ONLINE: "Photosketch is designed to help people quickly get a picture out of their head."

The team around Tan and his colleagues Shi-Min Hu from Tsinghua University Beijing has worked on the software for a year. Israeli researcher Ariel Shamir has worked with Photosketch, whose work in new Photoshop versions makes the content-sensitive image scaling possible.

Image processing experts: "Interesting idea"

Whether the Photosketch idea is similar fast? As an improved idekritzler perhaps. Image processing expert [Doc Baumann](#) finds the idea nice and the demonstration "as an entry into a new technique also quite impressively". Baumann, however, sees two main problems. On the one hand the legal

problem with picture elements extracted from the Internet: "For applications that go beyond hobbies, it would have to be clarified for each picture, how is that with the copyrights and personality rights."

Besides, most of the Photosketch montages are anything but perfect. Baumann: "A glance at the images shown confirms that almost all criteria, which I always recommend to my readers to consider and summarize under the term 'image logic', are not considered." Some of the points, the photosketch little noticed, so that the pictures look spurious:

- Direction of light and, in its succession, body and shadow shadows
- Light characteristics such as color, brightness, tonal range, directionality, scatter, shadow color
- Object integration into the environment, such as mirroring, ambient lighting
- Perspective: relative size, up or down (camera height), depth staggering, focal length used
- Air perspective: contrast reduction and blue tint with increasing distance

Also the exact release succeeds Photosketch only with very simple foreground background constellations. Baumann's conclusion: "An interesting innovation - for consistent montages, however, a lot of additional artificial intelligence would be required, which then also presupposes the perspective correct addition of shadow shadows taking into account the 3D properties of objects and the surfaces on which they are thrown . "

As a tool for perfect image montage Photosketch is not good, but perhaps as a digital counterpart to the scribble block.