T⌁E ⌁NXIO◡S P⫰OP

FEELING THE GLITCHES
Mendel Heit

The end of the 1990s brought the introduction of the first glitch music records to the public. For some the new type of music—made of clicks, cuts, disturbances, interferences, and noises—was just another chapter of electronic techno garbage (at this time, techno was called *Dosenmusik* by the elderly in Germany, literally "tin can music"). On the other hand, glitch music was a challenge, in the most positive sense of the word, with its producers taking bits and pieces from found sound, broken tapes, failing cell phones, *acouphènes*, and recorded industrial sounds, mixing, assembling, and finally composing something potentially hearable. Today music software companies and DIY music communities have figured out ways to incorporate clicks and cuts and audible glitches into our daily music consumption; plug-ins for music authoring software allow you to generate, control, and modify the quality of your glitches in a few clicks.

In digital imaging, glitches manifest themselves in pixel exchange and replacement, and color mixing, rendering their primary uses null. Often, memory of an old image lingers and is mixed into a new image, making the original image only slightly changed or completely modified. Pictures tend to slice with a stair effect, becoming oversized and re-colored. Distortion is common, with images slightly bent to one side. Scan-line and interlace artifacts recompose and cut into the image. Glitched images might stay recognizable in the background, under a slightly transparent layer; alternatively, everything could be covered with the no trace of the original. On top of these formal and color-based distortions, pieces of text or meta-data elements, like numbers, characters, and symbols, can be randomly incorporated.

Videos are also very accustomed to glitch-attacks. Compression algorithms, and slow or defective hardware often help create surprising visual disturbances. The effects here are enhanced because of the image flow. Sometimes video glitches follow a moving subject in a static shot like a halo of colorful pixels and signs. Like the aforementioned still images, the memory of a previous moving image may be integrated into the current frame. The viewer sees a fraction of an image that is static, while the rest continues in motion. These moments are optimally experienced with older digital TV receivers with slow hardware components, or a low TV signal.

In electronics and programming glitches belong to everyday life. Designing electronic circuits and programming aren't easy disciplines, the languages are rather complex, making errors and malfunctions a part of the design process. Programming itself is an unlimited resource and platform for surprising effects within well structured and designed systems. For the human eye, software and hardware glitches show themselves in all sorts of applications. In computer games some 3D objects lose their texture, screen and controllers start flickering, or the sound might even start hanging like an scratched CD that repeats the last five seconds of a track over and over again. A favorite is the glitch drawing effect achieved on your computer screen when your computer freezes. While your mouse cursor moves, the image of the previous position of your cursor stays, or the windows of your operating system superimpose themselves dramatically, leaving no space for a peaceful exit unless you hit the

power button. Printers can also output glitches on texts and images by replacing typography with illogical signs, numbers, and geometric shapes.

The production of objects can experience glitch-like elements as well. Injection molding machines, as well as packaging, CNC-milling, extrusion, 3D-printing, laser, or waterjet-cutting machines can produce defect objects: material can be squeezed out of the mold, the milling tool can potentially burn the material or not mill according to the programmed design, packaging can close itself before the product has been inserted. Very impressive glitches also happen with specific materials like glass or metal: air bubbles can become caught in glass objects, metal surfaces absorb modified colorations, wood warps in specific conditions, plastic degenerates.

In most cases, glitches are unexpected and surprising. But it is also possible to purposefully generate or design them. Cartridge tilting is a glitching technique among (old school) gamers consisting in the abrupt removal of the game cartridge out of the console during gameplay, thus interrupting the data flow. The effects can vary from missing sound or textures to total freeze.

If you want a digital image to be tortured, if you want to create dissonant sound with a musical instrument, or create randomized unique shapes for a same object, you can generate it. Like many other creative disciplines, typography dared to play with glitches. Typefaces can be modified to look dirty, used, or speckled, but you can also manipulate them to appear distorted and imperfect. Antonio Roberts, a glitch collector, worked on a piece of code to generate a glitchy typeface called "dataface," which mutates at every compilation. Generating glitches into digital images is also known as databending, and can be done with more or less control. Graphic and interaction designers use glitch in their work to generate attention, by assembling startling sounds or visual disturbances to catch the eye.

As music did with the incorporation of audible glitches and noises, other creative fields now use and generate functional elements and formats that were formerly considered as errors and dissonant statements. Sometimes a glitch can lead you to a totally new and innovative idea for your business, inspire a book title, or define a basic idea for a new product, even inspire a new formal language. Glitches grab our attention, shake us, and trigger our imagination. They can hurt or activate our feelings during gameplay or TV watching, feed our visual and audible space with new aesthetic choices, or inspire new working processes. The act of generating glitches itself then becomes entertainment, research, and production.

Even if at first a glitch disturbs our comfort zone, hustles the systems and models we install and follow on a daily basis, they should not be considered as damaging elements to a design process. Our prefabricated models tend to keep us safe from errors and change, and these errors occur more often than we would presumably like them to. By daring the glitch and generating imperfection, we open ourselves to new poetic ways to embrace the unknown, experiment with new techniques, and refute the notion of a finished, end product.

Overleaf: Mendel Heit, Glitch images*, 2010*