Glitch

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This term is usually identified as a part of the jargon, used in electronic industries and services, and also amongst programmers, circuit-bending practitioners, gamers, media artists and designers. In electrical systems, a glitch is a short-lived error in a system or machine. A glitch appears as a defect (a voltage-change or signal of the wrong duration - a change of input) in an electrical circuit. Thus, a glitch is a short-term deviation from a correct value. Glitch can also describe hardware malfunctions. The outcome of a glitch is random.

When applied to software, the meaning of glitch is slightly altered. A glitch is an unpredictable change in the system's behaviour, when "something obviously goes wrong".
A glitch is often used as synonymous to bug; but not to error. An error might produce a glitch but might not lead to a perceivable malfunction of a system. Errors in software are usually structured as: syntax errors (grammatical errors in a program), logic errors (error in an algorithm) and exception errors (arising from unexpected conditions and events).
Glitches have become an integral part of computer culture and some phenomena are perceived as glitches while not being glitches in technical terms. Artefacts that look like glitches do not always result from an error. What users might perceive as "glitchy" can arise from a normally working function of a program. Sometimes these might originate from technical limitations, such as low image-processing speed or low bandwidth when displaying video. For example, the codecs of some video-conferencing software, such as CU-Seeme [1] visibly "pixelize" the image, allowing the compression of parts of the images that remain static over different frames when, for instance, the transfer speed drops.

To comply with customary usage of "glitch" we propose to think of glitches as resulting from error, though in reality it might be difficult or impossible to distinguish whether the particular glitch is planned or results from a problem. To understand the roles glitches play in culture, knowing their origin is not of primary importance. We also think that understanding of glitch as erroneous brings more to a comprehension of its role than trying to give a clear definition that would include or subordinate either encoded glitches and glitches as malfunctions.

Glitches can be seen as a manifestation of genuine software aesthetics. Computers as such do not have a recognisable or significant aesthetics that possesses some kind of authenticity and completeness. It is a commonplace that the aesthetics of software is largely adopted from other spheres, media and conventions. Thus, the desktop is a metaphor for a writing table, the "bureau"; icons descend from labels or images of objects; while the command line interface is inherited from telegraph, teletype and typewriter.

The aesthetics of computers that have developed over a few decades from the early 1950's to the early 1980's when they were first introduced to the public and on to the current time (consisting of dynamic menus, mouse, pointer, direct manipulation of objects on the screen, buttons, system sounds, human computer interaction models) are, in our opinion, not rich and self-sufficient enough to be called the aesthetics of the computer.

On top of that the current aesthetics of software is not complete, it does not work very well – it does not contribute enough to the computer's user-friendliness. Besides, it is a widely acknowledged problem that the customary information design principles of arranging computer data, derived from earlier conventions, such as the treelike folder structure, result in problems users experience with data archiving, and memorizing documents' names and locations.

Historically, the shape, style, and decoration every new technology has been introduced with owed much to the aesthetics and thinking customary at that time. Thus, when mechanism has not yet replaced naturalism as means of framing reality, Lewis Mumford argues, mechanisms were introduced with organic symbols. For instance, a typical eighteenth century automaton, "the clockwork Venus" comprised a female mannequin resting on top of a clockwork mechanism. (Mumford, pp.52-55).

As technology developed further, some genuine machine aesthetics were born, primarily derived from machine functionality. And it was their functionality that some avant-garde movements of the 20th century admired in the machine. For instance, amongst the Russian avant-garde movements of the beginning of the 20th century (i.e. cubo-futurism, abstractionism, rayonism, suprematism), and artists such as Mayakovsky, Gontcharova, Kandinsky, Larionov, and Malevich poeticized new machines for their speed, energy and dynamics. The methods they used to depict movement, light, power and speed could be regarded aesthetically as grandparents of

some of today's glitches (certain correlation of color mass; unlimited diversity of colors, lines and forms; repeating geometrical structures, figures, lines, dots, etc.).
Rationalism and the precision of technical creation inspired many. Thus, Meyerhold writes that: "Arts should be based on scientific grounds" (Meyerhold, p.10).
Russian Constructivists (Tatlin) established a compositional organization based on the kinetics of simple objects and complex ideas of movement; rotating inner mechanisms and open structure, "real" materials - all intended to function for utilitarian use. Punin writes of Tatlin's Tower: "Beneath our eyes there is being solved the most complex problem of culture: utilitarian form becomes pure creative form" (Punin, p.5)

Functional machines, primarily built by engineers, established strong aesthetic principles that have defined technological design for years. Functional elements are later used as non-functional design elements that are appreciated as "beautiful" by users not least due to the cultural memory of their origin. For instance, the curved part of the wing over the of the tire of some car models reproduces the guards used in horse-driven vehicles and early automobiles to protect users and vehicle from dust and to fix lights on (just as in today's bicycles). It does not carry any function today, but is used in automobile design as a recognizable and nostalgically nice element.

Today, the functionality of the computer is concealed inside the gray/white/beige box, which covers the cards, slots, motherboard and wires. In modding [2] these parts are reimagined as elements of visual richness and a symbolism of certain sorts. Hardware elements are aestheticized: users might install neon lights, weird jumbo fans and colorful wires into a transparent computer case or even build an entirely new one from scratch.
Electronic boards jutting out at 90º angles and architectures of twisted wire are widely used in cinema and design to represent "technical substances".
By contrast, the way data is presented on a hard drive is not human-readable. It is stored in different segments of the disk and reassembled each time the documents are retrieved according to a plan kept as a separate file. Software functionality here is invisible and an interface is needed to use the machine. Modern software manages to almost always conceal its functionality behind the window. It provides us instead with images such as a page flying from one folder to another, a sand-clock or that of a gray line gradually being filled with dark blue color.

There are moments in the history of computer technology which are rich in computer functionality producing distinct aesthetics. At such times, computer functionality reveals itself through technological limitations. Bottlenecks, such as processor speed, screen resolution and

color depth or network bandwidth. 4-bit, 8-bit music, 16-color pixelized visuals, slow rendering, compressed image and video with artefacts, create the realm of authentic computer aesthetics, that is, the aesthetics of low-tech today.

There are vast contemporary 8-bit music communities (such as Micromusic.net), based entirely on producing sound on emulators or surviving models of the early home computers of the 80's, such as Atari or Commodore. Alongside producing sine waves, the sound chips of such computers tried to simulate pre-existing musical reality, guitar, percussion, piano. Imperfect and restricted, the chips could only produce idiosyncratic, funny and easy to recognize sounds which were far from the originals. Scarcity of means encouraged a special aesthetics of musical low-tech: of coolness, romanticism and imperfection. People making 8-bit music nowadays come back to their childhoods' favourite toys, memories that are shared by many people. Returning to a genuine computer aesthetics of obsolete technology is not a question of individual choice, but has the quality of a communal, social decision.

Functionality, as a characteristic of established machine aesthetics is always chased by dysfunctionality if not preceded by it. Functional machines, robots, mechanized people (from Judaism’s Golem [3], Frankenstein’s monster [4]) to the rebellious computers of the 20th century) are interpreted as alien to human nature, sooner or later becoming “evil” as they stop functioning correctly.

Thus, the dysfunctional mind, conduct and vision become especially human, compelling, sincere, meaningful, revelatory. Chance, unplanned action, uncommon behaviors were already central to European and Russian literature of the 19th century (Balzac, Flaubert, Dostoyevsky).
In the technological era, society organized according to the logic of machines, conveyor belt principles, “rationally” based discrimination theories, war technology increases fear, frustration, refuse and protest. As a response, errors, inconsistencies of vision, of method, of behaviour become popular modernist artistic methods used from Dada, Surrealism and earlier. One of Surrealism's declared predecessors - the Comte de Lautréamont provided us with the lasting phrase that something could be as "Beautiful as the fortuitous encounter of a sewing machine and an umbrella on a dissection table." (Lotreamont, p.57) - is an introduction of chance, "hasard" (fr.), subconsciousness and irrationality into art and life as opposed to and deeply embedded in rationality and functionality.

Dysfunctional machines are not only those that are broken (images and figures of crashed cars and other mass produced imperfections figure in the aesthetics of Fluxus and Pop Art), but also those that do not comply with the general logic of machines, acting irrationally and sometimes even turning into humans. Thus, in the end of a Soviet movie “Adventures of Electronic Boy” (1977) a robotic boy starts crying and this emotion symbolizes that his nature has become human.

A glitch is a singular dysfunctional event that allows insight beyond the customary, omnipresent and alien computer aesthetics. A glitch is a mess that is a moment, a possibility to glance at software's inner structure, whether it is a mechanism of data compression or HTML code. Whereas a glitch does not reveal the true functionality of the computer, it shows the ghostly conventionality of the forms by which digital spaces are organized.

Glitches are produced by error and usually not intended by humans. As a not-entirely human-produced reality, its elements are not (at least were not) 100% compatible with customary human logic, visual, sound or behavioral conventions of organizing and acting in space.
Aesthetically glitches inherit from avant-garde currents, but are not directly a product of the latter.
Avant-garde artists inspired or disgusted by technology and its societal influence have created certain artistic response, to the aesthetics of which today’s glitch strangely comply.
A glitch reminds us of our cultural experience at the same time developing it by suggesting new aesthetic forms.

A glitch is stunning. It appears as a temporal replacement of some boring conventional surface; as a crazy and dangerous momentum (Will the computer come back to "normal"? Will data be lost?) that breaks the expected flow. A glitch is the loss of control.
When the computer does the unexpected, goes beyond the borders of the commonplace, changes the context, acts as if not logical but irrational, behaves not as technology should, with a glitching interface, strange sounds and broken behaviour patterns, - it releases tension and the hatred of the user towards an ever-functional but uncomfortable machine.

"Error sets free the irrational potential and works out the fundamental concepts and forces that bind people and machines… An error … (is) a sign of the absence of an ideal functionality, whether it be understood in the technical, social or economic sense" (Schultz, p.82-85)

As with every new aesthetic form, glitches are compelling for artists and designers as well as regular users. Glitches are an important realm in electronic and digital arts. Some artists focus on finding, saving, developing, and conceptualizing glitches and glitches form entire currents in sonic arts and creative music making. For example, the Dutch-Belgian group Jodi are known for their attention to all kinds of computer visual manifestations that go beyond well-known interfaces. It's enough to only look at their web-page http://wwwwwwwww.jodi.org to get a sense of their style. In http://text.jodi.org a user browses through an endless sequence of pages that are obviously of a computer origin, and appear to be both meaningless and fascinatingly beautiful.

Video gamers practice glitching [5] (exploiting bugs in games). Game modifications by Jodi, such as Untitled Game, as well as by other artists, such as Joan Leandre's (Retroyou) R/C and NostalG are achieved by altering parts of the code of existing games. The resulting games range from absurd environments in which cars can be driven, but with a distinct tendency to sometimes fly into outer space, to messy visual environments one can hardly navigate in, but which reveal dazzling digital aesthetic qualities.

In his aPpRoPiRaTe! Sven Koenig exploits a bug found in a video player that makes a video compression algorithm display itself. By deleting or modifying key frames (an encoded movie does not contain all full frames but only few key frames while the rest of the frames are saved as differences between key frames) he manages to modify the entire film without much effort. As a result we get excitingly distorted yet recognizable variants of videos popular in file exchange networks, where such algorithms are widely used.

And, of course, with this much work already done for them, we'll soon to see the power of new aesthetics of glitch to be used in commercial products.

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Projects:

JODI, http://wwwwwwwww.text.jodi.org, entitled game, http://text.jodi.org

Joan Leandre (Retroyou), R/C and NostalG, http://www.retroyou.org/ and http://runme.org/project/+SOFTSFRAGILE/

Sven Koenig, aPpRoPiRaTe!, http://popmodernism.org/appropirate/

Film:
Adventures of Electronic Boy, Odessa Film Studios, 1979, Parts 1 - 3, 200 min.
Director: Konstantin Bromberg, Script: Evgeny Veltistov, Starring: Vladimir Torsuev and Yuri Torsuev

Footnotes:

[1] Traces of CU-SeeMe can be found through http://archive.org searched for http://cu-seeme.com

[2] See ”case modification” in Wikipedia: http://en.wikipedia.org/wiki/Case_modification

[3] For an excellent account of Golem, see: http://en.wikipedia.org/wiki/Golem

[4] Mary Shelley, Frankenstein; or, The Modern Prometheus, London, 1831.

[5] See “glitch” in Wikipedia: http://en.wikipedia.org/wiki/Glitch