

Web browsers prescribe the ways we access and navigate knowledge and communities online. Since the 1990s browser software has been an arena for artistic interventions ranging from quirky standalone browsers to performative pieces to minimalist browser add-ons. The (im)possibility of navigation is not taken for granted and is probed, questioned, and reformulated through such software practices. We propose navigation as a mode of exploring interactive software that allows researchers to collectively document manifold facets of artists' browsers.

Navigation

Reihe
Begriffe des
digitalen Bildes



Navigation



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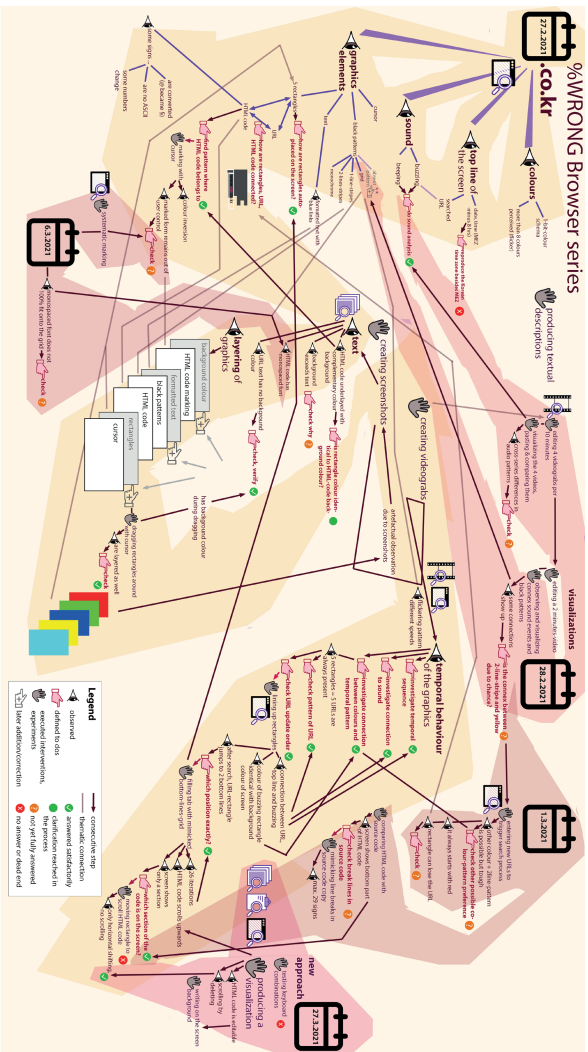
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Fig.1., Illustration of the author's meandering research process. The darker yellow areas show roughly the sequence of actions, starting at the top left. While not every micro step is entered here, the illustration should provide information about which questions and observations were made on the grounds of which empirical data.



Meta-forensics: Is it possible to get %WRONG Browser right?

My task was to get to know the browser as well as possible, to document it in a way that would enable someone who did not have the chance to interact with the application to get a feel for it. For me, that involves pictorial densification and narration, taking the reader of the documentation – that tightly interlaces images and text – by the hand and leading them through the jungle of impressions and opportunities for interaction.

Biases

First, I must address some biases, which somewhat compromised my contribution with respect to a “clean” set of experiments as envisioned in this issue.

Pre-knowledge due to interviews with the artists.

The documentation of *.co.kr* was the fourth documentation I have made of JODI’s %WRONG Browser series. In total, I dealt with: *.com.mx*, *.nl*, *.cn*, [interviews on 1/26/2021 and 2/12/2021], *.co.kr*, *.com*, and *.br*, in this order. The last three of these were informed in several ways by conversations with the artist duo. I took the nomenclature and responded to clues either by dropping the follow-up of a (clarified) detail or by deepening the investigation (if discrepancies are suspected).

Pre-knowledge due to analysing a series.

The browsers in the series have some design elements in common. Therefore, the aspects that had been explored in detail in another browser were only briefly verified in the next, placed well down on the list of priorities, or used *en passant* as a given to target something else. The epistemic significance had thus changed.

Main questions

My central questions are: a) How are the elements or phenomenological aspects related to each other? b) What patterns can be found (to ask later: how can they be interpreted)? This inquiry model allows me to adopt a low-level entry point in the sense that I can begin basically anywhere, my attention can refer to tiny connections which can then accumulate, cluster and thus enable me to recognize larger complexes. These build on former observations and thus, as the analysis advances, my analysis becomes ever more entangled with the specific artwork in question.

Hardware and software

I mostly worked with two monitors (laptop and a larger external monitor) simultaneously, which allowed me to have the browser running, filling the whole screen of monitor 1, and have a window open next to it for the several other programs I use. When working with only one monitor, I switched between the programs with *alt+tab*. Generally – for better screenshots – I try to run the browsers on a larger monitor (which did not work in this case). This was the only hardware-related consideration I brought to the documentation, otherwise my tools

remained limited to software. I used the following programs:

- Mozilla Firefox 78.2.0esr (64-Bit) for comparing HTML- and source code
- Greenshot for full screen screenshots
- IrfanView 32 to view screenshots
- Bandicam 4.5.6.1647 for screen recording
- MiniTool MovieMaker 2.0 for editing videos
- VLC Media Player for watching videos
- Sonic Visualizer 4.2 for visualizing sound in video
- Adobe Photoshop 2020 for creating visualizations (besides pen and paper)
- Word in Microsoft Office Professional Plus 2019 for textual documentation

From a nonlinear process towards a linear documentation

In the documentation I set three priorities: a) to map my explorative procedure, b) record my days of analysis, c) ensure consistency in the reading flow of the illustrated Word document along the aspects I studied. These three dimensions could only be combined with compromises (Fig. 1).

I start the process of familiarizing myself with an ‘auto-pilot’-program like *.co.kr* by first simply observing it before moving into an interactive engagement. In the first phase, I mostly use screen recording (screenshots to a lesser extent). Here, I make a broad variety of observations and register these mentally. After about ten minutes, I start to write down what I have found. I describe the points and initial patterns I observe and put these into a (text-induced) linear order. In this initial stage of collecting impressions, the order is not yet a major concern. It is more important that nothing is forgotten, and

everything is filed as ‘seeds’ that can be developed as individual nuclei at a later stage.

Exploration.

Initially, the screenshots serve as evidence for referencing the many details that remain constant. The description of this inventory is created anew with each application and is not oriented according to a preconceived list. Even entities of the next higher level of complexity, that is performative patterns, are the results of my conceptualizations, and thus usually cannot be revealed in the same way via screenshots. Sometimes, it turns out that an observation is declared as a pattern too early, that a tentative explanation seems to be implausible after all, or that an aspect has been looked at only imprecisely or partially. This is often the case while the events are too confusing. Only gradually does it become possible to isolate the simultaneous events and to observe them individually. At this point, the phase of conceptual clustering for the observation and documentation begins. The individual events and patterns are then labelled with descriptive names of my own invention (here for example the ‘black pattern’). This process of isolation is necessary for the analysis, in order to understand the interaction of the elements and to grasp this as a synthesis. Once this is understood, test series are set up. One strategy for mining information in works with parallel and autonomous processes is by going to extremes, provoking singularities, that is producing a stress test of the application. I find this particularly appealing because the range of the program’s processes would appear to be a meaningful metric. Exploring the limits and conditions of the possibilities for expression paves the way for an exploratory, criminalistic or forensic procedure. A second strategy is to create ‘clean’ situations to get an unobstructed

'view'. Depending on the application at hand, this can either take the form of a restart, of 'emptying' the screen or of inducing an easily recognizable pattern, from which the subsequent deviation is suspected to be informative.

Consolidation.

Initially, I gather impressions from every direction before going on to expand them, consolidate them, determine their scope, and possibly explain them. At this point, at the latest (here from day 2), the linearity of the textual documentation necessarily begins to diverge from the procedure. I start by noting down my observations and trying to clarify the open questions in the examination of the application selectively (this is where the reddish arms point to in Fig. 1).

Structuring the documentation.

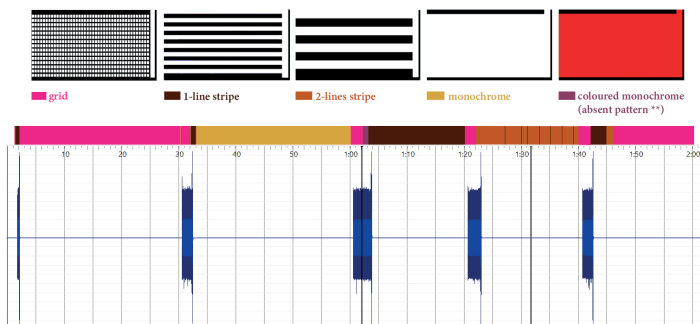
The key task now is to structure the documentation text. For better orientation, the paragraphs are retrospectively provided with bold headings or text passages that indicate their own conceptual clusters. This allows me to insert subsequent additional information more quickly and in the correct place. Cross-references of a different kind run down the text via asterisks (* that indicate answers to previously posed questions) and via the numbered trials. Things that are still unclear are marked in red as questions, because even knowing what you do not know is helpful. Sometimes I deliberately and openly admit that I am in conversation with my earlier observations, the assessment of which may have changed several times, because the information that there was confusion here can also be significant.

Trials – or test series – are deliberately created and executed experimental arrangements with the browser. Not all

confrontations with the browser are declared as experiments. Which of them are listed as such is relatively contingent upon whether an explanation is required of how a result was reached or the complexity of the step. Pure exact observation does not qualify as an ‘experiment’, excursions with external analysis tools do. The experimental setups are intuitively designed to address the general guiding questions above. My experimental set-up design is not always right, sometimes the test series needs to be longer or have a different resolution. Fig. 2, for instance, is successful as micro patterns become evident. However, long-term patterns do not yet come into view as the sample is too short.

In the experiments, I more often take screenshots than use screen recording. Here, I am consciously not yet very specific, the screenshots aim at a phenomenological range, at difference in color, form and composition, or try to capture (supposed) peculiarities. The screenshots are also discussed ever more specifically later in the documentation text. This is in keeping with the spirit of the procedure as a whole. In this post-initial phase, where I ‘look’ a bit more thoroughly, I still make a lot of casual observations, but this decreases successively as I gradually clarify the various aspects. The investigative gaze becomes both sharper and narrower. In cases where the perception of a particularity (such as a suspected bug or Easter egg) becomes more pronounced, I direct the reader’s attention with the help of detail screenshots, which are practically always incorporated into the Word document and annotated. Otherwise only a small selection of screenshots of the whole monitor find their way into the text document and the remainder are simply filed in a folder.

Fig.2. Attempt to clarify the temporal correlation between the buzzing and beeping sound (waveform diagram, 2 minutes) and the black patterns in the color-coded stripe on top.



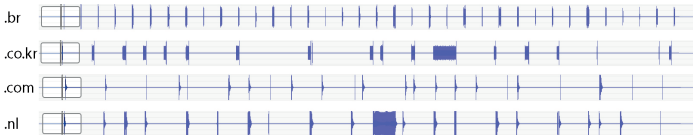
Visualizations.

Being aware of recognizing and remembering visual elements better than time-based features, I put a special focus on the latter a) by repeating a situation in a targeted manner so that a specific dynamic is staged for the video grab and b) by producing visualizations. The visualizations are intended to be condensed clarifications of connections and can compile cumulative events in a proto-statistical manner (lots of counting!) or combine different features of an individual (typical) runtime section (Fig. 3).

This connects to Franco Moretti's "artificial constructs" that present information in an abstract model to create a sharper sense of how elements are connected.¹ In addition, visualizations are useful for explaining relationships that are recognized during the inquiry but cannot be captured with screenshots alone. The collage (Fig. 4) is intended to make clear that the screen view shows only a section of the bigger picture. To

1 Franco Moretti: *Graphs, Maps, Trees. Abstract Models for a Literary History.* London 2005, p.1.

Fig. 3. Comparative line-up of waveform diagrams (10 minutes) from four different works of JODI's %WRONG Browser series in order to determine whether the sound (search) events exhibit different patterns.



depict the off-screen elements, I do not shy away from inventing fictitious HTML code sections that are visually plausible or copied from other screenshots. Since JODI's font is custom made, and consequently cannot be found in font libraries, I approximated the font with one that comes close to the original impression (I took *Source Code Variable* (designed by Paul D. Hunt, 2017), bold, 27pt), but leaves the reconstruction recognizable as in a *tratteggio* retouching.

Fig. 1 reveals that the most time-consuming steps – such as these ad hoc visualizations – end up being labelled as having only partial results. This may have something to do with the slight dissatisfaction I feel here, as I can think of many more ways to optimize these visualizations for producing evidence. Here, the orange signs are shorthand for ‘it could be improved’.

General features

Varying degrees of depth in analysis.

Evaluating my results critically and in retrospect, it is noticeable that the degree of analysis and time invested in this evaluation work differs according to my biases and the presumed significance of the targeted detail. In some cases, I was even prepared to accept a process as a performative ‘pattern’ if I was able to

replicate it once (!) or twice, or if it repeated itself. Sometimes, I consider aspects that were only analyzed once but could be 'consolidated' at a second instance as being transferable to other elements. This procedure presupposes that the work is subject to a constant set of rules and that coherence and correlation are predominant. This was unquestioningly assumed in the context of these programmed works. Some aspects

a) were observed, tested, or tracked down until no more questions were open.

b) could be clarified briefly without problems but did not arouse any special curiosity due to the biases mentioned. This was seen as a compulsory exercise and initially pushed into the list "(confident to know how it works but) not yet tried".

c) were taken as given only on the basis of intuitive judgments without being objectified further. For example, I thought the term 'color inversion' was adequate for the marking, even though I did not measure the individual color values.

d) were analytically only teased (such as the long-term pattern in Fig. 2, also indicated as 'semi-clarified' by orange marking in Fig. 1), e.g., if the analysis is very labour-intensive with the present means.

e) were considered a desideratum but not pursued due to a lack of adequate tools, otherwise the process would be too exhausting, fragmentary, or error-prone.

More curiosity-driven than systematic.

The various distinguishable iconographic steps were not systematically separated: oscillating between interaction and analysis, the text documentation mixes simple descriptions, externally researched results and first interpretative approaches. Viewed retrospectively, my style of documentation feels like the beginning of a research project that has stopped midway

as it falls short of argumentation, theorization and contextualization. The interpretative bits and pieces are brief and serve to note down the ideas that arose during the investigation, so that they could be used later for academic elaboration. Thus, I would see my outcome as a hybrid. The short inquests ‘outside’ the *%wrong Browser* – in a ‘competitor’ browser – were quite relaxing and enabled me to create small packages of information that may well be useful when sorting through the many aspects that are still not understood. It did not occur to me that I could seek out this additional information within *.co.kr*, i.e. to take this browser seriously in its browsing capacity. For this experimental endeavour, however, quite different test arrangements would be needed... which leads me to my final point.

Open-ended.

I interacted with the application until I ran out of ideas of what to do next. Distributing the analysis over several days proved useful as it gave fresh ideas time to emerge. Reading the documentation after an interval of a few days was a valuable exercise as forgetfulness allowed me to detect gaps and insecurities in the own documentation as well as aspects I had only half understood. The production of visualizations is also a valuable testbed for proving a full understanding. Completeness is an aim. This exploratory approach faces a latent ‘halting problem’ and thus probably a pragmatic ending. Here, the “epistemic thing”² feels like a fractal or even rhizome where one can always refine an inquiry even regarding the most unsuspecting occasions and can find another seed or pocket to explore in greater detail. My hope is, however, that the loose ends will grow together, that details will meet in instances of mutual confirmation and become “robust”.³

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2 Cf. Hans-Jörg Rheinberger: *Experimentalsysteme und epistemische Dinge. Eine Geschichte der Proteinsynthese im Reagenzglas*. Göttingen 2001.


3 Cf. William Wimsatt: *The ontology of complex systems. Levels of organization, perspectives, and causal thicketts*. In: *Canadian Journal of Philosophy. Biology & Society. Reflections on Methodology*, no. 20, 1994, pp. 207-274, here pp. 214-215.

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