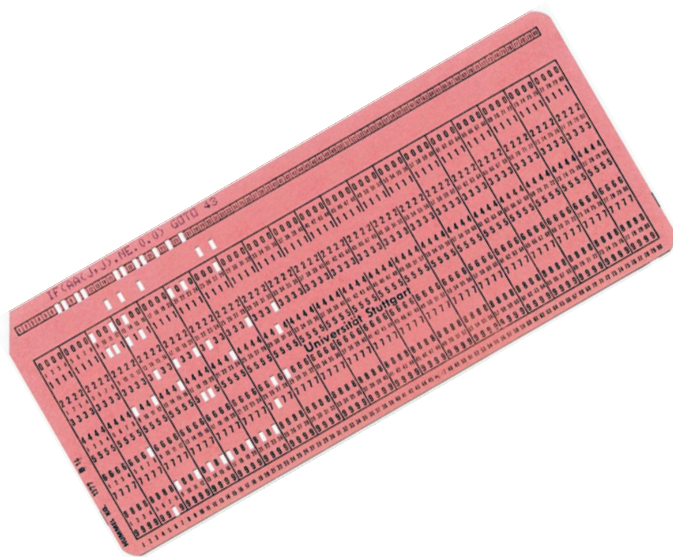


# Materialidades da Literatura



Vol. 6.1 (2018)  
Electronic Literature: Affiliations

Editors:  
Rui Torres  
Manuel Portela

# Mallarmé's Self-replicating Machine

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## ABSTRACT

This paper explores the artistic legacy of Stéphane Mallarmé's 1897 poem "Un Coup de Dés Jamais N'Abolirà le Hasard" through a selection of derivative works, in order to demonstrate how the poem can be interpreted in digital environments as a self-replicating machine, programmatically facilitating the ongoing production of potentially countless ulterior works, including our own internet recasting called [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com). Through a detailed discussion of this work, we will attempt to draw a lineage between Mallarmé's original poem/book of 1897 and Google, incorporated a century later, in 1997. In conclusion, we will speculate on the potential that our interpretation of Mallarmé's work may provide a form of poetry for non-human readers, which we interpret as a metaphysical search for meaning by the kinds of Artificial Intelligence programs currently in development by corporations such as Google.

## KEYWORDS

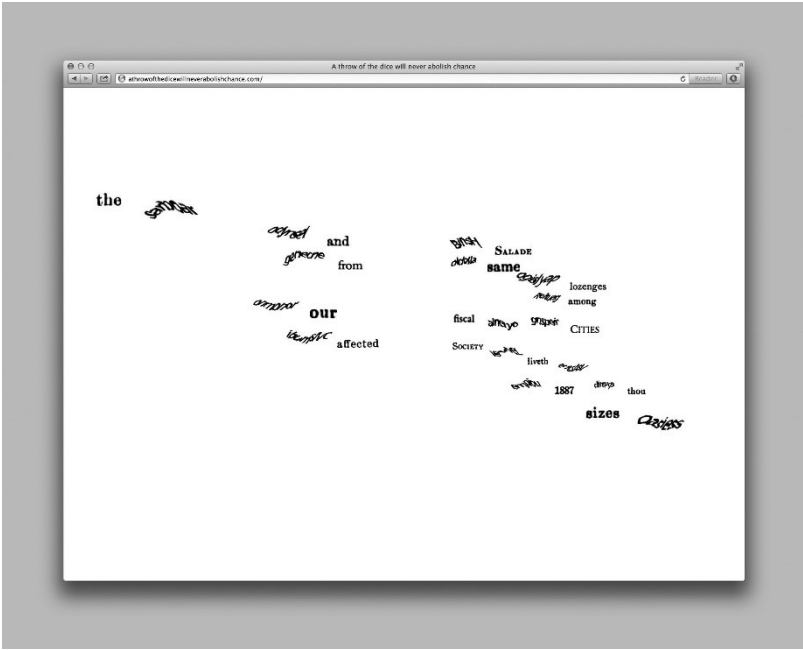
electronic literature; generative poetry; remediation; Google.

## RESUMO

Este artigo explora o legado artístico do poema de Stéphane Mallarmé "Un Coup de Dés Jamais N'Abolirà le Hasard" de 1897, através de uma seleção de obras derivativas, a fim de demonstrar de que forma o poema pode ser interpretado em ambientes digitais como uma máquina auto-replicadora, que propicia programaticamente a produção contínua de obras posteriores, potencialmente incontáveis, incluindo a nossa própria reformulação para a Internet, chamada [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com). Através de uma explicação detalhada desta obra, tentamos traçar uma linhagem entre o poema/livro original de Mallarmé de 1897 e a Google, empresa constituída um século depois, em 1997. Concluímos especulando sobre o potencial que nossa interpretação da obra de Mallarmé contém para uma forma de poesia dirigida a leitores não-humanos, que interpretamos como uma busca metafísica do sentido pelo tipo de programas de Inteligência Artificial atualmente em desenvolvimento por corporações como a Google.

## PALAVRAS-CHAVE

literatura eletrônica; poesia gerativa; remediação; Google.



**Figure 1.** [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com), internet artwork by Karen ann Donnachie and Andy Simionato, (2015-2018). All images copyright Karen ann Donnachie & Andy Simionato.

I. BACKGROUND

**A**t ELO2015 we launched the internet artwork [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com) (*A Throw of the Dice*) exhibited at LydGaleriet, Bergen, Norway. This work has been subsequently exhibited in Tokyo and Kyoto by the Tokyo Type Director’s Club, in the Australian exhibition “Words Without Grammar,” and remained functioning and accessible to the public at the URL until 31st March 2018, when Google turned off the reCAPTCHA v1 service. The title of the work derives from the English translation of the title of Mallarmé’s original poem “Un Coup de Dés Jamais N’Abolirà le Hasard” (“Un Coup de Dè’s”).

## II. GENERATIONS

Although this is not specifically a critical discussion of the literary or linguistic matter of Mallarmé's poem "Un Coup de Dés," its narrative is useful here and can be summarized as follows; a ship's captain, who Mallarmé calls the "Master", is floating on the ocean in a terrible storm, below him sinks the wreckage of his ship. The Master is holding dice, that he hesitates to throw for he knows that by casting the dice he will reveal an important truth, one that Mallarmé refers to as the 'Number.' It is not important here, as suggested by some scholars (Meillasoux, 2012), whether the 'Number' that the Master is about to reveal is indeed a key to unlocking some mystery hidden within the poem itself, but it is suffice to note that the poem uses a system of symbols that describe a suspended process of internal combinatorial logic that remains hidden to the reader.

Perhaps, the poem's most distinctive visual feature is its radical departure from typographic and grammatical conventions of the period, specifically its distribution of words and groups of words. The resulting white spaces, described by the poet's friend Paul Valéry as 'embodied silences' (Bindeman, 2017: 12; Guerlac, 2000: 98), occupy a majority of the poem's eleven double-page spreads, suggesting additional meanings or interpretations of the poem.<sup>1</sup> Yet any internal logic suggested by this graphical treatment appears just beyond the reader's grasp, and indeed 'solutions' to this visual poem-puzzle abound in its historiography. One example among many that demonstrates the extent of the poem/book's influence beyond the literary field, can be found in Philip B. Meggs's entry for "Un Coup de Dés" in his *History of Graphic design*:

Rather than surrounding a poem with white, empty margins, this "silence" was dispersed through the work as part of its meaning. Instead of stringing words in linear sequence like beads, they were placed in unexpected positions on the page to express sensations and evoke ideas. (Meggs and Purvis, 1992: 242-243)

Mallarmé's adoption of expressive typographic experimentation and creative use of page-space has influenced not only the genre of visual poetry but, as Marcel Broodthaers would argue, has also helped establish principles of sign, symbol, and image, that underlie much of 20th Century Contemporary Art (1992: 149).

Given Broodthaers' own potent connection to Mallarmé through his well-documented homage of "Un Coup de Dés," (1969) to which we will turn shortly, such claims may appear exaggerated. Yet the statement may not be all hyperbole, if we consider the large number of derivative artworks, and more specifically, artists' books, that owe a debt, in some way, to "Un Coup de Dés." What follows is not an attempt to exhaustively document this lineage of derivative

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<sup>1</sup> Despite its graphical treatment, as both Malcolm Bowie and Jan Hokenson note, "Un Coup de Dés," should not be defined as a calligram (Hokenson, 2004:172; Bowie, 1978: 119).

works (although even a cursory search suggests a sufficient number exist to populate at least one anthology of works which directly quote Mallarmé's poem), but simply a scattered sampling of notable exemplars useful for our purposes. Our primary objective in referring to these derivative works is to identify congenital similarities traceable back to Mallarmé's 1898 poem/book and forwards to our own version of Mallarmé's poem/book, which we re-imagined as a "technological machine," designed to self-replicate by reconfiguring its constituent elements at each re-casting.

As previously mentioned, of the most notable interpretations of Mallarmé's poem/book is the 1969 work by Marcel Broodthaers, who remade Mallarmé's original poem/book by redacting all its text, drawing over each lexia (line of words) transforming each spread of the original book into a patchwork of black rectangles. In this way Broodthaers privileges our awareness of the importance of the relative positions of the words and sentences on the page over their semantic meanings. His act of creative destruction renders the language of the poem illegible and returns the book to an object to be seen and not read.

Yet Broodthaers' appropriation is not the only, nor the first, derivative work that explores the formal qualities of "Un Coup de Dés" while obliterating its words. Another noteworthy example, and not only for its uncanny resemblance, is Italian artist Mario Diacono's "JCT 1, a MeTrica n'ABOolira" (1968).

In what appears to be a parallel action to Broodthaers' treatment of Mallarmé's poem/book, Diacono redacts the texts in Mallarmé's poem with orange and grey coloured boxes, albeit on heavy, opaque paper, rather than Broodthaers' exclusively black marks on translucent stock.

Broodthaers' and Diacono's formal graphic treatment of Mallarmé's poem both appear to echo Ernest Fraenkel's appropriation of "Un Coup de Dés," (1960) which, in addition to black boxes obliterating Mallarmé's words, includes lines linking the extremities of each box directly above or below. These additional parenthetical insertions, which define distinct areas of the page-space, become completely filled with black in later spreads of Fraenkel's derivative work, further reinforcing the topographic interpretation of Mallarmé's poem/book.

Such topographies become further abstracted when Ellsworth Kelly revisits the spatial balance of the poem by filling the pages with large graphic blocks of black ink (Kelly: 1992), suggesting a contradictory space where all semantic meaning is both contemporaneously lost (a void) and possible (a well of ink).

A decade after Kelly's work, Guido Molinari paints (and publishes) bold multicoloured friezes of Mallarmé's pages (2003) and Michael Maranda (2008) cuts away the redacted blocks previously added by Broodthaers in his appropriation (1969), leaving a kind of negative after-image. This is followed in 2010, when Cerith Wyn Evan performs an analogous operation, allowing the gallery walls to be seen through the rectangular holes in the page (Evan, 2010). Marine Hugonnier (2007) instead incorporates collage into the page in her 2007 homage, disrupting Mallarmé's original topographies with images, introducing the logic of the photograph to that of the word.

Michalis Pichler (2009) and Rainier Lericolais (2009), independently create works which apparently meta-appropriate (that is, appropriate another artist's appropriation of) Mallarmé's poem. Like Maranda and Wyn Evan, both Pichler and Lericolais perforate the paper following Broodthaers' redactions, but combine all the pages into a single long sheet suitable for playing music on a street-organ.

Finally, Eric Zboya's 2011 digitally generated works derived from "Un Coup de Dés" extend these existing tropes, that share the desire to explore the poem's page-space, by introducing a vector of depth to the preserved letterforms (Zboya, 2011). Through the extrusion and generative manipulation of typographic dimensionality, Zboya claims to relate these experiments back to Mallarmé's "higher-dimensional motifs" (Raley, 2016).

Whether the product of coincidence, influence or confluence, the works in this brief collection of referential artworks evidence the ongoing potential for Mallarmé's poem/book to generate new works. We argue that the function of these, and many other derivative works, is not merely to cite, each paying homage to their collective parentage through the reflective translation of an original that remains inert and passive. Instead, we propose that such derivative works may be re-imagined as 'generated' by Mallarmé's poem/book which, from this perspective, can be described as active in generating subsequent works. We will argue how the work's deliberate resistance to its own resolvability, its perpetual 'unfinal' status is an invitation for creative interpretation by others.<sup>2</sup> "Un Coup de Dés" is deliberately designed to remain suspended and unresolved. Mallarmé symbolized the significance of this state of suspension through the shipwrecked Master, hesitating to throw the dice he holds, because through this action he may reveal some hidden truth. Critical discourse around the poem, and its many derivative works often focuses on imagining what this ultimate meaning may signify. Instead of understanding "Un Coup de Dés" as holding a key required for its understanding, we argue that Mallarmé's poem/book can be reframed as a question locked within itself. It was this intuition that led us to explore the recursive potential of "Un Coup de Dés," through the making of our own derivative work [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com).

What follows is how we manifested this re-imagining of "Un Coup de Dés" as a self-replicating machine—the primary function of which is to generate ulterior machines—by developing a *techné* for self-generative literary reproduction using Google's own attempts to find meaning in the book.

### III. GOOGLE AND THE MYTH OF THE UNIVERSAL BOOK

Our research into this genealogy of derivative works revealed how "Un Coup de Dés" can be seen as a Guattarian "technological machine," generation zero of a

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2 This is a reference to Derrida's term "unrealized" (*Le livre irréalisé*), (Derrida, 1978: 29).

machinic phylum containing self-productive elements with the capacity to construct or evolve for future and alternate assemblages, “with each generation opening the virtuality of other machines to come; and particular elements within these machines also initiate a meeting point with all the machinic descendants of the future” (Guattari, 1995: 8-12).

Mallarmé kept detailed notes describing his ambitious and unrealized masterwork, that he called simply *Le Livre*, which translates to ‘*The Book*’ (Meillasoux, 2012). According to these notes, Mallarmé’s universal masterwork *Le Livre* comprised unbound double-page spreads that could be re-shuffled according to a “complex combinatorial,” which dealt the reader new meanings at each delivery. Meillasoux describes Mallarmé’s detailed sketches for *The Book* that included the organizing of reading ‘ceremonies’ analogous to a secularized mass:

...a ceremony whose Bible would be a Book made of mobile pages, without the name of an author, and whose officiant is presented as an ‘operator’ joining two by two the loose-leaf pages according to a complex combinatorial that, so it seems, was intended to discover a multitude of meanings that would vary with the connections (Meillasoux, 2012: 24).

Blanchot claimed that Mallarmé’s masterwork was not merely speculative, but rather gained “support and reality” in “Un Coup de Dés” (2003: 234). Whether “Un Coup de Dés” was the realisation of *The Book* that Mallarmé theorized is unimportant here, it is suffice to note Mallarmé’s interests in the potential for generating new meanings from the perpetual recombination of the paratextual elements of the book—a quality which became a primary objective during our development of our own Mallarmé-machine.

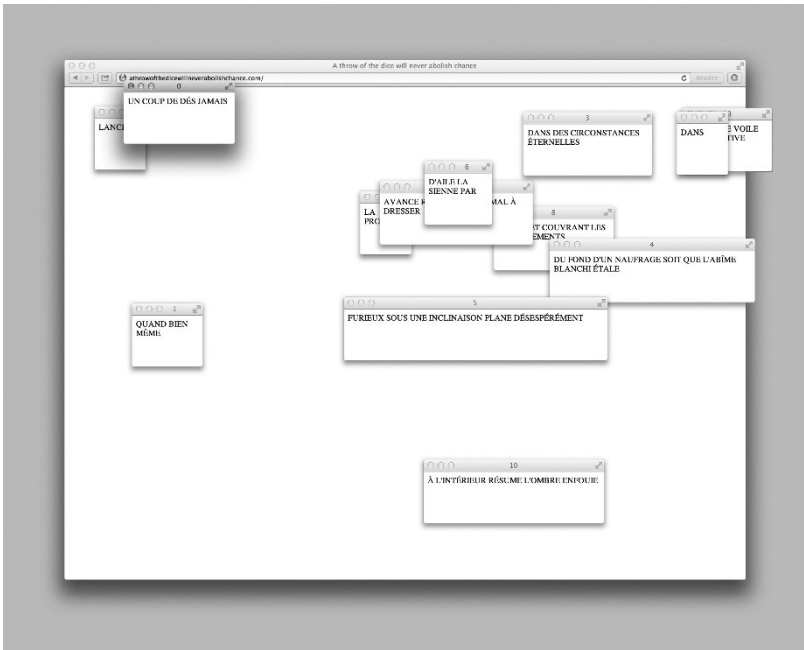
Once we began re-imagining Mallarmé’s work as the manifestation of a desire to create a way to generate a multitude of meanings through infinite recombination, and we consider the theory that the computer is precisely a “language machine,” the potential connections between “Un Coup de Dés,” algorithmic writing and electronic literature in general, became more apparent (Winograd, Sheeran & Sosna, 1991). Considering the possibility that Mallarmé intended “Un Coup de Dés” as a combinatorial mechanism as imagined within his mythical conception of *The Book*, then a contemporary interpretation of his poem/book could be explored through a programmatic machine, or to use a contemporary term, a computer code. It was with these elements in mind that we turned to creating our own derivative work.

Our process began with a consideration of the symbol of the dice—what we considered the algorithmic device used symbolically within Mallarmé’s work and often cited as central to an understanding of the poem—and the correlation between the number of pages of “Un Coup de Dés” (eleven) and the number of possible distinct outcomes of a roll of two die (also eleven). Félix Guattari (1995) reminds us that even in the games of chance such as roulette, chaos is perceived, until an intimate knowledge or closer observation reveals series and patterns in

the outcomes. So we set about designing an experiment to permit us a more “intimate knowledge” of what we perceived as chaotic distribution of the typographic elements in Mallarmé’s poem/book.

We subjected Mallarmé’s spatial distribution to probability tests through the use of geo-statistical models. The ultimate goal was to have the poem not only self-generate but also self-organize according to Mallarmé’s instructions for the placement, density and typography, as found on the original text, with each new generation dependent on the results of the addition of the values on two randomly rolled die.

Early experiments of this iteration of *A Throw of the Dice* applied a statistically weighted combinatorial logic of the roll of the die to “Un Coup de Dés.” A process that at first was appealing as it promised a new uncovering of the poem’s ‘key’ hidden within the book. The pages were served to the user randomly, according to eleven possible results of a pair of dice. The text (Mallarmé’s original verse, available in French and English) was then ‘cast’ across the page with typographic elements (the font position, style, weight and size) determined according to the statistical inference of Mallarmé’s original distribution and page-design.



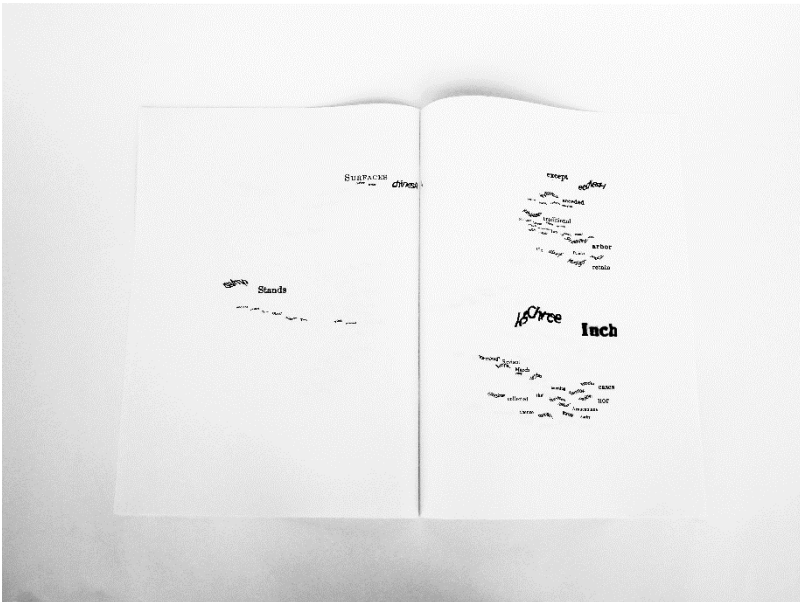
**Figure 2.** An early iteration of [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com) (2015) where browser windows were distributed across the screen in positions analogous to Mallarmé’s poem/book.

This early iteration of our Mallarmé-machine could generate continuous variations of the poem’s paratexts so successfully that without prior knowledge



of the poem, the casual reader could possibly mistake a machine-generated version for the original, even if the words were positioned differently to Mallarmé's poem. This 'goodness of fit' evidenced the successful relocation of the elements of chance that we had observed in "Un Coup de Dés." Several other minor iterations followed that provided superficial interaction of the page surface dependent on mouse movement, words moving as ripples, browser windows flocking and ebbing across the screen, and other experiments which all ultimately proved unsatisfactory in our desire to recast the poem/book as a self-replicating machine.

We realized that all of the experiments to date were in some way determined by Mallarmé's typographic choices and the semantic values they carried. In some experiments, Mallarmé's words appeared even more static alongside our algorithmically generated elements. In short, because our *A Throw of the Dice* remained tethered to the language of the original, we had merely created a series of digital simulacra which unwittingly fetishized Mallarmé's poem/book (along with its 20th century print technologies). Although some were visually exciting, our early experiments failed to engage the reader with the affordances of electronic space. Our project appeared merely another (more or less successful) homage to Mallarmé's legacy, paying tribute to its lineage without contributing significantly to the kinds of critical discourse on the transformation of the post-digital book that interested us most. At least until we enlisted the help of an unexpected co-author: Google corporation.



**Figure 3.** Visitors to the internet site [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com) are encouraged to make a physical printout of the uniquely generated edition for delivery to the Google book project. This unique edition was printed 3 June 2015.

We will now briefly outline the “machinery” behind this most recent iteration of our internet artwork, and describe how these elements serve to form a meeting point between both Mallarmé’s original poem (written in 1897) and the uber-book of Google (registered in 1997). We will describe how we recast Mallarmé’s poem/book by using images of words appropriated from Google’s reCAPTCHA service in order to continuously reconstitute and recombine new meanings.

#### IV.A METAPHYSICAL RECAPTCHA

Before describing reCAPTCHA, we must begin with a description of CAPTCHA. The ‘CAPTCHA’ interface, an acronym meaning ‘Completely Automated Public Turing test to tell Computers and Humans Apart’, in practice, is a security service which can be used for allowing only humans access to specific areas of a website; to do so, users are asked to type the words they read in an image of some way or distorted characters to determine they are human before proceeding. Thus the CAPTCHA system assumes the role of gatekeeper in order to protect against automated (non-human) programs that attempt malicious access to online resources (Von Ahn et al., 2008).



**Figure 4.** [www.athrowofthedicewillneverabolishchance.com](http://www.athrowofthedicewillneverabolishchance.com) (2015). Detail of a text-based reCAPTCHA image served by Google and appropriated for a generated edition of *A throw of the Dice*.

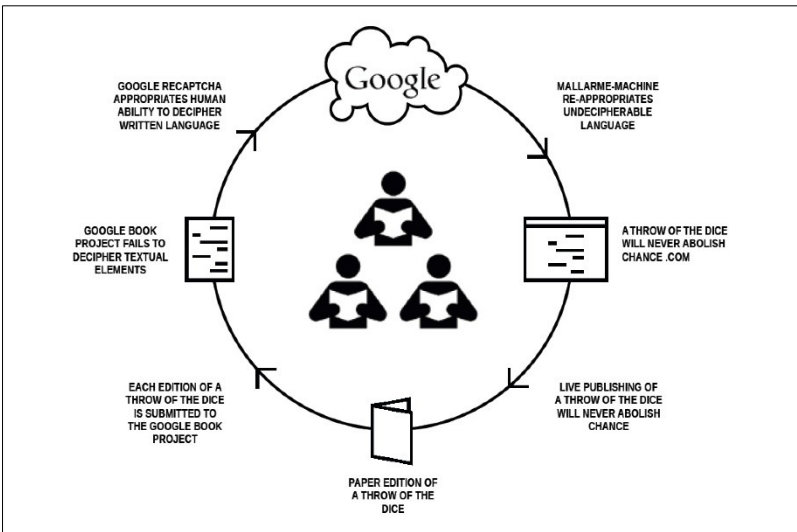
The functions of Google’s reCAPTCHA, however, extend beyond that of simple sentry or security device, it was in fact adopted by Google in 2009 to assist in

the company’s attempt at digitizing every book in the world. When optical character recognition (OCR) fails to find a strong match in a scanned text from a book or diagram (which may happen for example, when the text is either blurred, wavy or otherwise distorted) an image of this word is farmed out to human readers through reCAPTCHA “...enlisting humans to decipher the words that computers cannot recognize” (Von ahn et al., 2008: 1465). As stated by a Google engineer, the purpose of Google’s mass-digitisation of every book in the world was not for human readership, but for their AI:

We are not scanning all those books to be read by people,” an engineer revealed to me after lunch. “We are scanning them to be read by an AI [Artificial Intelligence] (Dyson, 2012: 367).

Google appears to be taking Mallarmé’s often cited statement, that “the world exists to end up in a book,” (Pearson, 2004) one step further. Google’s attempt at creating a “universal book” suggests that “the world exists to end up teaching an AI.”

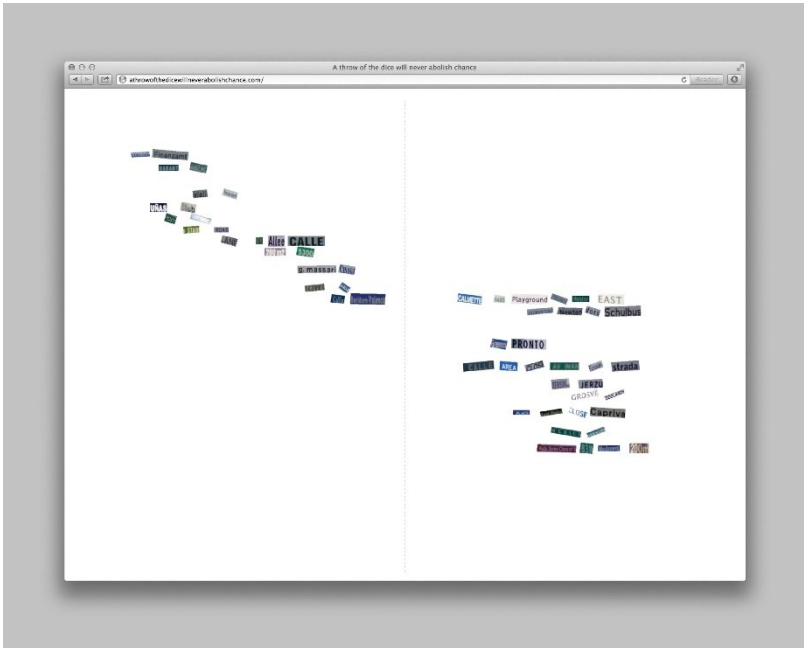
Whenever the internet site of *A Throw of the Dice* is accessed, our algorithm generates a unique, randomized combination of reCAPTCHAs arranged with the same spatial distribution as Mallarmé’s “Un Coup de Dés,” therefore each access to the page potentially generates a new edition of the book.



**Figure 5.** Conceptual visualisation for [www.athrowofthedicewillneverabolish-chance.com](http://www.athrowofthedicewillneverabolish-chance.com). The work is designed as a recursive system for human and non-human reading of “Un Coup de Dés.”

The reader is encouraged to save and resubmit their new edition of *A Throw of the Dice* to be catalogued in the Google book project. Predictably, Google’s OCR system will continue to fail to read the texts made up of the same reCAPTCHAs

it previously could not decipher, and once again, the Google book project will enlist the help of other human readers to resolve these undecipherable images of words. In this way, *A Throw of the Dice* becomes a recombinatorial, recursive, self-productive machine capable of making and unmaking meaning across both Mallarmé's cryptic 'unfinal' book of poetry and Google's book project, each meeting points of the book a century apart.



**Figure 6.** An unexpected development of <http://www.athrowofthedicewillneverabolishchance.com> (2015) happened when Google's reCAPTCHA service began to serve images from Google's street view alongside the words from its Google book project. The inclusion of these images of numbers (taken from houses and street signs) added a further layer of meaning to our derivative work.

When our artwork was first published online, the reCAPTCHA images were all of words from manuscripts, books, marginalia and so on. Later, the images started to present as numbers, and street signs, presumably taken from Google's Street View. This further recombination, the substitution of the word-variable was an unexpected but welcome evolution of the work. Our Mallarmé-machine was based on the idea of experimenting with combinatorial logic as an attempt to decipher the meaning of the poem, a meaning that has been argued can be only unlocked through the discovery of the Number (Meillasoux, 2012). Our algorithm of the Mallarmé-machine was designed to serve texts generated by Google's reCAPTCHA program, but later, and without our intervention, it appeared to attempt a construction of the poem by recombining numbers. In these

instances, the work both visually manifested its intrinsic self-productivity, and also continued to reveal its ‘unfinal’ quality. Eventually the Google reCAPTCHA was deprecated and ceased service on March 31, 2018. The project is archived at the url, and a future iteration is currently under development.

## V. POETRY FOR ROBOTS

Groys (2011) has argued that to enter a search term into Google is a metaphysical pursuit for truth that moves beyond the rigid structures of language and into ‘clouds’ of words. Through its reCAPTCHA program (V1), we argue that Google was demonstrating its own search for meaning by enlisting the help of humans to complete what alone it could not resolve.

Google leverages humans’ superior ability to help its AI find meaning in certain scanned words. We leverage Google’s reCAPTCHA service to identify those words in which Google’s AI is unable to find meaning. By recasting Mallarmé with these images of words currently indecipherable to machines, we would be ensuring that future generations of AI may continue to attempt to unlock its meaning.

The algorithms of AI are coded to learn through our actions, see through our eyes, gathering data on every click, post, like or other traces we leave as we move through electronic space. Despite the increasingly large sets of semantic and visual data processed and incorporated into databases and used for machine-learning by existing AI, it currently continues to struggle to comprehend human expression, behaviour or language. Our *A Throw of the Dice*, deliberately designed to be unresolvable by existing AI, remains as ‘unfinal’ as Mallarmé’s original poem, every new recombination makes and unmakes new meanings, such that the AI that attempts to read it must necessarily return, in a tireless techno-metaphysical search for truth. In short, *A throw of the Dice*, is poetry for robots.

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