OULIPO | VS | Recombinant Poetics

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ABSTRACT

This paper compares and contrasts approaches to combinatorics in OULIPO and Recombinant Poetics. OULIPO, also known as Ouvroir de Litérature Potentielle, is a literary and artistic association founded in the 1960s whose combinatoric methods and experimental concepts continue to be generative and relevant to this day. Recombinant Poetics is a term that I coined in 1995 in order to define a particular approach to emergent meaning that is used in generative virtual environments and other computer-based combinatoric media forms. Combinatoric works enable the exploration of sets of media elements in different orders and combinations. The meaning of such work is derived through dynamic interaction. Another group exploring combinatorics uses digital audio techniques. The abbreviation "VS" ("versus") is often used in techno-audio remix culture to designate the remix of one group's music by another, often having only an oblique relation to the original.

COMBINATORICS: FROM OULIPO TO RECOMBINANT POETICS

Interaction with different forms of generative production enables one to dynamically explore emergent meaning. New forms of computer-based art can make it possible for participants to actively become engaged in aspects of the production of the work. Each "user" of a specifically authored computer-mediated system may have a quite different experience emerging through interaction. Yet, emergent systems can also be analogue in nature. There is an interesting commonality to generative literary, artistic, and musical production that is relevant to the OULIPO, Recombinant Poetics [1], as well as techno-audio remix culture. In the following, I will compare and contrast approaches to combinatorics from the perspective of each of these fields of research.

OULIPO (Ouvroir de litérature potentielle — The Workshop for Potential Literature) "does not want to be considered a literary school, or to overtly advance specific ideologies or theories, its goals portray an understanding of literature that merits outline and critique" [2]. In his illuminating book entitled *OULIPO – A Primer of Potential Literature*, Warren F. Motte, Jr., outlines the history of OULIPO, which was conceived at the initiative of Raymond Queneau and François Le Lionnais:

> It was born... on 24 November 1960, to be precise, the day of the first official meeting. The ten founding members came from various disciplines: writers, mathematicians, university professors, and pataphysicians (although, early on, the official affiliation with that group would be dropped), under the title 'Séminaire de Littérature Expérimental.' But at there second meeting, the more modest and (to their way of thinking) more precise title was adopted: 'Ouvroir de Litérature Potentielle' [3].

Their work initially exemplified two principal directions of research: "analysis, that is, the identification and recuperation of older, even ancient (but not necessarily intentional) experiments in form; and synthesis, the elaboration of new forms"[4].

OULIPO has tirelessly worked to develop axiomatic approaches to literary and artistic production, and Queneau abstracted notions from David Hilbert's "Les Fondements de la littérature d'après David Hilbert"[5]. Motte describes this influence as following:

> The model [for axiomatic literary production] is in fact one of the fundamental texts of the axiomatic method, the famous

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> Grundlagen der Geometrie, the first edition of which dates from 1899. In this work, whose impact was very great, Hilbert described for the first time in a detailed, rather than circular, manner the properties of a "geometry," beginning with an explicit system of axioms. Queneau in his introduction speaks of Hilbert's starting point: "After having listened at Halle to a paper presented by Wiener, David Hilbert, waiting for the Königsberg train in the Berlin station, murmured pensively: "Rather than points, lines, and planes, one might just as well use the words tables, chairs, and drinking glasses." ... The principle adopted by Queneau, after Hilbert, is the following: "Taking my inspiration from this famous example, I present here a system of axioms for literature, replacing in Hilbert's propositions the words 'points,' 'lines,' and 'planes' with respectively, 'words,' 'sentences,' and 'paragraphs.'"

In a text entitled "Memory and Oulipian Constraints," Peter Consenstein defines the importance of the notion of "poetic constraints" employed by the group:

> The Oulipians emphasize the use of formal constraints in their literary production in reaction to the emphasis placed on "ecriture automatique" by the Surrealists. Although a mathematical equation is usually at the base of their constraints, Oulipians also pay tribute to literary history by declaring all structure of all various genres of past eras open to innovation. In so doing, they define their relationship with French literature: it is one of direct innovation on the stockpile of texts of differing genres, and their goal is to offer new forms to future writers by elucidating the potential of past literary forms [6].

In OULIPO, often original literary material becomes the operative material for a new work through the application of a rule-based abstraction process—through a conceptual machine or process that enables a path of generative abstraction for the current author or interactant, for example, by taking a classic and re-working it. Another approach is to take a literary form like the sonnet and play with its conventions. Queneau's work *Cent Mille Milliards de Poemes (One Hundred Million Million Poems)* [7] exemplified the notion of a poetic structure which could be recombined to form new poems:

> For this "collection" Queneau wrote 10 sonnets, each having fourteen lines that are complete in themselves as units of meaning. He then placed the 10 sonnets together sequentially, one atop the other, cut each one so that the reader can open the fourteen lines of each poem and combine the lines of all the poems freely [8].

Mathews and Brotchie point out that OULIPO is quite interested in historical poetic constraints like the sonnet form explored in Queneau's poem:

> For anyone at all familiar with literature of Oulipian inspiration, it is obvious that many of the constraints it uses predate the foundation of OULIPO: they are to be found scattered across the world and the ages. We have described this phenomenon as anticipatory plagiary [9].

A playful and humorous approach to literary history and art history is central to the operative Oulipian strategy and values the creative re-understanding of the past through recontextualization and abstraction.

Similar to the works of OULIPO, Recombinant Poetic works often employ rule-based constraints as a generative engine. In my Ph.D. thesis entitled "Recombinant Poetics: Emergent Meaning as Examined and Explored Within a Specific Generative Virtual Environment" [10], I present a broad introduction to ideas surrounding Recombinant Poetics. According to my thesis, Recombinant Poetic works share the following attributes:

- emergent properties are explored by an interacting participant;
- Interactive engagement is empowered at a high level;
- The artist defines the approach to the art content;
- The artist involves media-construction as an active process in the work, calling forth the exploration of media-elements;
- The works are functional examples of generative virtual environments;
- The works enable the exploration of environmental / spatial configurations of media elements.

Works that might each be considered "Recombinant Poetic" include Jeffrey Shaw's *Televirtual Chit Chat* (1993), Perry Hoberman's *Barcode Hotel* (1994), Knowbotic Research's *Turing Tuning* (1994; in collaboration with Alexander Tuchacek) and Victoria Vesna's *Bodies Inc.* (1995 - Present). Emergent experience and concomitant emergent meaning is an evocative product of each of these recombinant works. Diverse groups of researchers and artists, drawing from a particular cultural/technological milieu, have gravitated toward a range of relevant issues, each individual or team presenting their own approach regarding aesthetics, interface design, and fields of content, while also illustrating the above criteria. In this light, I would suggest that Recombinant Poetics can be seen as its own field or genre, in which practitioners explore differing relations in each authored work.

I am particularly interested in how media elements from the mixed semiotic milieus of text, image (both still and time-based), and sound/music can be explored within generative virtual environments as well as in other forms of media-environments through engaging forms of interactivity. *The World Generator / The Engine of Desire* (1996-98)—a virtual environment I have authored with the assistance of the programmer Gideon May—enables participants to construct, edit and explore virtual worlds in real time.

A "Working" Description of the Mechanism: The World Generator / The Engine of Desire

Users sit down at a table in front of a fifteen-foot wide projection screen in a darkened room. On the screen, there is an empty plane or plateau-like space—an empty field. Built into the physical table is a track ball that can be used to spin wheels on the screen and to move across the wheels, over a series of container compartments—a bookshelf-like system of small compartments appearing across the bot-

tom of the screen. This is an entire set of virtual compartments which bend around to form a series of separate adjacent spinning container-wheels. One set of wheels holds a series of hundreds of 3D objects that I have authored. A second ball, slightly raised over the table, is used for navigation across the virtual plateau space, which can be populated by selections from the spinning container-wheels.

The interface is thirteen units, or containers, across. There are five sets of containers holding 3D objects. One set of two wheels holds a series of pictures including landscapes, close up figurative pictures, and a series of abstract images. Another grouping of wheels contains digital movies. Another wider wheel contains short poetic phrases. Yet another wheel, moving left to right, holds a series of sound-objects. These sound-objects are pre-composed digital audio loops that can be positioned in the virtual space. Other wheels contain a series of digital processes that we can access to operate on the elements in the construction of the world.

Once a particular 3D media-object is selected and entered into the space, the users of the mechanism can navigate and observe the media-object from all sides. If the media-element is an object of some kind, they can project an image (texture map) or movie (moving texture map) onto its surface. They may also present an image or movie in the space, on a virtual-nested screen. The picture, suspended in virtual space, can be navigated around or a particular behaviour can be attached to it. The environment has been optimized so that a digital movie will only play when we are virtually close to it.

As selections are entered onto the plateau, the field of vision and sound grows in complexity. At any time we can navigate within this virtual field and discuss and/or observe the media elements that populate it. The ways in which these objects can be combined and/or interpenetrated further enhance the complexity of the visualized combinatoric space.

I am keenly interested in how this type of artwork can be generative of emergent meaning—a topic that is central to the research of OULIPO. Where OULIPO's and Queneau's approach to combinatorics, in particular, arose out of geometric abstraction, it is interesting to note that Recombinant Poetics makes a literal return to geometry, albeit through the auspices of virtual space. In my Recombinant Poetic work, modular media-elements of image (both still and time-based), text (both spoken and presented graphically), as well as sound/music can be dynamically explored via a new interface metaphor by engaged interactants.

In terms of tracing the history of combinatorics, one could point to the Mathemetician Claude Berge, another member of OULIPO. In the book *Principles of Combinatorics,* Berge provides this definition:

> What is Combinatorics:
> We wish to offer here a definition of combinatorics, which depends on a very precise concept of "configuration." A configuration arises every time objects are distributed according to certain predetermined constraints. Cramming miscellaneous packets into a drawer is an example of a configuration... The concept of configuration can be made mathematically precise by defining it as a mapping of a set of objects into a finite abstract set with a given structure; for example, a permutation of n objects is a "bijection of the set of n objects into the ordered set 1,2,..., n." Nevertheless, one is only interested in mappings satisfying certain constraints [11].

One can not help but see the relevance of OULIPO as a precursor to Recombinant Poetics (although I focused on a series of differing paths to arrive at the hybrid media-architectures of Recombinant Poetics).

As we trace the development of OULIPO we see an expansion of Oulipian explorations into the use of computer-based systems as well as many other fields. OU-x-PO (where x = the field in question), for example, was defined by François Le Lionnais [12] and functions as a generative means to enable infinite expansion into new fields. For example, OULIPO has now expanded out and influenced the creation of the following new approaches to research:

- Painting – Oupeinpo (Workshop for Potential Painting);
- Oumapo – Ouvroir des Mathématiques Potentielles (Workshop for Potential Mathematics);
- Oumupo – Ouvroir de Musique Potentielle (Workshop for Potential Music);
- Ouhistpo – Ouvroir d'Histoire Potentielle (Workshop for Potential History);
- Oucuipo – Ouvroir de Cuisine Potentielle (Workshop for Potential Cuisine);
- Oubapo - Ouvroir de Bande Dessiné Potentielle (Workshop for potential comic strips);
- OULIPOpo – Ouvroir de Littérature Policière Potentielle (Workshop of Potential Detective Fiction) Etc. etc.

Along with Recombinant Poetics and OULIPO, I also want to bring contemporary ideas related to technological-audio remix culture to this discussion of recombinance and combinatorics. In the context of a vast audio remix culture, the abbreviation VS (standing for the term "versus" and used in this essay's title) becomes an abstracted sign referencing a social and technological context of artistic production. A techno-remix entails a technological set of processes where one person or group initially created an audio work and the next musician or group engages in dissecting, adding to, recombining, and/or sonicly abstracting the material through different technological means as a creative form of inter-authorship and/or re-authorship. The new version of the piece of music may have little or no resemblance to the original or it may only contain subtle changes. The letters "VS" communicate a dynamic operative relation between these two individuals or groups, where each one of them has created an audio work based on the configuration of a sonic time-based field. In a remix, the mutation potentially has enough of the original sonic material to allow for connecting the two works via the memory of the original version.

We could say that Recombinant Poetics re-mixes and/or abstracts some of the poetic constraint properties that OULIPO defined. It recontextualizes different approaches to combinatorics through experiential, spatial, virtual explorations of a set of media-elements and processes.

In some Oulipian works, a suggestive rule-based methodology is applied to

selected subject matter to arrive at a new approach to the media material—a skewed understanding, an alternate perspective, a differing navigation, a re-defined configuration, a new reading, each od them constituting a reterritorialization (see *1000 Plateaus*) [13]. This new conceptual entity provides an abstracted perspective or vantage point from which to observe the original, thus the act of creating this new configuration colors the content of the original work through abstracted mobility of its subject matter. The meaning here is layered and condensed. The original context also informs the new. This dynamics inverts time—with a domino effect which moves backward playfully affecting the reading or understanding of the original.

As the axiomatic or rule-based approach and later algorithmic procedural approaches to media proliferated, other relations to non-literary media were also explored. In writing about Oupeinpo, one offspring of OULIPO, Matthews and Brotchie state:

> Various methods or operations (in the mathematical, strategic and even surgical sense), applied to every component of the work of art, have given rise to:
>
> 1) treatments using codes and... tactile transposition, the hidden message, transposition of coherence;
>
> 2) applications of rotation and its offspring, symmetry, such as the rotary picture (viewable from 4 sides), painting with variable symmetry, anamorphosis;
>
> 3) rules of assemblage and reassemblage, involving intersection in the mathematical sense, reunification, inclusion, superimposition, chronology (chronological collage);
>
> 4) a wide variety of constraints by edges... bitangential picturogenesis... rotary substitution, etc.
>
> 5) combinatorial works, many already mentioned as constraints by edges but applicable to other domains: to surfaces, for instance...
>
> 6) works with measured constituents—colour, light, drawn lines, volumes etc. [14].

In my virtual work *The World Generator / The Engine of Desire,* many of the above operations can be said to be potentially explored through differing code-based operations within virtual space.

Perhaps reading always points to the logocentric, although Derrida proposes a different form of "media" reading. Yet, Derrida wanted to "read" other media based on the metaphors of the text where I am suggesting that each media element is "of itself"—conveying in different ways. The meaning forces emanate from the sonic, the visual, the textual, the entire environmental field and all it envelops—the sphere of the perceptual. For Recombinant Poetics, virtual environments become a place of authorship and inter-authorship. In Recombinant Poetics, the Oulipian volume of the book becomes the virtual volume of an authored electronic space enabling the exploration of new forces of meaning—new potentials for the operative experience of mutable media, generated through computer-based combinatoric processes explored through computer-based axiometrics; or more specifically, modular algorithms that are called into play through interaction.

> If the OULIPO insists upon combinatorics in its poetics, it is perhaps because combinatorics, whose status as a mathematical discipline is now established, is demonstrably functional in many literary structures, even some of the most traditional ones. That is combinatorics offers a priviledged locus for the interplay of mathematics and literature. All of this, perhaps inevitably, granted the practical problems inherent in the manipulation of complex combinatoric structures, leads to experimentation with computers. Queneau, in "Potential Literature," which dates from early 1964, says that the constant lamento of the group at that time was its lack of access to sophisticated machinery [15].

Recombinant Poetics starts with "sophisticated machinery" to enable one to generate and explore virtual environments in real time.

Through OULIPO, high art is de-elevated and turned into a material of a contemporary process of human re-understanding. In the contemporary sonic environment of the remix, the popular form of recombinant exploration becomes an important approach under its own canons, albeit fleeting and ever-shifting in explorations of combinatorics. This process of the re-mix inverts the notions of originality, of high art, of the unique, in favor of the experimental, play, pleasure, inter-authorship. Emphasis is placed on the process of abstraction and recontextualization —reterritorialization in the sense of Deleuze and Guattari—that is, media mutation. Listeners observe the elegance of a conceptual abstraction, a new approach to the given music that embodies a dynamic, constructed relation to aspects of the internal rules of the original.

One could say that the computer is made up of a relation between hardware (the physical machine) and software (the conceptual machine). The conceptual machine of the under-text (code), working in tandem with the hardware, brings about the potential on the higher level (the digital output of the machine) to interactively explore media elements such as image, sound and text in virtual space—the recombinant poetic. Interacting with this environment brings about new relations, permutations, inter-penetrations, and different levels of abstraction.

The embodied continuum that the participant inhabits through interaction—the body functioning in physical relation to the media space—links the authored combinatoric potential with the actuality of interactive use. While OULIPO initiated this through an analog set of methodologies (lovingly derived), they also became aware of the computer as an organizational device. The organization of OULIPO used its modular rule-based findings to encode a vast set of poetic constraints—a generative conceptual machine of rule-related potentiality.

Recombinant Poetics operates on OULIPO principles. Poetic constraints become both central as a generative methodology and as a mobile set of processes, functioning as a combinatoric method within virtual reality as well as potentially in other new forms of media space, combining physical interfaces and/or machine sensing modalities with specifically programmed generative interactive media environments. The mathematical methodologies that enabled combinatoric exploration in OULIPO have become extended through the advanced code that enables the real-time

generation of virtual space. In terms of Recombinant Poetics, the notion of a shifting configuration of media-elements is essential. Recontextualization forms the moving center of generative media.

As the mathematician Bourbaki, another member of OULIPO, states in *Elements of Mathematics: General Topology,*

> Historically, the idea of limit and continuity appeared very early in mathematics, notably in geometry, and their role has steadily increased with the development of analysis and its applications to the experimental sciences, since these ideas are closely related to those of experimental determination and approximation. But since most experimental determinations are measurements, that is to say determinations of one or more numbers, it is hardly surprising that the notions of limit and continuity in mathematics were featured at first only in the theory of real numbers and its outgrowths and fields of application (complex numbers, real or complex functions of real or complex variables, Euclidean geometry, and related geometries)... In recent times it has been realized that the domain of applicability of these ideas far exceeds the real and complex numbers of classical analysis. Their essential content has been extracted by an effort of analysis and abstraction, and the result is a tool whose usefulness has become apparent in many branches of mathematics [16].

When notions surrounding "limit and continuity" are explored through "abstraction" and are applied to words, texts, media-elements and meanings, one begins to see how mathematics has informed both OULIPO and Recombinant Poetics. The mathematical idea of the variable is defined in terms of an approximation as mentioned in the following quote: "whenever we replace a by an element that 'approximates' a, this new element will also belong to A, provided of course that the 'error' involved is small enough" [17]. This concept provides one of the operative principles enabling combinatoric practice within linguistic structures. In part, the content of a combinatoric work derives from observing the dynamic relation that makes these media "variables" functionally exchangeable.

In OULIPO, the "error" explored becomes one related to the production of meaning and the understanding of context. Bourbaki proposed that through the exploration of the "neighbourhood" there flows a series of other notions whose study is proper to topology. This includes the interior of a set, the closure of a set, the frontier of a set, open sets, as well as closed sets [18]. The abstraction flows from a mathematical topology to a linguistic/semiotic one in both OULIPO and in Recombinant Poetics. This idea is central to many of the combinatoric examples explored in the OULIPO movement. "As with continuity, the idea of a limit involves two sets, each endowed with suitable structures, and a mapping of one set into the other" [19].

As we come to rely on environmental and/or spatial transmission of information, as exemplified by virtual environments, we must seek to understand the nature of environmental "combinatorial constraints." In *Semiotics of Visual Language,* Saint-Martin speaks about the relevance of "neighboring," which is central to the production of meaning in a virtual environment:

> The relationship of neighboring is the most important topological notion by which the function of continuity is constructed in any spatial field, whether physical or perceptual. Its importance to physical sciences was underlined by Bachelard1 when he stated that any force in the continuity of the field "presents itself as determined by the condition of neighboring. The term, vague in everyday language, acquires all of the desirable conciseness in mathematical expressions" [20].

Thus, Bachelard also points toward "neighboring" as being central to an enlarged understanding of topographic space. The possibility for a related spatial form of poetic construction was discussed by Bolter with regard to hypertext:

> In place of hierarchy, we have a writing that is not only topical: we might also call it "topographic"... It is not the writing of a place, but rather a writing with places, spatially realized topics... The writer and reader can create and examine signs and structures on the computer screen that have no easy equivalent in speech [21].

When 2D "topographic" spatial interaction is extended into virtual space, new spatial-poetic domains emerge, yielding many technological and poetic relationships of significance. Interactive technology has enabled the exploration of text in a virtual 3D space, in conjunction with other operative poetic elements of sound and image that can be dynamically recombined. It is the set of underlying "mathematical expressions" that enables the production of virtual space, which in turn makes possible the operative exploration of media-elements. The poetics of virtual space pushes the boundaries of what might constitute "neighboring" media-material in that media elements are explored within a dynamic, responsive, spatial volume. The trajectory that one takes through the virtual volume enables the juxtaposition of differing media elements based on participant proximity, line of vision as well as relation to spatial sound elements that are encountered based on virtual proximity. The responsive behavior of media elements as well as the potential of artificial intelligence applied to media relations become a focus for future research.

Recombinant Poetics and Hybrid Invention in Virtual Space: The Hybrid Invention Generator

Where OULIPO opened a series of approaches to the exploration of generative rule-based production, Recombinant Poetics seeks to extend rule-based production into a new poetics of hybrid invention in virtual space.

I extended my Recombinant Poetic research in a more recent investigation, which has manifested itself in a new work titled *The Hybrid Invention Generator* [22] and funded by the Intel corporation. This work seeks to generate potentially functional connections between different inventions and to enable conceptual interfunctionality across different electronic and physical domains.

In the "First Manifesto" of OULIPO Le Lionnais states: "Anoulipism is devoted to

discovery and Synthoulipism to invention. From one to the other there exists many subtle channels" [23]. Thus "anoulipism" can be defined as linguistic discovery—forms, rule systems, structures etc.—and "synthoulipism" as invention of new forms, rule systems, and structures. From the perspective of Recombinant Poetics, computer code enables a jump from literary invention to literally inventing, that is visualizing and making sonic, conceptual, hybrid inventions—thereby exploring a conceptual computer-based machinic-genetics. Derrida hints at such potential in *Of Grammatology,* when he speaks of the new expanded sense of writing:

> It is also in this sense that the contemporary biologist speaks of writing and program in relation to the most elementary processes of information within the living cell. And, finally, whether it has essential limits or not, the entire field covered by the cybernetic program will be the field of writing [24]

I am interested in pushing beyond writing into an experiential field of authorship and inter-authorship through the exploration of combinatorial configurations of media-elements and processes. Unlike Derrida, I understand each of these media-elements in terms of fields of meaning that are evocative in their own way. Instead of approaching media combination through the metaphor of the text, I am trying to open out a new spatial, environmental understanding of meaning production. In particular, I am trying to expand the conceptual machine of linguistics/semiotics into a hybrid domain of conceptual functionality. In this case, media elements, in particular images of past inventions, are connected with an underlying code that represents their functionality. The machine seeks to form a logical/functional connection between the initial functionalities of the devices, where the output of one device must become the input of the other to make them inter-functional. I call the code that bridges the output with the input "conjunction" codes.

We can apply this metaphor of conjunction to object-based code functionalities that are distributed on the Internet. What would it be like to build a device that would enable one to bring these diverse code functionalities together through conjunction codes, to generate new computer-based inventions?

I am currently seeking to develop an object-based "language" of hybrid generation that includes virtual visualization accompanied with related audio/music. In terms of techno-remix culture, each hybrid invention will also be connected to a sonic mix of elements. A prototype/model displaying the operative processes of the artwork has been developed. For one year, I have been working with a team [22] on the project, which is funded by Intel. We are developing code in Java 3D as a versatile template that can enable this prototype to become conceptually functional. The initial objectives for the project are as follows:

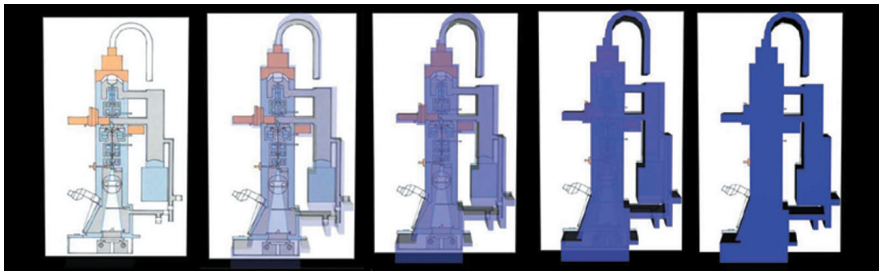


Fig. 1. The Hybrid Invention Generator by Bill Seaman, 2001. 3D test rendering Daksh Sahni and Kalim Chan. Test example. Extruding an image of a microscope diagram for use in 3D hybridization.

1) Enable intuitive access to many encoded inventions—each invention is visualized. It also carries with it a bottom-up code that I develop to represent the input, functionality, and output of the invention. The user of the system can see these code words, which are also used to implement the computer code in order to make logical connections between different devices.

The team has developed a series of interconnected scrolling windows to enable access to: a) a series of diverse inventions portrayed as digital stills, 3D models, and Digital Video (still being implemented) (Fig. 1); and b) a database of relevant alternate "Input|Functionality|Output" descriptions (Fig. 2). These descriptions are being developed for each invention loaded into the system and dynamically connected to all the inventions included. If one scrolls through the different inventions, a related set of descriptions is loaded into a "descriptive" slot in the template as well as a "code" variable slot in the code of the program. Each of the inventions has a set of key word descriptions that enable the system to make intelligent connectivity between inventions—based on the selections made by a user.

2) Visualize (with related sound/music) the functionality of these inventions.

Each invention will be presented first as a low res image on one of the sliding "trains of images" (Fig. 3) presented next to each other on the screen. Once an image has been selected, a high resolution version is presented on the screen and the "train" is removed from the screen.

3) Present, generate, and enable the exploration of the inventions in networked virtual space.

The interface enables the effortless visualization of hybrid inventions that can be generated by users. They can select "Generate Hybrid" and a visualization/sonicization is generated by the system and presented center screen. This model be added to the train of inventions or be exported to a related virtual environment for positioning and perusal.

4) Enable the viewer/user (vuser) to choose a particular set of inventions from a series (Fig. 4) and to logically bridge them through conjunction code (Fig. 5) (Fig. 6), thus enabling the construction of different hybrid inventions.

5) Create an intelligent, auto-generating, bridge of functionality between the inventions (Fig. 7), an object-based grammar of intelligent conjunction.

Users can choose two devices and the intelligent choice of appropriate conjunction codes will be automated. They can also choose a single device and a conjunction code (presented as a scrolling pop-up window). In this case, the system automatically chooses a second invention to be combined with the first.

At the core of this research is the creation

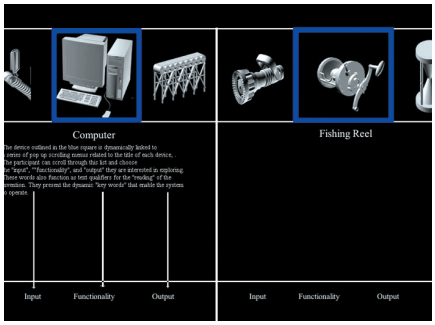


Fig. 2. The Hybrid Invention Generator. The interface for choosing input, functionality, and output.

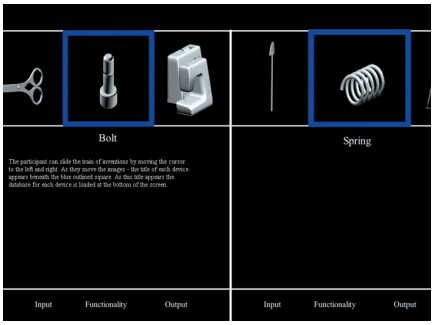


Fig. 3. The sliding train of inventions.

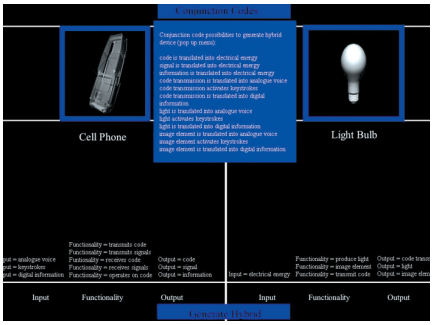
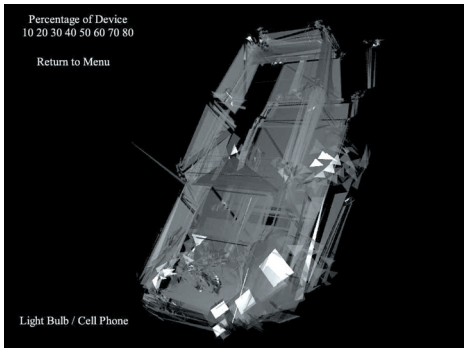


Fig. 5. Test example of menu system. Lightbulb and cell phone including Input/Functionality/Output and conjunction code potentials



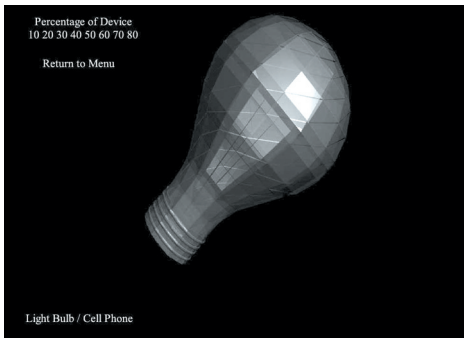


Fig. 4. Two distinct inventions, a light bulb and cell phone.

tating functional, "intelligent" computer-based hybridization of inventions that are encoded in a modular, object-based way. As intelligent systems become more modular and are functioning across distributed networks, diverse programs will be accessed from a distance—from multiple sources. In order to be able to build flexible, hybrid, computer-based devices/inventions, one will need to facilitate seamless, intelligent, automated connections between various object-based functionalities. The unique aspect of my project is that it will enable the interactive process of choosing different inventions encoded in a database and facilitate the automated hybridization of these choices, while simultaneously visualizing this process and making it sonic. The code functions both on the surface (through visualization with related sound/music), as well as on the level of a relational database enabling aconjoining of symbolic functionalities.

It is interesting to consider the functionality of linguistic and/or semiotic media-elements. The computer enables one to actuate the conceptual machine of written code through the physical machine of the hardware. Later, A logical abstraction can be translated into a functioning actuality. If we think about the code-based processes scattered across the Internet as a metaphor, we can imagine future hybrid processes that bring together the functionalities of different conceptual machines based on human interest and need. This hybrid combinatorial construction could function on a linguistic level, enabling new forms of expression and communication in computer-based environments, generated through the linkage of different conceptual machines. OULIPO suggested that words can become a conceptual machine that generates meaning in alternate configurations. While OULIPO focused on literary invention, I am interested in generating actual inventions through combinatorial means,

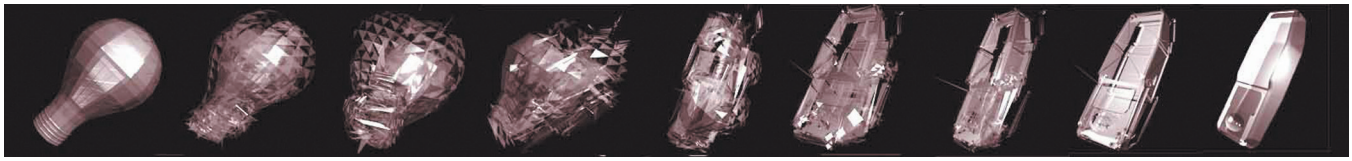


Fig. 6 Test example of hybrid invention. Different percentages of lightbulb and cell phone. 3D test rendering Daksh Sahni.

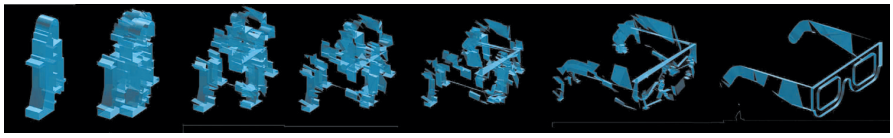


Fig. 7 Test example of hybrid invention. Different percentages of microscope and goggles.

of a system that enables the automated computer-based connection of high level, object-based functionalities. The system will be operative as a metaphor (a generative work of art), building hybrid inventions, while also functioning as a symbolic visualization tool. The research seeks to answer questions related to facili-

and underlying code processes. Media-elements in Recombinant Poetics and computer-based environmental contexts can form combinatorial configurations, and in turn generate hybrid linguistic/semiotic inventions. In my work *The Hybrid Invention Generator*, the long-term goal is to define an overarching set of combinatorial characteristics to define a universal approach to the generation of new inventions across different domains.

References

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22. Assistant researchers on the Hybrid Invention Generator include Daksh Sahni – UCLA Architecture; Steve Spahl – UCLA Computer Science; Gustavo Rincon – UCLA Architecture; Kalim Chan – UCLA Design | Media Arts; software consultant Kostas Terzidis, Ph.D. – Assistant Professor of Architecture at UCLA; and Grace Tsai, UCLA Architecture.

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Bill Seaman's work explores text, image, and sound relationships through virtual reality, video, computer controlled videodisc, CD-ROM, photography, and studio-based audio compositions. He is self-taught as a composer and musician. His works have been included in numerous international festivals where he has been awarded prizes such as the Prix Ars Electronica in Interactive Art, Linz, Austria (1992 and 1995); International Video Art Prize, ZKM, Karlsruhe, Germany; Bonn Videonale prize; First Prize for Multimedia, Berlin Film / Video Festival (1995); and the Awards in the Visual Arts Prize. Selected exhibitions include "MEDIASCAPE" at the Guggenheim, New York (1996); the premiere exhibition of the ZKM in Karlsruhe, Germany (1997); Barbican Centre, London (1997); C3 - Center for Culture & Communication, Budapest, Hungary (1997); "Portable Sacred Grounds," NTT-ICC Tokyo (in 1998); "Body Mechanique" at The Wexner Center, Columbus, Ohio (1999). Seaman received his M.S. from the Massachusetts Institute of Technology and his Ph.D. from the Centre for Advanced Inquiry in Interactive Arts (CaiiA), University of Wales, UK.

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