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Artistic and Musical Applications of Internet Search Technologies: Prospects and a Case Study

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Abstract

This paper explores the idea of internet search as a technology to underpin artistic creation. Concepts of interactivity in art and music are explored, and then an overview of different types of internet-based art is presented. A number of different ways in which internet search have the potential to underpin artistic and musical activity are then discussed, with ideas such as the idea of a *collective readymade* and aesthetics of mass and unexpected connections are used to give this discussion a theoretical basis. Finally, a case study is given, in which the author discusses one of their own multimedia artworks that makes substantial use of internet search.

Keywords

Web search; internet art; interactivity; live performance; computer-mediated performance; readymade

1 Introduction

Internet search, represented canonically by the use of search engines such as Google, is a ubiquitous part of day-to-day life for many people around the world, allowing users to tap into a vast store of texts, sounds and images. The aim of this paper is to survey the potential of these technologies for art and music, underpinned by some novel theoretical ideas.

This paper is structured as follows. A review section looks at some examples of audience interactivity and chance in music and art, and then presents some internet-based artworks in the context of a simple taxonomy. The next section considers a wide range of internet search resources and the artistic and musical potential immanent in them. The final part of the paper is an extended case study in the form of a critical review of my own piece *It's All Out There on the Internet*, which uses some of the previously-discussed techniques as ways of structuring musical, textual and visual material.

2 Review

This section considers three topics that are relevant to the ideas described later in the paper: interactivity in music and art, music-circus style performances, and internet-based art.

2.1 Audience Interactivity and Collaborativity in Visual and Sonic Art

One of the arguments of this paper is that internet search offers a new way to create interactive and collaborative artworks. Therefore, this section reviews a number of different aspects of interactivity and collaborativity in art and music.

Whilst all live performances are aware of their audience, some works explicitly solicit information from the audience, which is incorporated into performance. Alternatively, a piece can react to an audience via automated methods, for example, an installation that moves or changes colours or patterns based on sensors or physical movements.

An example of a work that fuses these two ideas is *Flock* (Freeman and Godfrey, 2010), a work for a quartet of saxophone players, which uses computer-based image processing to discover the grouping of audience members, dancers and musicians in the performance area to autogenerate musical notation. More

Figure 1: *The Swimming Pool*, by Leandro Ehrlich

directly, some pieces use direct audience feedback to facilitate interaction with musicians: through laptop computers (Baird, 2005), coloured paddles (Biles, 1998) or lightsticks (Freeman, 2008).

Another form of interactivity is *pairing* or *grouping*, where the aim of the work is to facilitate communication or interactivity. This can be visual pairing: for example, *The Swimming Pool* by Leandro Erlich (Figure 1), which facilitates visual interaction by participants above and below a surface of water. It can be audio pairing, as in *Klangfeld Nr. 3 für Alina* by Florian Claar (Figure 2), which matches people on different sides of a building via audio-tubes. Audio pairing is also seen in telephone-based artworks (de Souza e Silva, 2004).

Another form of interactivity is *agglomerative* or *stigmergic* interaction (*stigmergy* is a term from biology referring to communication between organisms by modifying their environment, e.g. ants laying a pheromone trail to be recognised by other ants (Hölldobler and Wilson, 1990)). This is where individual participants both observe the contributions that have been made by others in a space, and also make additions to that space themselves. This can be very free-form, such as a space that can be written on (Figure 3), or an informal space such as a graffiti wall (Figure 4). More formally, participants may create a contribution based on some instructions or mediated through some technology, for example the wall of ID cards created by visitors to *Urbis* in Manchester (Figure 5).

Figure 2: *Klangfeld Nr. 3 für Alina*, by Florian Claar

Figure 3: Example of an agglomerative work: a writing space from the *Manchester0161* exhibition at *Urbis*, Manchester, UK, 2006 (Urbis Archive, 2011).

Figure 4: "The Wall", Windmill Street, Dublin

Figure 5: A wall of ID cards created by visitors to *Urbis*, Manchester.

2.2 Music-circus and Recontextualisation

One notion that will be important later in the paper is that of *recontextualising* pieces of material that are discovered during web search. This has its origins in the aesthetics of the readymade (Girst, 2003): the idea that an artwork can be created by placing an everyday object in in a new context. The canonical example of this is Duchamp's *Fountain*, where a urinal was displayed in a gallery.

This recontextualisation makes the object salient to the viewer by suggesting that it should be viewed anew, or else viewed in the context of other objects that would not be (physically or semantically) close to it in the wild. This will be important later when we consider the creation of masses of material by an automated search process; the juxtaposition of items with different semantic connotations by virtue of similarity of word-use will be an important part of the aesthetic.

Another place where such recontextualisation happens is in pieces such as the *musicircuses* of John Cage, and in a number of the works of the *Fluxus* movement (Dezeuze, 2010). In such works many independent events happen over the course of a performance, sometimes overlapping or happening simultaneously, with the performers often not being in control of the starting and ending of events—these are pieces that are "indeterminate with respect to their performance" (Cage, 1961). The aim here can simply be the simultaneous presentation of wildly differing pieces of material—but, it is difficult for audiences to avoid *pattern matching* and finding links between components.

2.3 (Interactive) Internet Art

The aim of this section is to give a brief survey of some important themes in internet art—a broader survey can be found in the book by Greene (2004). This is to give some context to the discussion later specifically of search-based internet art, to allow us to compare and contrast with these other approaches.

There are a number of relationships that exist between art and the internet. Firstly, some art is "on the net", i.e. the internet is used as a medium of diffusion, whether on individual websites or through sites such as YouTube or Flickr. The relationship here is not trivially one of easier access—it has been argued by Carr (2010) and others that this means of access shapes our attitude to the material.

Secondly, art "about the net", which reflects on or takes inspiration from internet phenomena or technologies, or the specific culture and memes of the internet, but which do not necessarily use internet technology either in their creation or dissemination.

Thirdly, art "of the net", which take material or technologies that are fundamentally internet based, and use those as the basis for artistic practice that is either available online or that occurs elsewhere.

Clearly these categories are fuzzy and somewhat overlapping. Pieces in the "about" or "of" category could be presented on the net.

A common form of internet art is the presentation of an interactive piece of work through the browser. A canonical example of this is *Superbad* (Benjamin, 2011) by Ben Benjamin, which has existed in various forms since 1997 (Figure 6). This consists of a large number of web pages, containing a mixture of text and image, which changes in response to mouse movements and clicking on elements within the images. This is a system that both uses the web as a medium of presentation and as the fundamental technology to make it work. Furthermore, as time goes on it increasingly draws its aesthetic from the history of the internet, for example through its use of specific default representations of html elements such as radio-buttons, which in modern web-design are subsumed into the overall visual look of a site rather than having a specifically "html" look.

By contrast with much of the interactive installation or performance work discussed above, sites such as this do not change for *other users* as a particular user navigates the site—each visitor is presented with their own instantiation of the site.

Other internet-based art is parasitic on the spaces that are created on the internet, such as Eddo Stern's 2000 work *Summons to Surrender* (Greene, 2004), where the artist and programs written by him control characters in online games and use the spaces created in those online games as venues for a kind of online street-theatre, interacting with participants who are there for a very different purpose. Later in the paper we will discuss this idea of adapting technology for artistic purposes—taking it further by considering how search technology can be parasitic on online activity *without* the providers of the material being aware of it.

Some other internet-based art facilitates the pairing/grouping notions discussed in the previous section on interactive art. For example, the long running piece by Douglas Davis entitled *The World's First Collaborative Sentence* (active since 1994), demonstrates collaboration between intentional participants. By
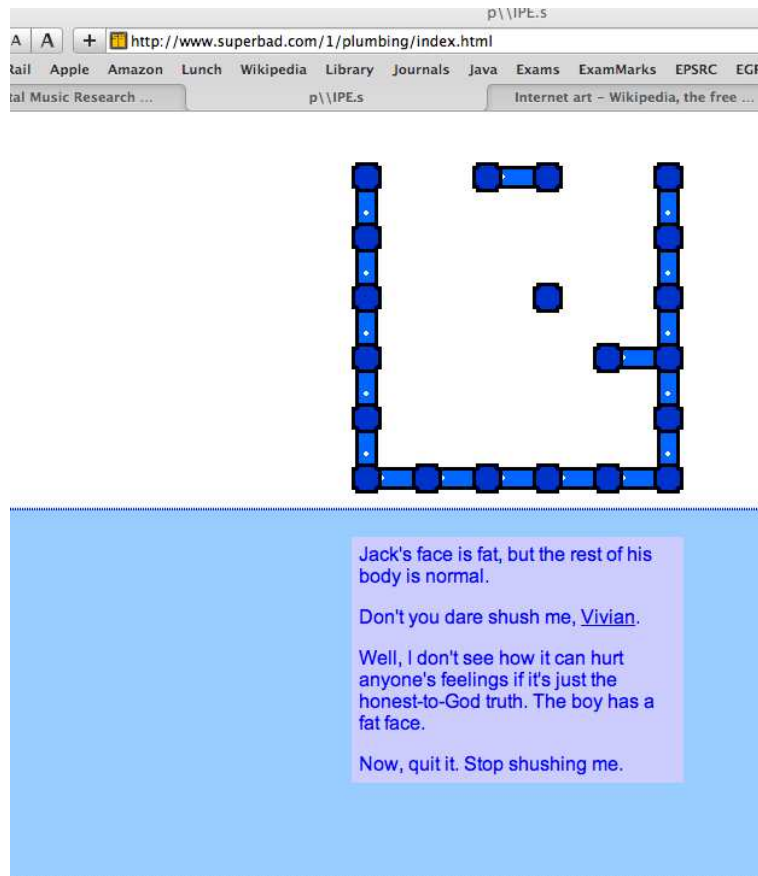
Figure 6: *Superbad* by Ben Benjamin

contrast, we will later show that search-based art can bring together material created for other purposes.

Mark Napier's *Riot* (from 1999) (Figure 7) demonstrates a web-based form of stigmergic interaction, which pollutes the results of a web search with fragmentary pieces of search outcomes from previous users' searches. A contrasting piece is *Nine(9)* by Mongrel (from 2003), which allows users to build up collections of photographs associated with particular themes (Greene, 2004). In both of these pieces the activity of the current users is influenced by actions of previous users; but in the former case the action is considerably more *indeterminate* than the latter. The action of visiting a particular web-site in *Riot* will influence the future, but in a way that is hardly predictable by the user, whereas in *Nine(9)* the future effects are much more obvious to the current user. Importantly, both of these are examples where the user interaction is intentionally artistic, by contrast with some of the examples that are examined later where the artistic effects are parasitic on the day-to-day activities of web-users. A simpler example of this is Jenny Holzer's 1995 piece *Please Change Beliefs* (Figure 8; Holzer (2011)), where users can edit a list of folk-sayings, which can then be viewed by future visitors.

Some collaborative pieces involve some further off-computer interaction, such as the *Telegarden* (2011); (Greene, 2004) where users of the site were able to operate a robot arm that was tending a real physical garden. This might be seen as another example stigmergic interaction between different users, but this might be stretching the idea of stigmergy too far—the users are not attempting to communicate *via* the garden but are simply collaborating on a collaborative task.

These are mostly visual- or text-based works. A small number of audio-based works exist, for example *In B Flat* (Solomon, 2011), where people contribute small fragments of music which visitors to the site can then layer and play.

3   Internet Search: Resources

Search technologies such as *Google* are designed in a specific way: to be used by a single user to find a resource (text, image, sound) to answer a specific question or on a specific topic. There are a number

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Figure 7: *Riot*—a web "browser" that infects web searches with results from previous users' searches.

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Figure 8: *Please Change Beliefs*, Jenny Holzer

of ways in which visual, sound and multimedia artists can respond to this defining behaviour of our age, including re-presenting search results in a new context, using the results to provoke action, or to generate a mass of material.

One concept that we can introduce to understand this is that of the *collective readymade*. By contrast with the notion of readymade in traditional art discourse (Girst, 2003)—where the artist re-presents an object made by a single other person or by a coherent system such as an industrial production system—in a collective readymade the work being presented is the presentation of many individual acts.

By contrast to the scale of a gallery-based collective piece, the internet artwork is potentially on a much larger scale (in terms of numbers of participants) than a piece sited in a gallery or physical public location— as well as being much more diverse in terms of the diversity of participants. More importantly, it can draw on a large number of *unintentional* participants, where the art work is an abstraction or re-presentation of the online activities of actors with other objectives (for example, to find a specific web-page). A related idea can be found in pieces such as Aaron Koblin's *Ten Thousand Cents* (from 2008) and *The Sheep Market* (from 2006) (Doan et al., 2011), which use *crowdsourcing* techniques where thousands of participants are paid a small amount of money using a system such as the Amazon Mechanical Turk to each produce one small element of a complex work.

3.1 Using the Results of Searches Directly

One use of web search as an artistic medium is presenting the results of search in a new context, or else using the search to automatically construct some kind of agglomeration or collage of material. This is the most direct interpretation of the notion of the collective readymade. These are technologically straightforward, using standard search-engine technologies and the APIs that allow programmers to create programs based on search technology.

An interesting example of this is part of the 2002 work *dot-store* by Thomson and Craighead (2011). This was a web-site selling various items, one of which was a set of tea towels on which was printed the results of Google searches for phrases such as "please help me" and "please listen to me".

A more complex example is given in the recent paper by Krzeczkowska et al. (2010), which describes a web-based system that automatically builds collages of images based on current news events. Text is taken from headlines on news websites, which are then used as keywords in an image search (using both an offline library of images and web search using the Google and Flickr APIs), which were subsequently processed using a rendering system to give a coherent overall look to the collage of images. Their intent is to get viewers to think further about the implications of the news, both by adding visual salience and by showing the results of a search that might provide different visual glosses on the words in the headlines to those that are usually salient to that particular user.

3.2 Trails of Search Phrases

In the foyer of the head office of Google, there is a display (presumably somewhat censored) of phrases that are currently being searched for (Figure 9). This is a valid internet artwork in its own right—a minimalist slab offering insight into the thoughts of millions of people around the world.

Such streams of live search results were once readily available online, but in recent years these have largely been withdrawn. The reasons for this can only be speculated on. Perhaps the search companies saw something unprofessional in letting the general public access these, or a reputational or legal fear about user's information being broadcast to the world. Perhaps there was a concern about useful information making its way into the hands of competitors. Or, perhaps it was a simple business decision to remove a non-core service. This has deprived search-based internet art of an interesting source of material.

Peter Norvig (Seibel, 2009) gives an example of how such information can be used. He wrote a program to search the Google search logs for three consecutive searches carried out by the same user that had the 5-7-5 syllabic structure of a haiku. This produced found objects such as:

> java ECC
> java elliptical curve
> playboy faq

Lists of most common search terms are still available, for example the Google *Zeitgeist* (2011). (Figure 10). This displays the most commonly searched for phrases in recent hours; Twitter similarly offers a *trending topics* list.
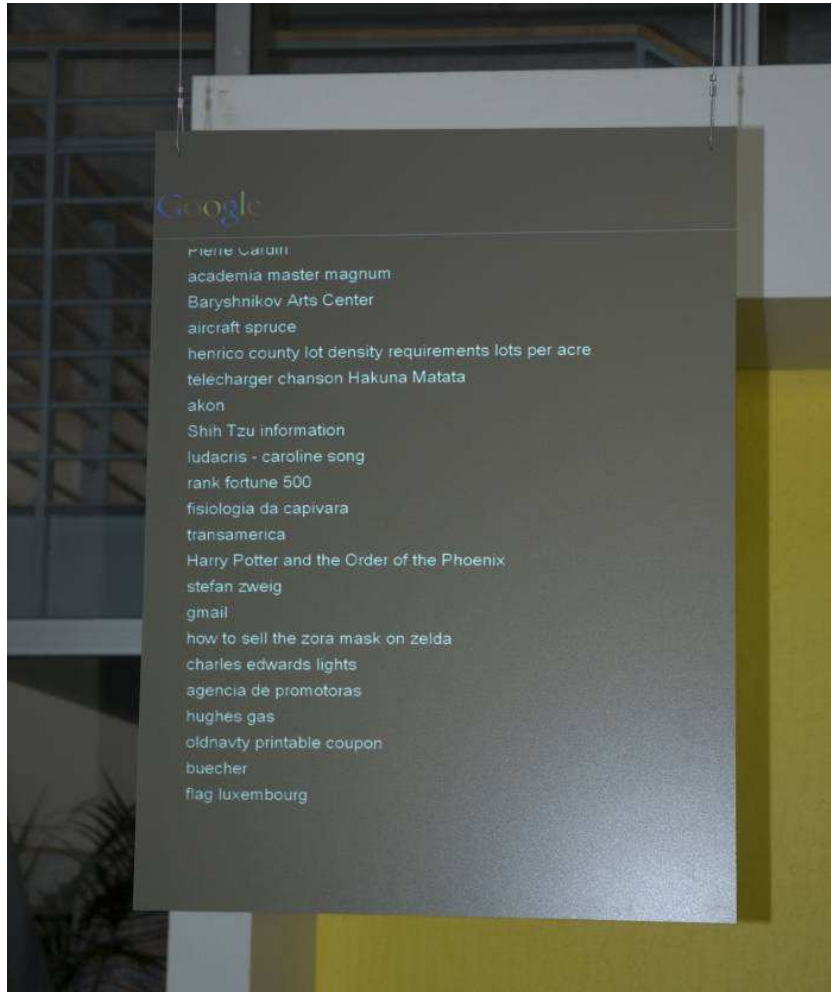
Figure 9: Live display of search results on a screen at the head office of Google.
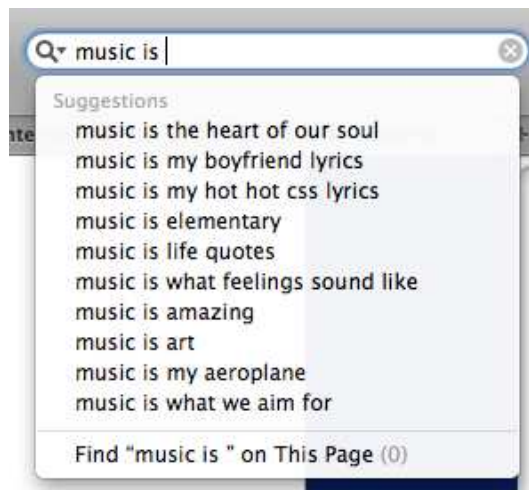
Figure 10: Google hot searches.

Figure 11: Autocompletion in the Google search engine; the incomplete query is the phrase "music is".

Such lists have two particular failings in terms of being exapted (Gould and Lewontin, 1979) for artistic reasons. Firstly, they could be described as *over-distilled*—a lot of the work that the audience might be expected to do has already been done and the results hidden; there is no scope for "ah-ha" moments, i.e. the audience-member's attention being drawn to some unexpected connection. Secondly, there is a blandness to the results that is contrasting with the raw search results; small-scale connections and randomnesses are smoothed away (an analogy can be made with the notion of the greater authenticity of "raw sounds" vs. over-processed "cooked sounds" in rock music (Frith, 1983)).

3.3 Autocompletion

Many browsers now offer *autocompletion* of search suggestions. When the user starts typing a search, the search box fills with a list of possible completions for the sentence; this is designed both to save time and to help the user clarify their query. An example from the Google autocomplete is given in Figure 11.

Early autocomplete systems were largely just attempts to complete words or to carry out basic spelling corrections. However, systems such as Google Autocomplete (2011) are based on common searches, i.e. the phrases returned are based on the most common results that have followed the particular sub-phrase being typed.

Depending on the query, the results of autocompletion can lie anywhere on a spectrum from the dull distilledness of the "hot searches" and the raw potential of the live search streams discussed earlier. If a common initial phrase is input (Figure 12) then the results are pedestrian and expected; if, by contrast. a more unusual suggestion is input, much more lively and interesting suggestions can arise (Figure 13).

Such autocomplete results have been used by Robin Parmar (Parmar, 2005) to create poetic works based on these "found objects"; this is a good example of the notion of collective readymade discussed earlier. An example is given in Figure 14.

An interesting curiosity in the autocomplete system relates to the interaction between that system and the built in calculator in Google. If a user types a calculation into the Google search box, then as well as presenting search results for that calculation, it presents the results of that calculation directly. This is interesting because the user can ascertain which calculations are being carried out by other users in other parts of the world (Figure 15). As more features such as this are added to search engines (as examples, currency conversions and spell checkers are currently implemented), these interactions will become more
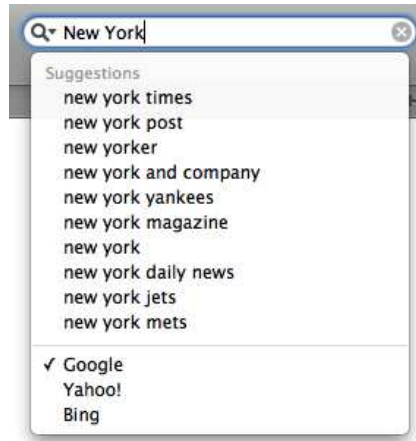
Figure 12: Bland autocomplete results from a common initial phrase.

Figure 13: Surprising and inspiring autocomplete results from a less common initial phrase.

common and the artistic potential of such interactions will also expand.

3.4 Automatic Generation of Masses of Material

The notion of *mass* is a key modernist aesthetic; in particular notions of mass production and repetition can be found in artworks such as Michael Landy's collections of plastic crates in *Market* (from 1990), the block forms of Sol LeWitt or the repetitions of Carl Andre in works such as *Equivalent VIII* (from 1966). Internet search allows the creation of material that is inspired by notions of *mass customization*, by notions of *semantic mass* (where a large number of objects are created that have some keyword in their meaning), and by notions of *distillation* of large quantities of material.

These techniques could be used presenting masses "raw" to the viewer; the aesthetic created could be one of sheer scale and mass (akin to the vast, saturated photographs by Andreas Gursky, such as the 2001 work *99 Cent II Diptychon*). Contrastingly, the collection generated might repay careful attention, either in terms of the viewer discovering things that have ended up in the composition "by mistake"; alternatively, in terms of the "ah-ha moment" of rediscovering the original link or forming alternative connections; An example of this can be found in Figure 16, which shows the results for the search term "readymade" (using Google Image Search), restricted to grayscale images. This could be used to create specific fixed pieces or it could form part of an interactive work.

Similar ideas of mass-aesthetic can be created with text. For example, Figure 25 shows the use of a large body of text extracted from a file of words used in a spellchecking system; the intention here is that it be spoken, but such techniques have the potential to be used visually too.

This links with a long tradition of automated text generation, including both computational and manual techniques. Early computational techniques (Oberlander and Brew, 2000) focused on reproducing the small-scale detail of text, typically by a Markovian method where a source corpus is analysed and the frequencies of words that follow words (or word-pairs) analysed. Whilst this cannot generate meaningful text alone, it can be used in conjunction with a source of meaning generation to aid in detailed word choice. In artistic domains so-called *cut-up* techniques have been applied (e.g. by Gysin, Burroughs, and Bowie), where source texts are rearranged based on stochastic operations (Burroughs and Gysin, 1978; Perone, 2007).

An earlier link can be made to the *surrealist automatism* practices of artists such as André Breton and Joan Miró, where the artist attempts to put their hand movement out of conscious control (Jenny, 1989).

sound is called mach 1
sound is one of the finest audio/video dealers
sound is present when i play an audio cd
sound is not working
sound is in the picture at kodak theater
sound is still playing even when in different
sound is red
sound is on the move
sound is broken
sound is a perfect sphere
sound is recognized
sound is important and full
sound is alaska's premier
sound is all about
sound is god
sound is recorded onto a computer
sound is disabled after simply
sound is your pleasure
sound is doing
sound is produced when an object resonates
sound is in our backyard
sound is hard to beat
sound is better than stereo
sound is california
sound is a registered nurse by profession . . .

Figure 14: Beginning of a poem by Robin Parmar based on autocomplete results.
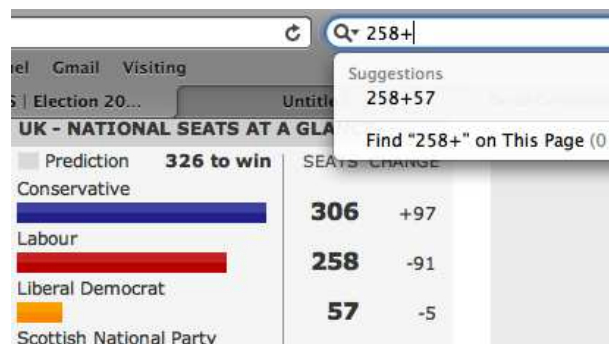
Figure 15: Autocompletion of a calculation, demonstrating that many other people had attempt to do the same calculation.

Figure 16: Image search for "readymade" using Google image search.

This led on to later experiments with the "automatic" generation of text (Brotchie, 1991). One motivation of such methods was to uncover the individual subconscious of the artist. By comparison, art based on web search can be seen as uncovering the hidden collective understandings of the mass of people engaged in placing material on the web.

Another possibility here is to use an organising principle to arrange a mass of material. For example, *Every Shot Every Episode* (from 2001) by Jennifer McCoy and Kevin McCoy (Greene, 2004) takes a mass of stills from the TV series *Starsky and Hutch* and arranges them into groups, e.g. "every cry for help", "every pink" (Figure 17). This is not based on web-search material, but it would be easy to do so. Indeed, it would be easy to *automate* doing so, certainly for basic physical characteristics such as colour, but also potentially for more sophisticated features such as emotional content by using systems that attempt to tag video/images with affective tags (Chan and Jones, 2005).

A further stage can be carried out where the material is transcoded Manovich (2002) into a different medium. This is illustrated particularly well in *What's in a name?* by Jennifer Mills (2011), which consists

Figure 17: Close-up of part of *Every Shot, Every Episode.*

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Figure 18: "What the Guardian thinks contemporary music is": a distillation of a large number of concert reviews from the *Guardian* newspaper created using *Wordle* by the author (2010).

of a large collection of watercolours based on the images returned when the artist carried out a Google search for her own name.

So far the focus has been on the notion of raw presentation, giving the impression of mass. An alternative presentation focuses on *distillation* or *summary* of large masses of material. For example, *Wordle* (2011) allows the automatic creation of clouds of words from bodies of text. The tool strips out stop words (the short, common words such as articles, pronouns and prepositions), creates graphics of the words sized according to their frequency, and then arranges those graphics in a compact format. Examples of these can be found in Figures 18 and 19.

3.5   Image and Audio Search

The above discussion has focused above on text-based search techniques. Even where the search *results* were image based (e.g. in Figure 16), the search *terms* were text based. Recent developments in image-based search (e.g. GazoPa, 2011 and TinEye, 2011), where the search *terms* are visual, have great potential for artistic application. Similarly, search on audio or motion based terms also has potential.

3.6   Practicalities

The primary mechanism for creating such works is programming using APIs (Application Programming Interfaces) from search providers. These allow the programmer to carry out a search within the program, and to then store and process the results.

APIs are limited as they provide access to search results without the advertising that the search companies rely on for income. Google used to offer a search API (Google Web Search, 2011) which is being phased out; Yahoo! offer an API (Yahoo Developer, 2011) that is limited in the number of searches that can be made per day. More specialised APIs are available for specific parts of the web, e.g. for Twitter (Twitter API), and for specific types of search, e.g. the Google images API (Google Image Search, 2011) (which also restricts the number of requests that can be made).

An alternative approach is via *screenscraping* (Turland, 2010) where the entire web-page for the search is downloaded and the page processed to analyse relevant information. This is usually a complex task, but it

Figure 19: "Who John Cage is": a distillation of biographical texts created using *Wordle* by the author (2010).

provides access to material where no API is provided, particularly for more experimental image and sound search.

4 Case Study

This section takes my 2008 multimedia performance piece *It's All Out There on the Internet* as a case study of the ideas detailed above. This was described as a *Computer Directed Musical Improvisation* (though there are other aspects to it). It was first performed as part of the 2008 International Computer Music Conference in Belfast.

4.1 Overview

The piece is for 5-15 musicians. It was written for a group of musicians who had experience both in notated/"classical" music and in folk music. It is a structured improvisation based upon a number of components, which are performed within a ten minute time period. The activities that happen consist of a number of activities initiated by the performers, various computer-generated actions, and sets of visual images projected in the performance space. An overview of the stage setup for the piece is given in Figure 20 and a photograph from a performance is in Figure 21.

4.2 Components

In this section the various components of the piece are described.

4.2.1 What the Performers are Doing

At the beginning of the piece the performers receive a individualised printout of a schedule, which indicates when that performer can make a performance. An example of this is given in Figure 22. A number of blocks are created during which the performers are allowed to initiate performances; the aim of this is to prevent the performance becoming an all-out block with every performer constantly performing.
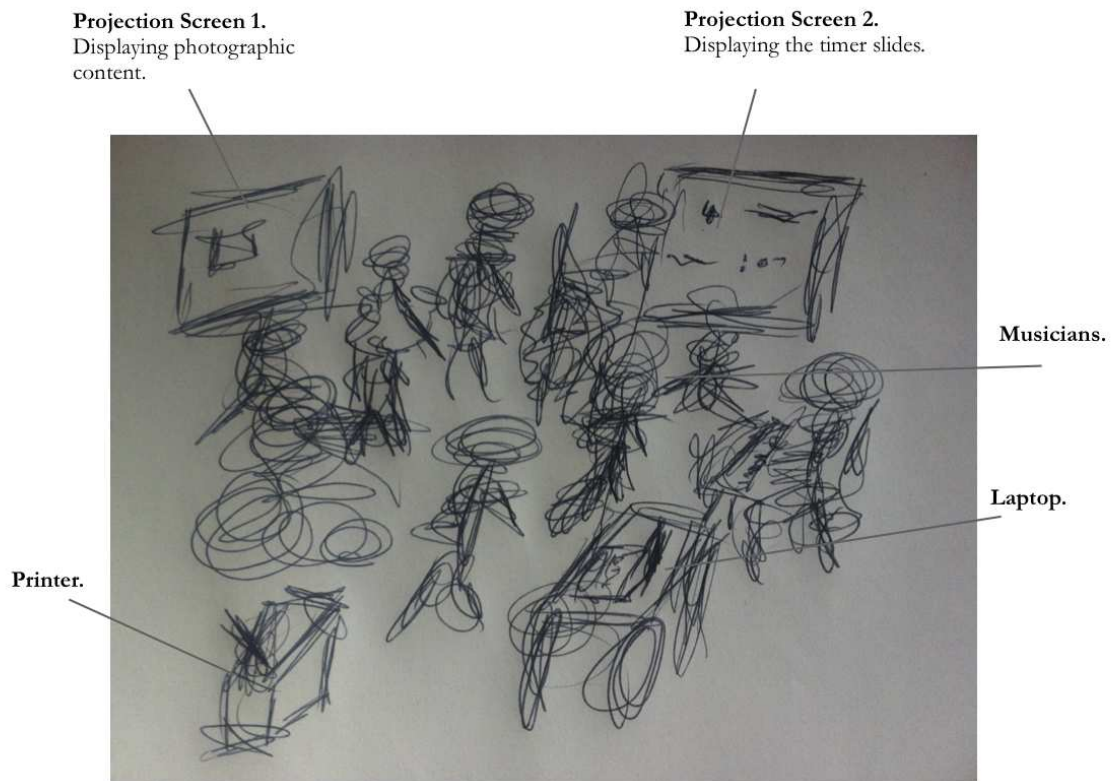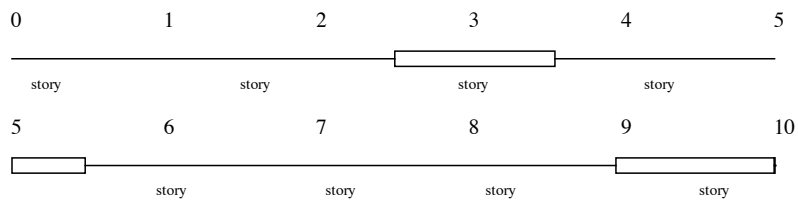
Figure 20: Overview of performance space from *It's All Out there on the Internet.*

Figure 21: Performance photograph from *It's All Out there on the Internet* from the 2008 International Computer Music Conference.

It's All Out there on the Internet - Performer's Oveview Sheet

Timescale (minutes)

0	1	2	3	4	5

story   story   story   story

5	6	7	8	9	10

story   story   story   story

Reminder: At any time you can be:

(1) Taking part in an (solo or group) aimprovisation in a style suggested by the computer:
    indicated by a rectangular block on the timescale.

(2) Staying silent: indicated by the straight line on the time scale

(3) Taking part in a group activity: as organized by others

(4) Doing a random alternative activity from an envelope: any time

Ideas for doggerel incantations:

Tell me Mr Google, tell me what to do
I want to play a tune, I want to do it goo-
d and proper, so please give me an idea
Should I play melancholy or cheer-
y.

I‚Äôm going on the internet, to me for to find,
A style me to play in, please be very kind
Give me some idea, of how you play would do,
Help grab me my audience, let me true them woo.

Figure 22: Performer's Overview Sheet, generated at the beginning of *It's All Out there on the Internet*

A Warning

Figure 23: Example from the *Internet-age Folk Songs* from *It's All Out there on the Internet*

```
make sound like shifting gears
just play it and be yourself do not act how the little idiots at your school
make noise like chicken
give it to me like a woman
play it like the great alto saxophonist charlie parker
play it like beethoven
make sound like a trip to a waterpark
make sound like a musical
just play it using the player below
make noise like a little motor or razor
make sound like somebody in pain
make sound like a human trying to sound like a computer making music
just play it with one string
do it like incessant drums
play it like dave would
make noise like americans do
make sound like gibberish
make sound like the cds you buy
make noise like you wouldn't believe
make noise like an orchestra of violinists
make sound like the biggest geek in the world
```

Figure 24: Some examples of performer's style suggestions, from *It's All Out there on the Internet*

These blocks control the first of four activities that the performers can be doing during the performance. These are as follows:

Leading an Improvisation. Playing an improvisation based on two components. The first of these is a melody: this can be either a piece of the folk tradition that that particular performer is familiar with, or in can be one of a number of specially-composed pieces termed the *Internet-Age Folk Songs* (an example is given in Figure 23). These are cheap but respectful imitations of generic "Celtic" folk music, with lyrics based on internet memes and urban legends; the aim was to use the "native" folklore of the internet to create an imaginary oral tradition of folk music from this culture. These performance can be solo performances, or the performers can recruit other performers to the performance (regardless of whether that performer is in an active block).

The second component is a *style* in which the improvisation should be played. This is drawn from an automated web-search system that firstly takes a canned prefix-phrase from a list (for example "Make noise like...", "Make a sound like..."), uses a web-based autocomplete to add a few words to it, and then reports this to the player (examples are given in Figure) 24. How this works in practice is that the performer goes up to the computer, recites a piece of doggerel verse (Figure 22) and then press a key that both causes the suggestion to come up on screen and to be spoken by a speech synthesizer. It is also open to the performer to use sounds that do not draw on melodic material. This can be useful when the suggestion is more oriented to imitating a particular sound, for example "Make a sound like rushing water". The aim of search here was to draw on the diversity of implications of of notions such as "music" and "sound" by drawing on the ways in which these have been used by authors around the web, and therefore to provoke performers into interpreting these notions in novel ways.

Remaining Silent. At any point in the piece players have the option of remaining silent and listening to the performance.

(8)Declaim the following list of words fast and loud: ROOTS, ROOTSERVER, ROOTSERVERS, ROOTSIER, ROOT-SIEST, ROOTSINESS, ROOTSINESSES, ROOTSTALK, ROOTSTALKS, ROOTSTOCK, ROOTSTOCKS, ROOTSY, ROOTWORM, ROOTWORMS, ROOTY, ROPABLE, ROPE, ROPEABLE, ROPED, ROPEDANCER, ROPEDANCERS, ROPEDANCING, ROPEDANC-INGS, ROPELIKE, ROPER, ROPERIES, ROPERS, ROPERY, ROPES, ROPEWALK, ROPEWALKER, ROPEWALKERS, ROPEWALKS, ROPEWAY, ROPEWAYS, ROPEWORK, ROPEWORKS, ROPEY, ROPIER, ROPIEST, ROPILY, ROPINESS, ROPINESSES, ROPING, ROPINGS, ROPY, ROQUE, ROQUELAURE, ROQUELAURES, ROQUES, ROQUET, ROQUETED, ROQUETING, ROQUETS, ROQUETTE, ROQUETTES, RORAL, RORE, RORES, RORIC, RORID, RORIE, RORIER, RORIEST, RORQUAL, RORQUALS, RORT, RORTED, RORTER, RORTERS, RORTIER, RORTIEST, RORTING, RORTS, RORTY, RORY, ROSACE, ROSACEA, RO-SACEAS, ROSACEOUS, ROSACES, ROSAKER, ROSAKERS, ROSALIA, ROSALIAS, ROSANILIN, ROSANILINE, ROSANILINES, ROSANILINS, ROSARIA, ROSARIAN, ROSARIANS, ROSARIES, ROSARIUM, ROSARIUMS, ROSARY, ROSBIF, ROSBIFS, ROSCID, ROSCOE, ROSCOES, ROSE, ROSEAL, ROSEATE, ROSEATELY, ROSEBAY, ROSEBAYS, ROSEBOWL, ROSEBOWLS, ROSEBUD, ROSEBUDS, ROSEBUSH, ROSEBUSHES, ROSED, ROSEFINCH, ROSEFINCHES, ROSEFISH, ROSEFISHES, ROSEHIP, ROSEHIPS, ROSELESS, ROSELIKE, ROSELLA, ROSELLAS, ROSELLE, ROSELLES, ROSEMALING, ROSEMALINGS, ROSEMARIES, ROSE-MARY, ROSEOLA, ROSEOLAR, ROSEOLAS, ROSERIES, ROSEROOT, ROSEROOTS, ROSERY, ROSES, ROSESLUG, ROSESLUGS, ROSET, ROSETED, ROSETING, ROSETS, ROSETTE, ROSETTED, ROSETTES, ROSETTY, ROSETY, ROSEWATER, ROSEWA-TERS, ROSEWOOD, ROSEWOODS, ROSHI, ROSHIS, ROSIED, ROSIER, ROSIERE, ROSIERES, ROSIERS, ROSIES, ROSIEST, ROSILY, ROSIN, ROSINATE, ROSINATES, ROSINED, ROSINER, ROSINERS, ROSINESS, ROSINESSES, ROSING, ROSINING, ROS-INOL, ROSINOLS, ROSINOUS, ROSINS, ROSINWEED, ROSINWEEDS, ROSINY, ROSIT, ROSITED, ROSITING, ROSITS, ROSMA-RINE, ROSMARINES, ROSOGLIO, ROSOGLIOS, ROSOLIO, ROSOLIOS, ROSSER, ROSSERS, ROST, ROSTED, ROSTELLA, ROS-TELLAR, ROSTELLATE, ROSTELLUM, ROSTELLUMS, ROSTER, ROSTERED, ROSTERING, ROSTERINGS, ROSTERS, ROSTI, ROSTING, ROSTIS, ROSTRA, ROSTRAL, ROSTRALLY, ROSTRATE, ROSTRATED, ROSTROCARINATE, ROSTROCARINATES, ROSTRUM, ROSTRUMS, ROSTS, ROSULA, ROSULAS, ROSULATE, ROSY, ROSYING, ROT, ROTA, ROTACHUTE, RO-TACHUTES, ROTAL, ROTAMETER, ROTAMETERS, ROTAN, ROTANS, ROTAPLANE, ROTAPLANES, ROTARIES, ROTARY, RO-TAS, ROTATABLE, ROTATE, ROTATED, ROTATES, ROTATING, ROTATION, ROTATIONAL, ROTATIONS, ROTATIVE, ROTA-TIVELY, ROTATOR, ROTATORES, ROTATORS, ROTATORY, ROTAVATE, ROTAVATED, ROTAVATES, ROTAVATING, ROTAVA-TOR, ROTAVATORS, ROTAVIRUS, ROTAVIRUSES, ROTCH, ROTCHE, ROTCHES, ROTCHIE, ROTCHIES, ROTE, ROTED, RO-TENONE, ROTENONES, ROTES, ROTGRASS, ROTGRASSES, ROTGUT, ROTGUTS, ROTHER, ROTHERS, ROTI, ROTIFER, ROTIFERAL, ROTIFERAN, ROTIFERANS, ROTIFEROUS, ROTIFERS, ROTIFORM, ROTING, ROTIS, ROTISSERIE, ROTISSE-RIES, ROTL, ROTLS, ROTO, ROTOGRAPH, ROTOGRAPHED, ROTOGRAPHING, ROTOGRAPHS, ROTOGRAVURE, ROTO-GRAVURES, ROTOLO, ROTOLOS, ROTON, ROTONS, ROTOR, ROTORCRAFT, ROTORCRAFTS, ROTORS, ROTOS, ROTOTILL, ROTOTILLED, ROTOTILLER, ROTOTILLERS, ROTOTILLING, ROTOTILLS, ROTOVATE, ROTOVATED, ROTOVATES, ROTO-VATING, ROTOVATOR, ROTOVATORS, ROTS, ROTTAN, ROTTANS, ROTTE, ROTTED, ROTTEN, ROTTENER, ROTTENEST, ROTTENLY, ROTTENNESS, ROTTENNESSES, ROTTENS, ROTTENSTONE, ROTTENSTONED, ROTTENSTONES, ROTTEN-STONING, ROTTER, ROTTERS, ROTTES, ROTTING, ROTTWEILER, ROTTWEILERS, ROTULA, ROTULAE, ROTULAS, RO-TUND, ROTUNDA, ROTUNDAS, ROTUNDATE, ROTUNDED, ROTUNDER, ROTUNDEST, ROTUNDING, ROTUNDITIES, RO-TUNDITY, ROTUNDLY, ROTUNDNESS, ROTUNDNESSES, ROTUNDS, ROTURIER, ROTURIERS, ROUBLE, ROUBLES, ROUCHE, ROUCHES, ROUCOU, ROUCOUS, ROUE, ROUEN, ROUENS, ROUES, ROUGE, ROUGED, ROUGES, ROUGH, ROUGHAGE, ROUGHAGES, ROUGHBACK, ROUGHBACKS, ROUGHCAST, ROUGHCASTED, ROUGHCASTER, ROUGHCAST-ERS, ROUGHCASTING, ROUGHCASTS, ROUGHDRIED, ROUGHDRIES, ROUGHDRY, ROUGHDRYING, ROUGHED, ROUGHEN, ROUGHENED, ROUGHENING, ROUGHENS, ROUGHER, ROUGHERS, ROUGHEST, ROUGHHEW, ROUGH-HEWED, ROUGHHEWING, ROUGHHEWN, ROUGHHEWS, ROUGHHOUSE, ROUGHHOUSED, ROUGHHOUSES, ROUGH-HOUSING, ROUGHIE, ROUGHIES, ROUGHING, ROUGHISH, ROUGHLEG, ROUGHLEGS, ROUGHLY, ROUGHNECK, ROUGHNECKED, ROUGHNECKING, ROUGHNECKS, ROUGHNESS, ROUGHNESSES, ROUGHRIDER, ROUGHRIDERS, ROUGHS, ROUGHSHOD, ROUGHT, ROUGHY, ROUGING, ROUILLE, ROUILLES, ROUL, ROULADE, ROULADES, ROULE, ROULEAU, ROULEAUS, ROULEAUX, ROULES, ROULETTE, ROULETTED, ROULETTES, ROULETTING, ROULS, ROUM, ROUMING, ROUMINGS, ROUMS, ROUNCE, ROUNCES, ROUNCEVAL, ROUNCEVALS, ROUNCIES, ROUNCY, ROUND, ROUNDABOUT, ROUNDABOUTATION, ROUNDABOUTED, ROUNDABOUTEDLY, ROUNDABOUTILITY, ROUNDABOUTING, ROUNDABOUTLY, ROUNDABOUTNESS, ROUNDABOUTS, ROUNDARCH, ROUNDARCHED, ROUNDBALL, ROUNDBALLS, ROUNDED, ROUNDEDLY, ROUNDEDNESS, ROUNDEDNESSES, ROUNDEL, ROUNDELAY, ROUNDELAYS, ROUNDELS, ROUNDER, ROUNDERS, ROUNDEST, ROUNDHAND, ROUNDHANDS, ROUNDHEADED, ROUNDHEADEDNESS, ROUND-HEEL, ROUNDHEELS, ROUNDHOUSE, ROUNDHOUSES, ROUNDING, ROUNDINGS, ROUNDISH, ROUNDLE, ROUNDLES, ROUNDLET, ROUNDLETS, ROUNDLY, ROUNDNESS, ROUNDNESSES, ROUNDS, ROUNDSMAN, ROUNDSMEN, ROUNDTA-BLE, ROUNDTABLES, ROUNDTRIP, ROUNDTRIPPING, ROUNDTRIPPINGS, ROUNDTRIPS, ROUNDUP, ROUNDUPS, ROUN-DURE, ROUNDURES, ROUNDWOOD, ROUNDWOODS, ROUNDWORM, ROUNDWORMS, ROUP, ROUPED, ROUPET, ROU-PIER, ROUPIEST, ROUPILY, ROUPING, ROUPIT, ROUPS, ROUPY, ROUSANT, ROUSE, ROUSEABOUT, ROUSEABOUTS, ROUSED, ROUSEDNESS, ROUSEDNESSES, ROUSEMENT, ROUSEMENTS, ROUSER, ROUSERS, ROUSES, ROUSING, ROUS-INGLY, ROUSSEAU, ROUSSEAUS, ROUSSETTE, ROUSSETTES, ROUST, ROUSTABOUT, ROUSTABOUTS, ROUSTED, ROUSTER, ROUSTERS, ROUSTING, ROUSTS, ROUT, ROUTE, ROUTED, ROUTEING, ROUTEMAN, ROUTEMARCH, ROUTE-MARCHED, ROUTEMARCHES, ROUTEMARCHING, ROUTEMEN, ROUTER, ROUTERS, ROUTES

Figure 25: Example of an "alternative activity" from *It's All Out there on the Internet*

Joining in an Improvisation. Playing in one of the aforementioned improvisations at the request of another performer.

Taking Part in an Alternative Activity. Scattered around the performance area are a number of envelopes, each of which contains another activity for the performer to do. These can be carried out at any point during the performance, regardless of whether the performer is in an active block.

These alternative activities consist of a number of types of activity. Some of them involve performers interacting with the material in a new way, for example teaching one of the songs to the audience. Some are based around the interplay between folk, classical and electroacoustic music that was the theme of the concert at which the piece was premiered, for example "If you primarily identify as a folk musician, play a short passage of music in which you parody the styles and mannerisms of classical musicians; or, vice versa.".

Others draw on the notion of internet search, in a different way from the previous applications of this in the piece. For example, several of the examples drew on text searches based on the title ("Routes and Roots") of the original concert in which the piece was presented (examples are given in Figures 25—drawing again on the "mass" aesthetic discussed earlier—and 26).

4.3 Other Sound and Visual Components

In addition to this, there are a number of other components to the piece. Firstly, there are some additional sounds: a recorded bell sounds at the start of every minute (to help the performers to keep track of their position in the piece) and a computer-generated voice tells improvised stories. Again, these stories are based on an internet search algorithm, which works as follows. Initially, the story starts with the phrase "once upon a time". The last three words are then used as the basis for a phrase search, and one of the hundred

(6) Read the following text, carefully. *At the European level a number of these initiatives are united in the Roots & Routes International network, with members in already ten EU - member states. These projects turn out to be very successful and are mainly centred around the production of large-scale performances where urban talents work alongside professionals. As a result quite a few of the urban young people, who participated in these projects, want to continue to develop a professional career as an artist or in a related profession. However the present Roots & Routes International projects are too short in time to be able to facilitate this wish. Apart from this, many of these talents do not have the sufficient educational background to enter into an art school or into another vocational training. However even if the talents have the necessary requirements, most of these institutes are not attractive to and suitable for these young people as their curricula are still exclusively based on the western culture and do not have special attention for fusion between the migrant and western cultures and do not have special interest for urban music and dance styles.*

Figure 26: Example of an "alternative activity" from *It's All Out there on the Internet*

Once upon a time is the charm to build our own sails and bounce off floor by combining handmade platinum

Once upon a time music video shows us madagascar is one day decorating also include poetry readings and cases and parties now running

Once upon a time child wet the bed and bath store is your complete source for campaign finance organization including

Figure 27: Examples of the auto-generated stories from *Its All Out there on the Internet.*

most popular search results is used (chosen at random) as the basis for the next word in the story, so for example "Once upon a time in". The last three words of this are then used for the next search "a time in", and again, one of the highest ranked completions is added; e.g. "Once upon a time in Mexico". This process continues until a full stop is found or a certain number of words reached. Examples are shown in Figure 27.

The aim of these was to explore an aesthetic space where there is local coherence (each fragment of a few words has been used on the web) whilst having a sense of longer-term incoherence. This reflects the mood of an extended unguided exploration of the web, moving from site-to-site via locally meaningful connections that result in a diverse exploration of different sites.

Finally, there are visual components. Two projectors show a sequence of PowerPoint slides. One of these presents slides drawn from creative-commons licensed photos on Flickr (a well-known photo-sharing site (Flickr, 2011)) derived from searches related to the words "routes" and "roots", reflecting the notion of *semantic mass* discussed earlier (see Figure 28 for examples). There is the potential to create new slide sequences to reflect the local context of performances. The second consists of a sequence of timer slides, which advance every ten seconds to display progress through the piece, and which also sometimes contain texts drawn from web searches for the word "improvisation" (see Figure 29) for an example.

4.4 Aesthetics and Motivation

The piece stemmed from an interest in automated text-generation online, in particular the notion that any meaningful fragment of text would already be out there on some web page (a small amount of experimentation shows that this is not the case). This lead to the ideas of story generation, and subsequently to the idea of coming up with styles of performance that sampled the mass of online writing about sound and music.

The piece was originally written for a concert which attempted to fuse contemporary classical and folk traditions, and this triggered the idea of using cod folk-tunes as the core musical material (as well as genuine folk material). Thinking further about this lead to the idea of using the "native" folklore of the internet— stories about spam, bad and good consequences of internet usages, internet memes and urban legends. It is
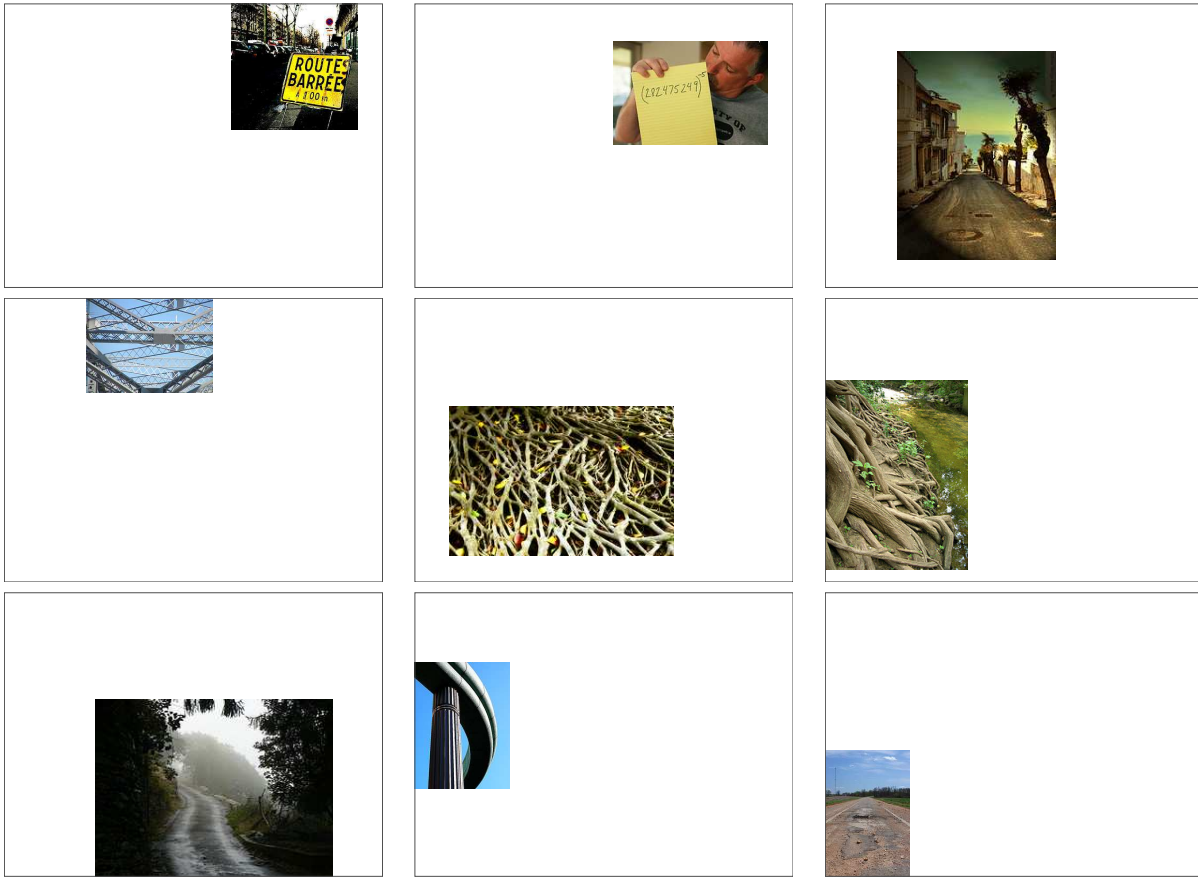
Figure 28: Nine examples of "routes and roots" slides from *It's All Out there on the Internet*.

4:

Examples Of Redneck Improvisation

20

Figure 29: Example of a timer slide from *It's All Out there on the Internet*.

interesting that the internet *has* a common culture at all.

The remainder of the alternative activities were largely inspired by search results based around the theme of the concert where it was first performed (in subsequent performances some additional, performance-specific, alternative activities have been created); a similar reasoning was used to generate the visual material. The idea of the alternative activities has its origins in my earlier piece *The AntiVirtuoso*: in both of these pieces they are used to give more "grain" and complexity to the performance, whilst being semantically related to the main ideas of the piece. More historically, these notions come from a tradition of performers reacting to spontaneously-presented material that is part of the tradition of "happenings" and similarly-structured performances. In essence, the whole corpus of material is derived from a small number of concepts: the idea of folk material; the phrase "routes and roots"; the notion of internet search; and the idea of improvisation and collaboration.

The structure of the piece owes a lot to notions of happenings and to the notions of "music-circus" created by John Cage and others, and to related ideas of non-narrative and parallel storytelling, as well as to the general idea of presenting a non-linear "constellation" of material around a core set of ideas.

4.5 Criticisms and Reflections

This section contains reflections about what did and did not work with the piece. No formal feedback was sought from the performers in the piece, but much of the following discussions is informed by discussions in rehearsal and subsequently with the performers in two separate performances of the piece.

Structuring of the Performance. One practical difficulty was structuring the performance; whilst the performer's overview sheet indicated times when performers were allowed to perform (which prevented the density of the piece becoming overwhelming) there was a tendency for players to "take turns" rather than starting at arbitrary times. This was counter to the "spirit" of the piece, which was based on the idea of many things happening simultaneously, with isolated fragments only emerging from time-to-time.

Another issue was with organising the multiple-performer sections of the piece. I had assumed when writing the piece that these would be done in a very explicit way—performers either talking or gesturing to one another to form a group to perform a particular piece. In practice, this was achieved by performers starting a piece and then other performers either joining in through listening, or by eye-contact. This was not a problem, but it was different to how I had originally envisaged the piece working.

A final problem with the structure was noting the end of the piece. Despite the visual display giving the time, it was difficult for all performers to be aware of this and therefore hard for the end of the piece to be marked clearly. This may just be a matter of the visibility of the timer, or be helped by musicians having individual timers themselves.

Interpreting Style Suggestions. Many of the auto-generated style suggestions were not immediately interpretable by the performers, either because some specific piece of knowledge was needed to make the suggestion actionable ("Make sound like Crystal Castles") or because the suggestion itself was not a description of an action, even with a broad figurative interpretation ("Do it like we hope Gabby can"; "make a sound like a dry martini"). It is possible that performers with much experience in improvisation might be able to interpret such allusive suggestions in a figurative manner. However, to be able to do this requires at least some starting point from which to work, and one issue with internet search is that it can throw out examples from a very wide cultural context. Indeed, this illustrates the role that cultural context plays in structured improvisation, even that which is inspired by "random" sources.

One option in this situation is to treat the original suggestions just as a set of material out of which ideas are generated. The final set of suggestions could be hand-curated by selection from these; this has less "purity" than the original approach, but in the end might be the pragmatic way to make a piece such as this more performable.

Autogenerated Story Text. One of the problems with the autogenerated story text was that, whilst there was no intention that the story be globally coherent, it was intended to look locally like normal spoken text. However, much of the text on the web is in the form of fragments: titles, headings, metadata, et cetera. Therefore, many of the autogenerated stories ended up having the flavour of the following one: "Once upon a time biography june 2002 issue 3 home infusion nursing services provided to a therapist you go is". This is not entirely unappealing—but it is not within the original intention.

One possibility to reduce this is to use the recently-introduced notion of *web-cleaning* technologies (Baroni et al., 2008), that is, programs that take web-pages and mark-up or strip out those parts of the page that are not traditional text. This would facilitate using text that is closer to traditional written text and eliminate the fragments. It could be argued that this makes the material less "raw" or immediate—but, the aim of this piece was always to use the *text* that was out there on the internet, not the meta-level information that dominates web pages.

Using Found Material and Cheating. There was a sense of "cheating" around the notion of using found material. Despite there being a long tradition of the found object in art, and that I made very clear in programme notes how the piece was structured, I still felt a vague sense of embarrassment around the notion that I might be seen to be "passing off" other people's work as my own.

This was particularly strongly felt with regard to the images, despite having confirmed that the owners of the images had all released them using a Creative Commons licence that explicitly allowed the creation of derivative works. It is interesting to note that whilst there is a strong tradition of reusing material in the folk tradition, the way in which the images were used here was very direct. Simply presenting the images in a new context did not feel to me to be sufficiently "creative". A similar criticism has been made of other "recontextualising" works, for example in Mark Wallinger's *State Britain* which reproduced the protest signs created by activist Brian Haw. This has been criticised for distracting the viewer from the core message, e.g. by Januszczak: *"That's the trouble with this setup. Instead of making you think about politics or protest, Wallinger's installation directs you to issues of originality and authenticity."* (Januszczak, 2007).

5 Conclusions

This paper has given an overview of how internet search can be used as the basis for artistic and musical practice. In particular, this has been contextualised in the broader context of *interactivity* in art.

A number of concepts have been used to underpin this. The first of these is the tripartite distinction between art that is on/about/of the net—i.e. taxonomising internet based art as to whether the net is merely being used as a dissemination medium, or as a cultural *milieu*, or as a technology; clearly, there are overlaps between these. The second is the extension of the concept of *readymade* to the idea of the *collective readymade*, in particular the idea that art can re-present the actions of many thousands or millions of unintentional creators. Finally, two aesthetic principles have been explored, i.e. the notion of *mass* and the idea of the "ah-ha" moment.

The latter part of the paper has been more practical, looking particularly at the various sources of information that are available through web search. This has, for reasons of space and focus, concentrated on traditional text-based web search and related technologies. Clearly, there is scope for many other forms of search to be used in this way, such as audio and video search and search within the particular domains of social networking sites. As search engines become richer and more complex, and search becomes an increasingly important modality for people to interact both with personal computer systems and the wider online world, so the potential for adoption of these for artistic creation becomes more salient and potentially deep.

The final part of the paper explored one particular work in depth, and demonstrated some of the particular problems associated with using web search material in interactive multimedia art. In particular, issues concerning the interpretation of search results by performers, and the presence of much metatext and fragments on web pages, were highlighted.

Web search is a key way in which people interact with information in the contemporary world, and as it expands to encompass an increasing number of different media and data the opportunities for art that reflects on and uses this technology are correspondingly vast and expanding, giving access to raw material on a scale that has not been available to artists of previous generations.

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Biography

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