The "I Ching" research group for the course 'Making Art of Databases'
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The experience of change
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The *I Ching* (Yijing) is a database, where data is accessed through actions that are a combination of chance and choice. We used the *I Ching* as a starting point for our product which displays abstractions of colour, animation and sound to express the experience of change both dynamically and interactively. After reflecting on a question or problem, the viewer is instructed to click 6 times. With each click there are 6 visible changes. Changes that are simple and persistent, reflecting principles of the *I Ching*. Finally the fields of colour seem to continually and gradually mutate, affected by the never-ending tiny animations of short and long lines over them.

Why the I Ching?
The *I Ching*, also known as 'the book of changes', is an ancient Chinese philosophical text, and an interactive oracle, and we chose the *I Ching* as a starting point for our project because we were interested in the paradox of chance and choice. The *I Ching* system relies on a succession of random events in combination with chosen actions, where the end result – a reference to a personal question or the consequences of a possible course of events or choice – results from an individual's involvement with this system. Usually the one asking the question throws the coins or straws.

The connections between our project and the I Ching
The *I Ching* system uses two types of lines: either two short lines -- -- known as the ying, or one long line ----- known as the yang). The yin and yang are the 0 and 1 in a binary system. A set of three binary choices creates a trigram, or *gua* in Chinese: there are eight possible trigrams. The 64 possible combinations of two trigrams represent the principles or 'changes.' The 64 combinations are called hexagrams. Individuals usually throw coins or straws and interpret the results according to various methods to make each 0 or 1 selection, and so built the hexagram. Then finally an 'oracle' - a text that relates to that hexagram - is read from the actual *I Ching* canon. [1]

We decided to represent the changes visually and aurally to make the system accessible in a tangible and immediate way. We interpreted the basic principles of the *I Ching* to guide us in choosing the colour, animation and sounds for the various changes. In our work "The Experience of Change", the colour changes with each click. Due to time constraints, we settled on making the animation and sound change only for each new trigram (achieved after each 3 clicks).

Various sources associate differing colours with either trigrams (sets of three lines) or hexagrams (sets of 6 lines, i.e. pairs of trigrams), but we wanted each moment of change to have a colour and we felt that that the colour should relate to the cultural practices of the *I Ching*, rather than being purely assigned.

We chose red and blue as the first two possible colours, with red symbolising the yin or open line and blue the 'yang' or closed line. The lowest line of the hexagram is the most effective in terms of influence in the *I Ching* result, and likewise in our system this colour (red or blue) has an affect on all successive colours. For example, if the first line is 'yin' but all the subsequent lines are 'yang', the final colour, although not longer red, has some trace of red in it as you can see in figure 1.

Figure 1: where the red is the only 'yin change' here, yet the affect of this first 'yin' result can be seen in the successive 'yang' results.

This relates to the principle in the *I Ching* canon: that earlier moments of change have greater effect than later moments of change (also a principle in the natural world).

So in our system each click is a visible 'yin' or 'yang' change. In another example, if you start with blue, and if all successive changes are also 'yang', resulting in a 'chien/chien' hexagram (6 long lines) then the colour result is (figure 2) a violet colour

Figure 2: The only 'yang' result here is the blue shown in the first click.

. In Figures 1 and 2 you the vertical thin lines of graduations of colour on the right shows the colour result at each of the 6 'change' moments, giving a visual record of the progressive moments of change. What you cannot see in this image is that the field of colour is affected by the animation of lines, nor can you hear the sounds.
For this experience go to: www.sonjavank.com/luminous.

So any colour is the result of preceding yin/yang moments of change. At one extreme, six pure 'yang' changes results in violet, which is virtually indistinguishable from purple: a colour in the subtractive spectrum that is mid-way between red and blue.

This idea of a 'change' also being in a state of change itself or being in between these two states is another aspect of the *I Ching*, referred to as 'old' and 'young' yin or yang. This will be come up again in the discussion of the animations.

At the other extreme (see figure 3) a pure 'yin' hexagram results in a brown red.

We used the principle of starting with pure red and pure blue; each moment of change can shift a colour more 'yin' (brown red) or more 'yang' (violet). These result in the hexagram colours following the sequence of the (electromagnetic) colour spectrum: violet – blue – green –yellow – orange – red – dark red. The hexagram colours range from violet (the colour with the shortest wavelength) progressively to the longest wavelength at red..

The I Ching associates aspects of the mathematical (yin/yang chance) or natural world with meanings.

Figure 3: A pure 'yin' hexagram.

For instance the meaning cluster (mountain/stillness/ grounded/certainty/caution) is associated with the 'ken' triagram (yin/yang/yang). Aware as we were that the simple system of associations underlying our colours, based on the colour spectrum and colour therapy,[2] was only one of many possible association systems we could have chosen, we were surprised to find some conceptual correlations with the *I Ching*.

The head chakra in the *I Ching* is violet, while red is associated with the one lowest to the earth, the pubic chakra. There are also some mathmatical correlations: to get blue or red as an end result, one needs equal alternations of 'yin' and 'yang' changes, as in figure 4.

Figure 4: Equal alternations of 'yin' and 'yang' changes beginning with 'yang' (blue)

Rationale for our approach

We focused on the principles of the *I Ching* as a way of 'making choices out of a database' rather than imitating the *I Ching*'s outward form or the aspects of 'prophecy' or oracle. We aimed to give some 'luminous' meaning to this system by using colour, animation and sound in ways that had both specific (identifiable) and abstract associations. While one colour emerges as the final colour for the hexagram, you are also aware of the changes that colour had gone through, and you see movement over this field of colour in patterns that seem sometimes geometric and sometimes organic.

The yin/yang principle is not just the coupling of this-or-that opposites, rather it reflects the concept of an equilibrium. You need a "no" possibility for a "yes" possibility to exist, and this principle of the balance of contrasts is reflected in a more complex way with the *I Ching* method of coupling contrasting trigrams. We followed this principle in the types

of animations we made. These animations were also an attempt to incorporate the idea of 'old' and 'young' yin/yang. For example in the animation of the 'chien'(sky) trigram, a line moves from one long line successively into two broken lines while moving downwards and from the left, while for the complementary, 'kun' (earth), two short lines change into one long line moving upwards and from the right side outwards. The corresponding sound clips incorporate a mix of 'atmospheric' sound and rhythm, where the 'sky' trigram sounds are lighter and more airy in feeling. For the 'water' (kan) trigram, we used a sound of bubbling water to relate it to the trigram's other associations (such as: danger, change, ear, pig, sound, north, rough water, second son).
We chose small randomly occurring contracting circles for the animation for the same trigram, while for the complementary (li) 'fire' the animation was an expanding circle form located randomly. For the marsh (dui)/mountain (ken) pair the same circular animation emerges from the edges inwards for the former and from the bottom upwards for the latter.

Such initial choices for a particular colour (such as red for 'yin') or animation (a straight or angled line or a circular form) or sound (a soundclip of thunder or from a forest) have been influenced by our own interpretations, but the aim has been to visualise the principles of the *I Ching* system of changes itself (yin/yang chance) to influence the final image -changing- image.

That was also a principle guiding the choice in colours of the animations themselves. The animation for the first trigram is either red or blue: the same first 'yin' or 'yang' colour but at a deeper hue so it seems to sink into the main colour. The colour for the second trigram is a complementary colour set at higher luminosity, so that it seems to be lighter (outside or over) the field of colour. This connects to the *I Ching* principle that the first trigram relates to the inner/personal aspect of change while the second trigram relates to the outer/external aspect of change.

Results and further work
Although we have approached this as an artwork rather than as scientific research, we still feel that anyone deepened in the knowledge of the *I Ching* could find some meaning in our work, because the rules of change in the system follow *I Ching* principles. Instead of text, the viewer is presented with a field of colour that continues to change.

The animations continue without end, affecting the field of colour which is set at the sixth click. The sounds change too, but this is arbitrary, due to time constraints. Ideally the sounds should be set recursively, as the animations are, but they are just looped with a slight offset.

For the *I Ching* novice, this work, presents the user with an immediate experience of image and sound, where change evolves and is dynamic. The *I Ching* expert could use this device as an inspirational aid alongside the *I Ching* text itself.
At present the user can get only 64 possible colour and animation possibilities at the sixth click. The animations yield diverse patterns and are never exactly the same but we would like to develop the work so that the colours and sounds then gently evolve in yin/yang

like manner. Another development could be to create more possibilities for the yin/yang colour choices, such as incorporating four options (old/young yin/yang or present and future hexagram systems) instead of the two we chose.

We have only touched the surface concerning the I Ching. For example we chose just the King Wen sequence of hexagrams, admittedly the most commonly used system.

There is also the whole system of 'Waxing and waning' bigua (changing hexagrams) which we did not look at closely. [3] Another area of interest would be to investigate circular diagrams,[4] especially since our work is a visual reflection of the I Ching, but we just ran out of time!

Finally
Things are yin or yang depending on the criteria you apply and only in the context of a relationship. Like the New Zealand Maori concept of tapu/noa, this is a system of constant change and relativity of states: akin to the human condition.

Figure 5: Xiantian diagram attributed to Shao Yong (1012-1077).
Black relates to the 'yin' changes.

In taking this approach with this data in our product (www.sonjavank.com/luminous) we aim to create an impression of present and luminous possibility.

Notes and sources:

1. See S J Marshall's (2005) website for an academic and practioner's approach to the I Ching. http://www.biroco.com/yijing/index.htm . The site has numerous diagrams and references as well as clear explanations, ranging from a basic overview to the more detailed.

2. Seven areas of the body that are associated with colour therapy:
see: http://www.colourtherapyhealing.com/ for a discussion of Chakras (colour therapy relating to part of the body).

3. See Steve Marshall's article for an introduction to various sequences in the I Ching: http://www.biroco.com/yijing/sequence.htm

And more information here: http://pacificcoast.net/~wh/Index.html , a site maintained by by Greg Whincup, author of *Rediscovering the I Ching*, St Martin's Press 1996.

Or: http://www.aasianst.org/eaa/smith.htm, maintained by Rice University Professor, Richard Smith.

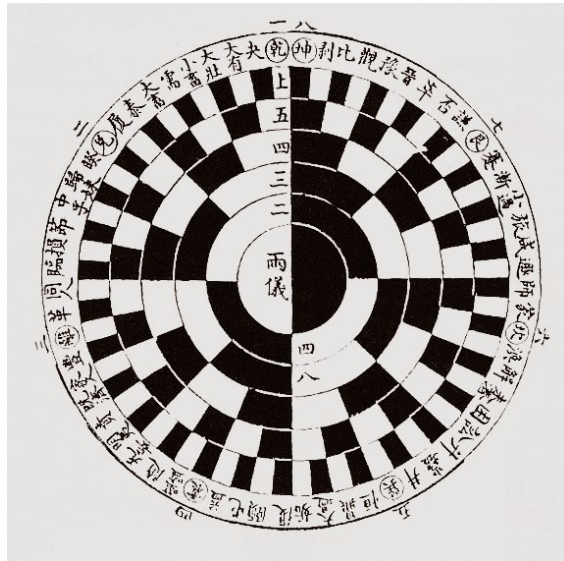4. Google the Yijing diagrams from the Zhouyi Tushi Dadian ('Encyclopaedia of Zhouyi Diagrams.' Beijing: Zhongguo gongren chubanshe, 1994, 2 vols)