

An Interactive Poetic Garden

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ABSTRACT

The garden is the symbol of man's control over nature. This project attempts to bring the computer into the garden in harmony with stone, water, and plant materials. The computer is used to drive a video projector, creating the illusion of text floating on the surface of the water as it flows through the garden. This relaxing computational environment lends itself well to several open ended active and passive modes of interaction.

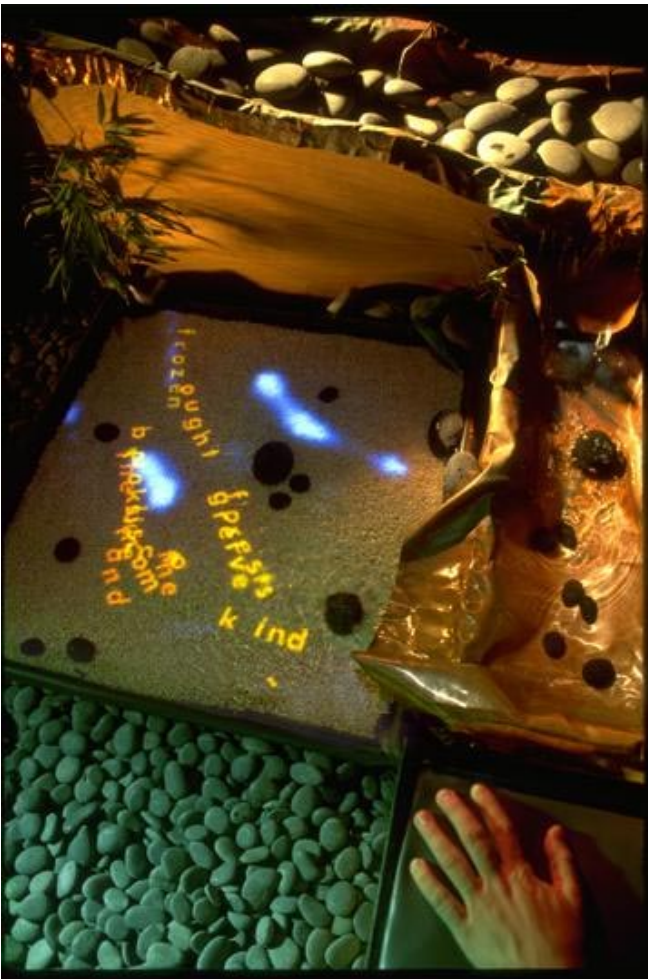


Figure 1: The garden with rocks, vegetation, flowing water carrying words, and an interface mapped onto the large pool.

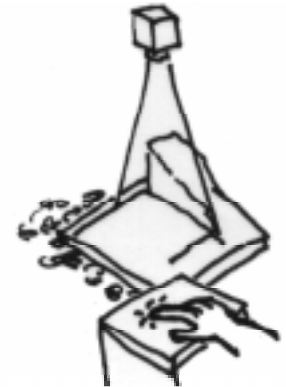
Keywords

Garden, water, interaction design, interactive installation, industrial design

INTRODUCTION

The interactive poetic garden is literally a fountain of words. Water flows briskly down a series of cascades into a glowing pool. A tangle of words projected on the surface of the pool float like leaves in a stream. Sitting on the edge of the pool—but without getting your hands wet—you can control the flow of words, blocking or stirring them up, causing them to grow and divide into new words that are eventually pulled into the drain, then pumped back to the head of the stream, only to tumble down again. The garden is one of the experiments underway in the Media Lab's Aesthetics and Computation group, under the direction of Professor John Maeda, working to sculpt computational media into new expressive forms.

Although it measures only six feet square, our garden contains all of the elements of a classical garden: flowing water, river stones, bamboo, and a bench for people to sit. The garden design is based on a square recursively divided



into a series of smaller squares, a design which can be traced back to the earliest formal gardens of Persia [1]. Water enters at the back of the garden and cascades down a series of pools until it reaches a large square pool. This larger pool is lined with crushed white coral and here the water moves slowly until it spills out the back edge. Words appear to tumble down the rocks along with the water, calmly pull themselves through the shallow pool, and then magically reappear at the top of the stream along with the water. The words mimic the physical behavior of objects floating in a real fountain. The person sitting at the bench can interact with the words through a special hand interface letting her stop the word flow, push and pull words, and over time change the content of the words themselves.

These physically modeled words are projected from above onto the rocks and coral. The computer computes the word

image as well as managing the camera based input device, which lets the person control the word flow.

DYNAMICS

There are obvious and subtle differences in fluid dynamics and typographic layout. It was our goal to have the words appear to flow naturally along with the water as if they were leaves floating downstream. An important design concern was to have the words maintain an orientation and interletter spacing such that the words are legible most of the time.

We decided on a mass/spring system in which each letter of the word is a point mass connected to its neighbor letters with springs. Additionally, the first and last letter of the word is connected with a separate spring that pulls the letters of the word into a line. A force is applied to the first letter of each word that propels it through the stream. This force is defined as a stable vector field that is designed to match the real water flow through the garden as well as appropriate forces from the input device. Of course, this complexity was completely transparent to the person arriving at the garden. To him, the words were naturally flowing and bouncing through the pools along with the water.

EXPERIENCE

Initially, we wanted our garden to be a place for meditation. We also wanted people to be able to affect the overall content of the words as they circle through the garden, as well as influence the dynamics of the digital content. We called our initial installation *Stream of Consciousness* because we hoped to evoke the fluid contents of conscious memory and shifting focus of attention with word association [2].



Figure 2: Three fingers hold back a stream of words

Through the hand interface, a person can reach into the pool of words and create a blue aura behind them. The words are repelled by the hand, making it easier to create blockages in the flow [figure 2]. But if the person presses

directly onto a word so that the glow is directly behind it, it begins to swell larger than the other words. Eventually it bursts into two words, the original along with a related word. If the hand is not moved, more related words will continue to be generated from the seed word. As the pool circulates, old words are removed, so that over time the words in the water are the words that have been chosen as interesting.

It is not difficult to affect words given the rich amount of information provided by the specially designed interface. The forces on the word slide away from the pressure gradient, and the pressure information is presented directly as the blue glow for instant feedback. Giving any word the ability to divide into a rich set of related words was trickier, but we were able to implement this functionality thanks to resources of Princeton's WordNet project [3]. For example, the word stone might give birth to such words as: pumice, grit, nature, and punish.

EVALUATION

The overall effect of the garden was foremost as a quiet, contemplative space. Over time, several hundred people experienced this interaction, and the response was warm and enthusiastic. We were also pleased to see the many unique experiences that people left with because the interaction was so open ended. Some people were content to passively watch the words, others would repeatedly damn up the words into clumps and then release them, and others would attack the words so that they divided out of control and filled the water with hundreds of words. Even pre-verbal children were able to explore the water and stones and the "lights" which shone on the water.

The computer is an integral part of the design, but it is also only one element among many. The interface allows a wide range of open ended interactions and creates a harmonious environment that is often lacking in computer based environments.

ACKNOWLEDGMENTS

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REFERENCES

1. Moore, Charles W., Mitchell, William J. and Turnbull, William. *The Poetics of Gardens*. The MIT Press, Cambridge, MA, 1988.
2. Stillings, Neil A., et al. *Cognitive Science*. The MIT Press, Cambridge, MA, 1995, 37-42.
3. WordNet is a research project inspired by human lexical memory that was developed at the Cognitive Science Laboratory at Princeton. Information is available at <http://www.cogsci.princeton.edu/~wn/>.