

Glowdoodle: A Medium for Expressive Inquiry

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ABSTRACT

Expressive inquiry is a process of exploration and discovery within an artistic medium that supports both intuitive play and iterative experimentation. Glowdoodle is a system that enables people to paint with light using objects in their environment, see the results as they paint, and share their creations on the web. I describe properties of systems that support expressive inquiry, illustrate them with glowdoodle as an example, and describe diverse examples of glowdoodle creations.

Author Keywords

Light-painting, expressivity, inquiry

ACM Classification Keywords

J.5 Arts and Humanities. K.3.1 Computer Uses in Education.

General Terms

Design, Human Factors

INTRODUCTION

This paper describes glowdoodle, an interactive system for painting with light, and describes the idea of expressive inquiry that emerged from developing the system and observing people's creative use of it. Glowdoodle enables people to paint with light using any object in their environment, and see the results in real time as they paint. It also provides a very easy way to share glowdoodle creations on the web.

THE GLOWDOODLE SYSTEM

Glowdoodle is an application written using the Processing programming environment [2]. It takes video input from a webcam, and applies a simple filtering algorithm to put the brightest pixels into the image on the screen. It can be used on a personal computer, and images can be uploaded anonymously from it and viewed on the web site (see <http://glowdoodle.com>). Alternately it can be installed in a larger space using a projector. In this case, it can be used in a darkened room to encourage the use of various types of glowing "light brushes." It can also be used in a normally lit room, with the painter in front of a dark backdrop, so that a wide variety of objects can be used as brushes. The controls are very simple: a click clears the screen, and one key press anonymously uploads your glowdoodle to the web. The website contains a gallery of glowdoodles.

RELATED WORK

Glowdoodle has three key differences from traditional long-exposure photography techniques that can be used for light

painting. First, glowdoodle shows the results in real time as you paint, providing feedback that helps you understand and control the painting process. With traditional light painting, even with a digital camera, you can only see the result after the exposure is complete. Second, glowdoodle allows you to paint with any object, not just a light source. This is partly because the algorithm (selecting the brightest pixels) is slightly different from the process in film or a digital camera sensor (accumulating brightness), and partly because seeing the results as you go facilitates much more rapid experimentation. Finally, glowdoodle has built-in a very easy way to share glowdoodle images on the web.

Karl Willis' Light Tracer [4] has some similarities to glowdoodle: it is also an interactive system that shows the results of light painting in real time, in an installation setting. Light Tracer processes the image further, thresholding the brightest areas, and rendering them monochromatic, leaving only white traces. The thresholding and whiteness provide a clean stylistic unity. The imagery created by glowdoodle, in contrast, is more raw, preserving intentional and unintentional details of light and movement in full color.

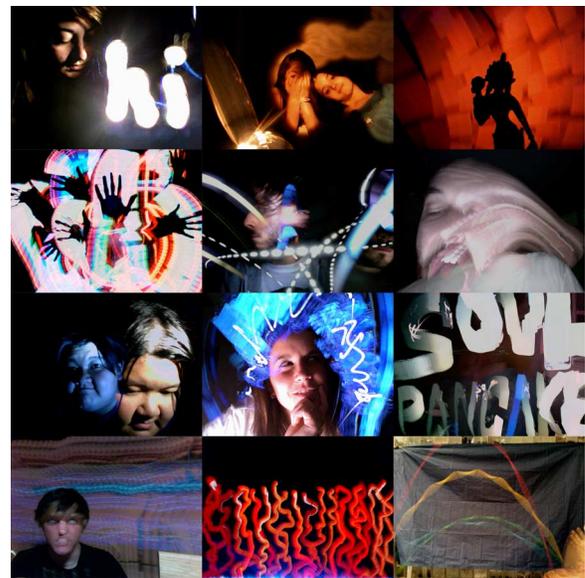


Figure 1: Glowdoodles created and shared by users

EXPRESSIVE INQUIRY

During the development of glowdoodle, several ideas emerged which together make up properties of interactive systems that enable expressive inquiry. By expressive inquiry I mean a process of exploration and discovery within an artistic medium that supports both intuitive play

and iterative experimentation. These principles arose from my own play, interactions with friends using the system in various contexts, and observation of glowdoodles contributed by hundreds of users on the web. They are naturally just a first pass, having emerged from a single design. They include transformative seeing, improvisational creation, immediate feedback, and easy sharing.

Transformative Seeing

When I began experimenting with glowdoodle, I started to see everything as a paintbrush. Each object in the world presented a new way to paint with light, because of its unique color, reflectance, texture, shape, movement and myriad other affordances. We don't normally see a glow stick, a Lego brick or a fingertip as paintbrushes, but with glowdoodle they take on new roles. This is "seeing-as" in Schon's sense [3], generatively drawing together the idea of a paintbrush with objects far outside the domain of painting. I hope that through accident, experiment and example, many other people using glowdoodle will experience the same new way of seeing. The experimentation in expressive inquiry may be motivated by this transformative seeing, through the intuitive generation of new ideas.

Improvisational Creation

The process of creating a glowdoodle is rapid, each one rarely taking more than a few minutes. Each gesture is irreversible: there is no way to erase or undo without starting over. In this way, glowdoodling has something in common with art forms like gesture drawing, where strokes are made continuously and indelibly, and jazz improvisation, where melodies and rhythms are invented spontaneously in time and cannot be unmade. The expressivity of glowdoodle is derived at least in part from this improvisational quality.

Immediate Feedback

Because you can see the results of your light painting gestures as you make them, there is a tight feedback loop in glowdoodle. Immediate feedback is one of the criteria for Csikszentmihályi's flow experience [1], enabling deep immersion and focus in a creative act. It invites a kind of expressive play with intuitive emotional gestures, such as facial expressions and full body movements. At the same time it supports more systematic investigation of, for example, the properties of a blinking LED toy or painting with silhouettes, through rapid iterative experiments.

Easy Sharing

You can share your glowdoodle creation with the world instantly, posting it on the web with a single key press. The participatory web has spawned a variety of easy ways to share media online, but typically they require at least a registration and login, which glowdoodle does not. Because it is so easy to share, and because it is anonymous, people may be more likely to share their half-formed ideas and failed experiments in addition to the more finished

works. As a result, people may be more likely to learn from and mimic the experiments of others. It seems likely that people are copying each other's glowdoodle techniques, such as the "zombie eyes" effect, silhouetting, and "multiple exposure" effect, based on their repeated appearance, though it is hard to distinguish mimicry from re-invention.

EXAMPLES

Without a more formal study of how people use glowdoodle, the best evidence I have for expressive inquiry comes from the diversity of the creations people have shared online. At the time of writing, over 1,400 glowdoodles have been shared. Here are some categories of uses (see examples in figure 1): *Painting with the body* by moving the face, teeth, or hands; *Facial expressions* that express a variety of emotions; *Zombie eyes* made by moving the pupils around until the eye is all white; *Waving around a light* to create abstract patterns, drawings, or words; *Painting light onto things* like the body, objects or walls; *Silhouetting* by painting with a glowing object behind something opaque; *Throwing things* to draw parabolic arcs; *Multiple Exposures* simulated with brief flashes of light on faces or objects; *Collaborations* with multiple people in the scene; *Mixed compositions* using several of these techniques. Also, there are some uses specifically related to sharing on the web: *Multi-glowdoodle compositions* such as a name spelled out letter by letter, so it can be read when they appear all in a row on the web gallery; *Web community messages* such as names of websites and twitter user names.

CONCLUSION

The idea of expressive inquiry emerged from the process of developing glowdoodle and observing people's creations. Glowdoodle provides one instance of a system that enables expressive inquiry, by supporting transformative seeing, improvisational creation, immediate feedback, and easy sharing. I hope these ideas will inspire the creation of mediums for expressive inquiry in other domains.

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