

Project Documentation of
The LED Gloves

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Date: 28th May 2007

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Introduction

The purpose of this report is to detail the artistic and technical developments that I have made towards the realisation of my work.

It will also include decisions and rationalisations that were made to enable the completion of the artwork.

How It Works

The LED Gloves is a DIY physical interface for controlling 3D mapping applications like Google Earth. The user interface is a pair of illuminating gloves that can be used to track intuitive hand gestures like grabbing, pulling, reaching and rotating.

The user stands in front of a large scale projection of the earth with a special set of illuminating gloves on their hands. By gently squeezing each glove, the LED turns on, which is then translated by the computer into navigational commands. The user is then free to fly above the world, zooming in and out, tilting, rotating at their leisure.

A small camera attached to a computer translates each LED enabled gesture into a set of possible actions such as pan, zoom, rotate and tilt. The video tracking functionality is written within the processing programming framework, in conjunction with Java's `java.awt.Robot` library. This robot library converts a special video tracking vocabulary into mouse clicks/ releases and curser movement in order to control the computer. Separating out the tracking and control interface in this way provides a flexibility such that LED Gloves can be used with a variety of applications.

Processing is an open source project initiated by Casey Reas and Benjamin Fry, formerly of the Aesthetics and Computation Group at the MIT Media Lab. It is "a programming language and integrated development environment (IDE) built for the electronic arts and visual design communities", which aims to teach the basics of computer programming in a visual context and to serve as the foundation for the electronic sketchbooks. One of the stated aims of Processing is to act as a tool to get non-programmers started with programming, through the instant gratification of visual feedback. It is a language that builds on the graphical side of Java programming language, simplifying features and creating a few new ones.

Processing includes a "sketchbook" which is a minimal alternative to an IDE for organizing projects.

When programming in processing all classes defined will be treated as inner classes when the code is translated into pure Java before compiling. This means that the use of static variables in classes are prohibited unless you explicitly tell Processing that you want to code in pure Java mode.

Here is an example of some processing language:

```
int num = 60;
float mx[] = new float[num];
float my[] = new float[num];

void setup()
{
  size(200, 200);
  smooth();
  noStroke();
  fill(255, 153);
}

void draw()
{
  background(51);

  // Reads through the entire array
  // and shifts the values to the left
  for(int i=1; i<num; i++) {
    mx[i-1] = mx[i];
    my[i-1] = my[i];
  }
  // Add the new values to the end of the array
  mx[num-1] = mouseX;
  my[num-1] = mouseY;

  for(int i=0; i<num; i++) {
    ellipse(mx[i], my[i], i/2, i/2);
  }
}
```

This code allows the user to change the position of the circles by moving the mouse across the screen. It works by recording the positions of the mouse in an array at played back at every frame. Between each frame, the newest value are added to the end of each array and the oldest one is deleted.

How The Gloves were Made

The gloves were made using two ping pong balls, two LED key rings, one nail and a glue gun.

The first thing to do was to remove the rings from the lights. I then made a couple of holes in the ping pong balls using a nail.

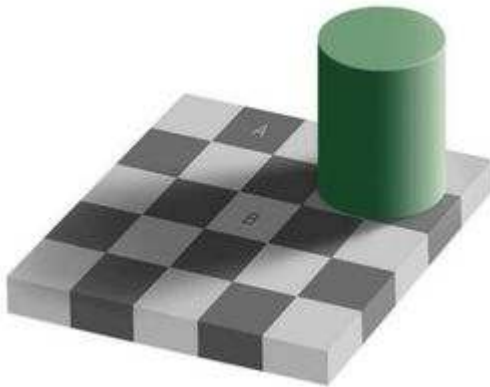
I made sure that the hole was big enough to accommodate the LED sticking from the lighter. I then glued around the holes I made in the ping pong balls and attached the lighters. I found that the gloves work best when there is balanced lighting in the room.

The Research

The artefact is mainly about optical illusions. An optical illusion is always characterized by visually perceived images that, at least in common sense terms, are deceptive or misleading. Therefore, the information gathered by the eye is processed by the brain to give, on the face of it, a percept that does not tally with a physical measurement of the stimulus source. A conventional assumption is that there are physiological illusions that occur naturally and cognitive illusions that can be demonstrated by specific visual tricks that say something more basic about how human perceptual systems work. Illusions fool us; they convince us of things that are not true. The interesting thing is we seem to enjoy being fooled in this way.

Many common perceptions involve illusions although most people are not aware of it. That is much of what we perceive does not correspond to the stimulation of our sense organs. Therefore, for example, we do not see a person who is walking away from us as getting smaller and smaller, even though the image in our eyes rapidly decreases in size.

Here is example of an optical illusion:



Square A is exactly the same shade of grey as square B.

I decided to use Google Sketch up to create some of the models and import them into Google Earth.

I decided to go with this software because it was easy to learn and quite powerful. It allowed me to build and modify 3D models easily and very quickly.

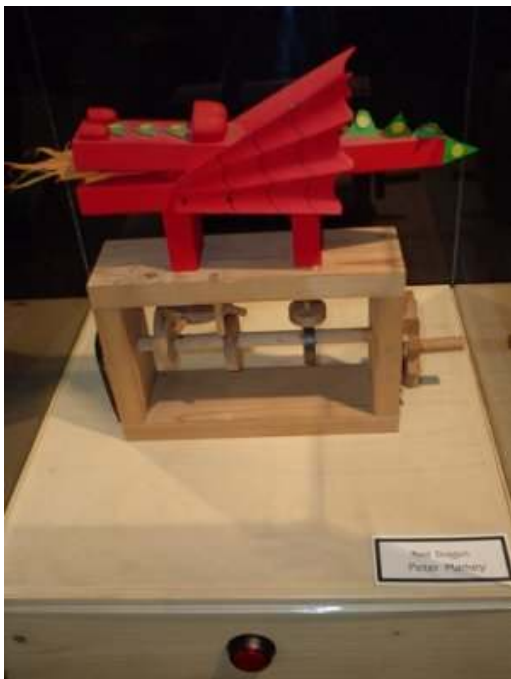
I also went to the Kinetica Museum in Spitafields. The exhibition I saw was the 'Cabaret Mechanical Theatre & The Ride of Life'.

During my time there I learnt a lot about Kinetic arts and saw some very interesting pieces of work.

I have discovered that when doing kinetic art, you have to explore how things look when they move. Experiments include light, motors, mirrors and wind to get the sculptures to move.

The biggest challenge is to get the sculptures to balance. This is similar to imagining two people sitting on a see-saw. If they weigh the same, the see-saw will balance. If one person is heavier, he/she will have to move closer to the centre of the see-saw to get it to balance. Therefore, kinetic artists rearrange their mobiles until everything is in balance.

The Ride of Life, developed as a satire of British culture, was a large-scale project commissioned in the late 1980's by the Meadowhall Shopping Centre in Sheffield. Designed and created by the top British automatists of the time, it was to become a huge automated theme park and ride covering a colossal 25,000 sq ft area of the shopping centre and was set to become a landmark in the history of automata. However what started as a wonderful dream in the booming 80's had a very rude awakening with the recession of the 90's and after 3 years of work, the project was suddenly axed. Stored in sheds and warehouses for the past twenty years, many of the sets were tragically destroyed through vandalism and theft. CMT have initiated the restoration of the surviving scenes with some of the artists originally involved, enabling segments of The Ride of Life and the only complete surviving scene to be shown publicly for the first time.



'Red Dragon' by Peter Markey

The origins of Cabaret Mechanical Theatre (CMT) date back to 1979, when a handful of automaton artists (woodcarvers, mechanists, caricaturists and satirists) began to work together as an artists collective, sharing a strong appreciation for the tradition of craft and a mutual wit with regards their sense of cultural commentary. The group, founded in 1983 in Falmouth by Sue Jackson, moved to London's Covent Garden shortly thereafter, where their collection of automata immediately received both critical and popular acclaim. Through Jackson's direction, CMT quickly established itself as the first and finest collection of contemporary automata in Britain, boasting a repertoire of artists such as Peter Markey, Paul Spooner, Ron Fuller, Tim Hunkin, Lucy Casson, Andy Hazell, Jan Zalud and Keith Newstead. The cavernous venue, which provided an environment reminiscent of the old end-of-the-pier arcades, became one of London's major tourist attractions (1984-2000) and captured the charm, creativity and humour of true British ingenuity.

Conclusion

I feel that overall my artefact went rather well. I learnt a lot during my research and had quite a lot of fun doing so.