

# Mixed drawing - merging physical drawing with creative coding

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## ABSTRACT

### Author Keywords

mixed reality, projection mapping, creative coding, drawing, touch input

### ACM Classification Keywords

H.5.1 Information interfaces and presentation: Information interfaces and presentation

### General Terms

Design, Human Factors

## INTRODUCTION

Creative coding the action of writing code not only for pleasure but also without any purposes except aesthetics of entertainment. It emerged with the first computers programs. The results of the programs were at first purely digital; nowadays it is possible to print them as images, 3D objects or apparel (cite...).

However, it is interesting to keep the programs running in order to obtain an interactive experience. The creation of mixed mediums, using drawings and sculpture with projection has been explored by artists in the past few years. The creation of such pieces of art requires time and dedication, consequently the results are usually animations and rarely interactive. In this paper we focus on the easy creation of planar (2D) interactive mixed drawings.

We enable the users to manipulate directly images, videos and programs using a touch and tangible interface in a spatial augmented reality setup.

## RELATED WORKS

We built our tool over the popular creative coding solution Processing (cite). Processing is a language and IDE based on Java, it was created for creative coding by Casey Reas and Ben Fry (cite).

The emergence of this kind of simple programming languages enables programming to anyone without a computer science

background. In this paper it is our target audience, we enable them to “compose” programs made of multiple processing sketches, images and videos.

– Related works dans la composition

– Revoir Touch & Tangible biblio dans le papier precedent...

## TECHNICAL SETUP

- SAR - markers, projection (main paper + additional cardboards)
- Touch - Kinect
- Capture - additional Camera
- Processing

## MIXING PHYSICAL AND DIGITAL DRAWING

### Layer representation

The first basic tools we propose is to compose the drawing with images and videos. The user can choose which one to integrate and then place them using the touch interface. We use the same interface to add programs (“Processing sketches”). Videos, Programs or Images will be referred as Layers.

We propose to use a hierarchical ordering of the layers as a tree: there is a root layer, containing sub-layers, and each sub-layer could also have sub-layers. The tree representation is fundamental in computer science: the position in the structure of will influence the layer’s position and rendering.

### Writing a program for the physical world

In computer graphics, everything is pixel or algorithms. However, in the real world pixels can be more or less dense and algorithms need a scale to be rendered. Consequently, the programmer must specify not only the size in pixels of the sketch, but also the size in millimeters. This size is not definitive, a program is a common layer: it can be moved and resized at will.

We tried to maintain the writing of programs as close as possible to usual Processing sketches. The first change was the addition of a physical size, the second change is the choice in the input method. We propose two input methods, either the touch or the 3d input, the user can switch between the two. The program will receive in priority the events in its drawing area, then the events outside it (like events outside a window in any operating system). The events are mapped to the values `mouseX`, `mouseY`, `pmouseX` and `pmouseY`

(mouse current and previous position) so that any sketch using the mouse will easily work in the projected environment.

Figure ... shows the difference between a Processing sketch and a sketch with our solution.

– Figure ...

The composition of programs as layers enables an easy manipulation that could stimulate the creative process. Here is an example: we want to create mixed scene with a car, the car is drawn and the wheels and background are programs and create the illusion of movement. The user have to create one program for the wheels, invoke it two times, and then place each wheels in a “What You See Is What You Get” (WYSIWYG) way. He or she creates also a scrolling background program, and also invoke it multiple times. Once everything is in place, at the right scale and positions, it is possible to measure the result to adjust the programs or just keep them running.

— Figure : rolling car...

### **Interaction between programs**

We mentioned earlier that the programs are running as layers, they cannot interfere with each other's positions or access the underlying layer structure. The communication can be achieved using variables outside the SubSketch class (Figure ...). Like in any Processing sketch the variables are accessible to all files, here they are accessible to every SubSketch.

We propose an example use of this to control the wheather in a mixed drawing. We took a few sketches from OpenProcessing.org, one for snow (cite...) and one for fire. We wrote a third program to control the two former. The third program has three switches depending on where the user moves the “mouse”, which is replaced by the touch interface. We propose to replace the finger interaction by a small paper cube to control the wheather.

- images
- videos
- animated elements (e.g. gif)

### **Interacting with the drawing**

- interactive elements (e.g. grass)
- changing (e.g. brightness from 3D spatial movements )

### **Creating animated drawings**

- animated sequences

### **USER FEEDBACK AND DISCUSSION**

on demande de faire un dessin qui necessite l'utilisation de "Digital tools for traditional drawing" on voit ce qu'ils en disent. On discute.

### **CONCLUSION**

### **REFERENCES**