



Farbcodes – Interactive Colorspace

FARBCODES analyses the colors of an image and generates a 3d-model of it - the Colorsculpture.

There is the possibility to change the parameters like saturation, hue, lightness in dependency of the sculptures shape.

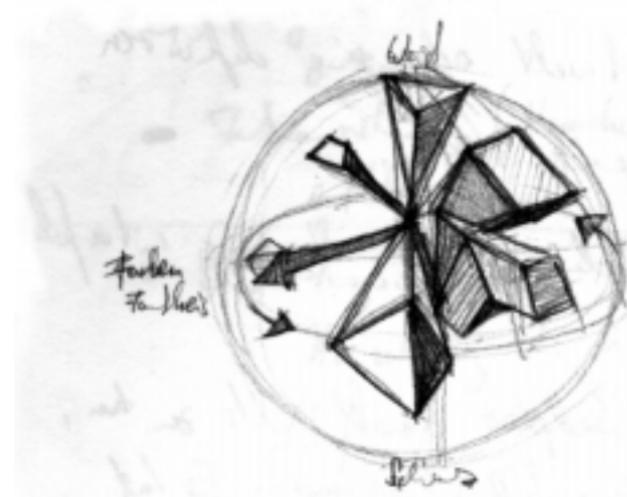
It is programed with „C“ and the Open GL-library.

The complete description of the FARBCODES project is on the web: www.beta45.de.
Center of the FARBCODES project ist an installation, that generates the 3d-modell in realtime of the actual environment.

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FARBCODES is transforming our real world in a world of colors. There is one reality of forms and one of colors, two parallel worlds which are both part of our reality. The reality of form which is more dominant is going lost. The colorworld is coming to front and takes shape in the sculpture.

You can even say it is an polaroid of colors displayed in a 3-dimensional model.



Rough 1

The Colorsulpture

The first idea was to display, the colors of an image as virtual figure. To show this figure the information of all sites (360°), of the object is needed.

First there has to be a room that can be visited by several persons at the same time.

Second the re has to be a camera that transmitts the data to a pc. The pc calculates the vitual copy and sends it to the videoprojector displaying it. This is happening in realtime, so the sculpture is changing permanently when the colors are changing in the room. Comes a person with a colored shirt to the room, the color conditions are changing so the figure is changing its face. The figure seems to live.

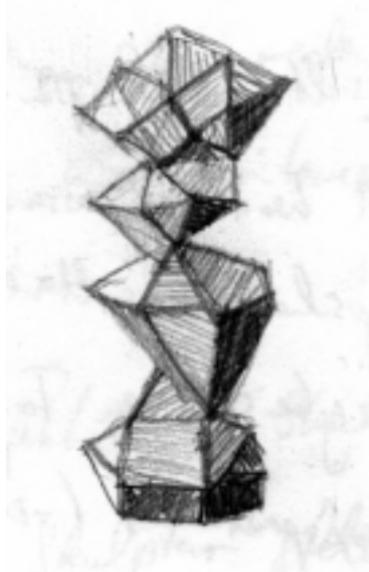
To generate the Colorsulpture a model had to be developed. We started with Ittens „Colorsphere“ that has the complete colorspectrum.

In rough 1 several polygones cover the colors of an image.

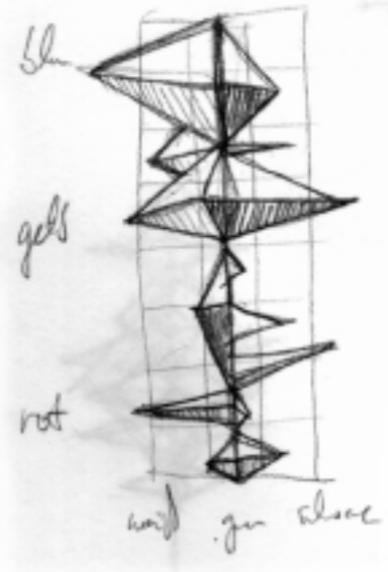
Roughs 3 – 6 try to make it look more like a sculpture. The Colorspectrum is now on a vertical line. The polygones can be, for example saturation, hue, lightness.

Rough 4 shows the active colors as pyramid coming out of the center. The size depends on how much of the color is there.

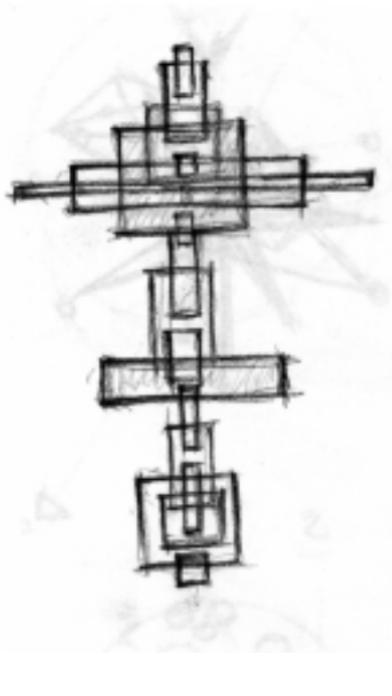
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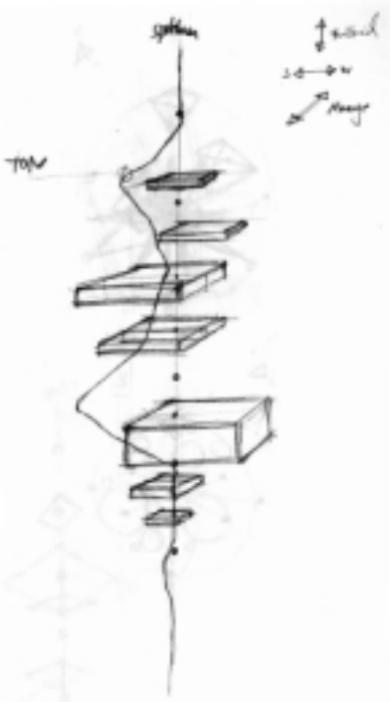
Rough 3



Rough 4



Rough 5



Rough 6

How does the Colorsulpture work?

The 3d model is rendered in realtime and displayed with OpenGL. A webcam is getting the information of the image. The software is programmed with „C“ on Windows. It is calculating the color-proportions of the image and transforming it to the model.

The active areas are displayed with cubes, the bigger the cube, the more color is there. The cubes are transparent, so you can see overlapping areas.

For example in dependence of the saturation the cubes can be moved on the axis, which could be very extreme (Images 10 to 17).

With the Farbcodes software it is possible to change all parameters individually.

That means relative or absolute calculation of the object, saturation, lightness, color-amount, transparency, form, rotation of the cubes and the whole figure.

These changes can be made by typing the key caps or in an extra window for finetuning. Absolute calculation means all the colors have a fixed place on the line, colors which are not represented, are not shown, the area is black (Image 14). Relative means all represented colors on the line are fixed together the others are missing. It is looking like a moving mass.

Saturation, lightness, color-amount could be switched between several models. The parameters have different dependencies. For example the saturation is very high the cubes a very long (Image 12).

The form could be switched from cube to pyramid.

The whole figure and the separate cubes can rotate.

There is the possibility to show the spectrum on the vertical line or from one point in the center. The vertical line could rotate in all axis.

The background could be changed from black to white. Black means „nothing“ for the projection in the room. And there is the possibility to not erase the background.

Also the cameraview could be shown.

Hardware description

We took the Logitech Webcam „Quickcam Pro 3000“, because logitech has an Developer Kit SDK 1.0 for Webcams . So there is the possibility to get directly to the information of the webcam. For example:

- integration of webcam image in any software
- access to several parameters (lightness, size, ...)
- access to the realtime images
- ...

The pc needs the following resources

- Windows 32Bit (Windows 95 and higher)
- minimum 1.200 MHZ Pentium 3
- 128 MB Ram
- 3D card with OpenGL (Software or Hardware)
- Logitech Webcam

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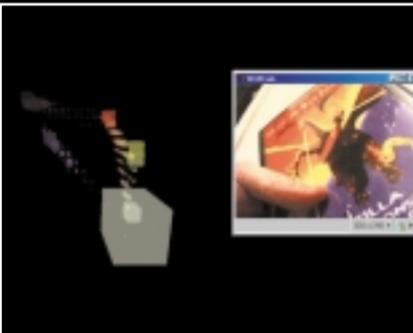


Image 10

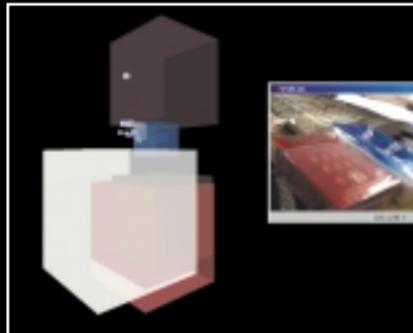


Image 11

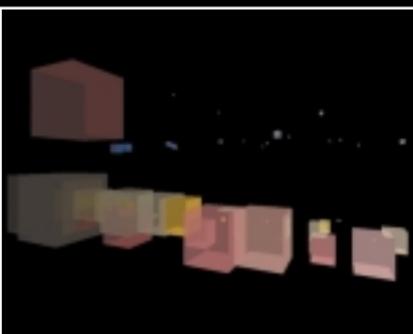


Image 12

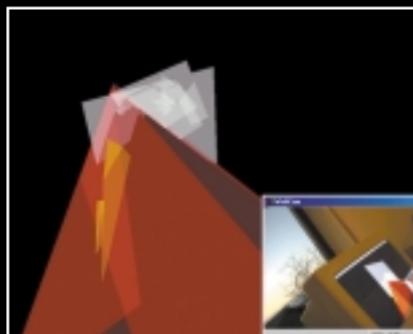


Image 13

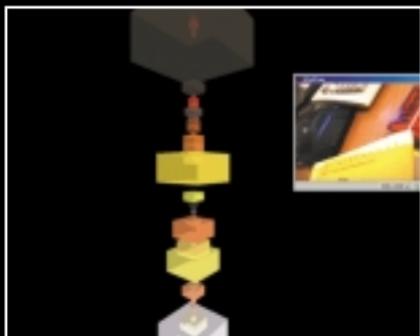


Image 14



Image 15



Image 16



Image 17

The Software is programmed with „C“ with Microsoft C/C++ Compiler Version 6.0 using the Windows OpenGL library.

Software description

The software is analysing the actual realtime images of the webcam. All pixels at an resolution of 320x240px are read and a histogram is generated. To get a faster calculation the colorspectrum is reduced. The colors are sorted in different areas. The colors red, green, blue are, for example sorted in 8 areas (depending on the pc used), so you get $8 \times 8 \times 8 = 512$ colors. This can be changed individually.

The 3d-model is realised with the OpenGL library. For the visualisation of the Colorsculpture the color-amounts are counted and the colorvalue is going to be calculated. Here we get the size and the color by transforming the rgb-model to hls, other values like saturation and lightness are retrieved.

With these parameters several displayed figures could be realised.

The installation

The FARBCODES installation is in a room, which can be visited by several people at the same time. Inside is the camera an the videoprojector installed. The light which is needed, comes out of the same direction as the camera. The image is going to be analysed and transformed to the Colorsulpture.

There are several possibilities for the projection. 2-dimensional on a screen or 3-dimensional in the space. This is a question of the budget.

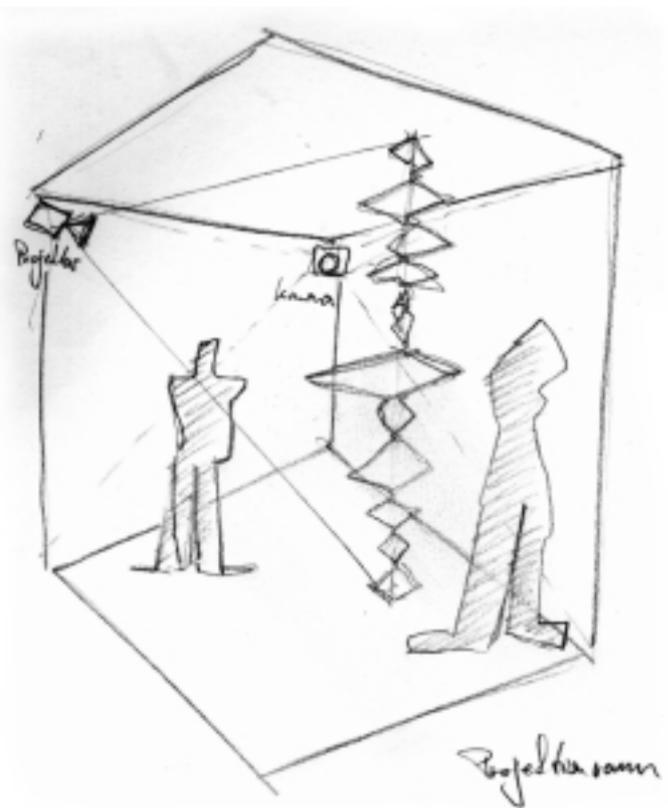
1. normal videoprojector for pc-data which displays on a screen.
2. 3-dimensional virtual projection in space. It is developed by the company musion (cologne, germany). The projection it on an „invisible“ foil or special mirror. So the Sculpture seems to be virtually in the room, no glasses are needed. But it is pretty expensive. The smallest version is starting at about 1.250 €. And it is not possible to walk around the sculpture.
3. is working with polarisation-glasses and a special 3d-beamer. Same as in the IMAX-3D-Cinemas. Also very expensive. And you have to face to the screen.

Is now a person coming into the room the camera is sending a changed image to the pc. It is going to be analysed and the new model will be displayed. Is the person now moving through the room to the light, the colors are changing and so the sculpture is. Does a second person comes in, the colors are changing again... and so on.

The FARBCODES Colorsulpture is a polaroid of colors, displayed in a 3-dimensional model. It is transforming the real world in a worl of colors. There a no forms and structures that you know. It is a new form: the Colorsulpture.

It shows a parallel world, a colorspectrum, what you normally not see. It show how important are forms for us to understand the information of an image.

What is the reality? There is a form and a color reality. Both are part of our reality. The FARBCODES Colorsulpture is filtering the colorinformation and transforms it in a new form, a virtual reality – the world of colors. The Colorsulpture ist moving the colors in front of the forms and shapes which cover the being of the colors.



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