

Model 2

COMPONENTS

Software: ARToolKit, Max/Jitter, Socket,

Hardware: Apple Powerbook 12', video HMD or see through HMD, FireWire Camera, Sensors

CONFIGURATION

ARToolKit in combination with movement sensors will be only used for tracking (no image display). The coordinates are sent to Jitter. Jitter overlays the image of the real world (R) and the virtual reality (VR) and outputs the resulting image to the head-mounted display (HMD).

CHOICE OF HMD

Using a video HMD the same camera image, which is used by ARToolKit to locate the markers gets displayed as the representation of the RW. Both, RW and VR can be precisely controlled within Jitter.

Problem: There is a performance problem since ARToolKit and Jitter have to be working at the same time on the same computer since there should be no extra weight from a second computer in the wearable set.

Solution attempt: ARToolKit does not display any image but just calculates the coordinates. According tests have been done by i-art, writing a Socket.

To hide the ARToolKit markers attached to the walls test with enamel paint and an infrared camera are being made.

Problem: if the tracking is done with an infrared camera the resulting image can't be used any more as representation for the reality. A second camera would enormously increase the dataflow.

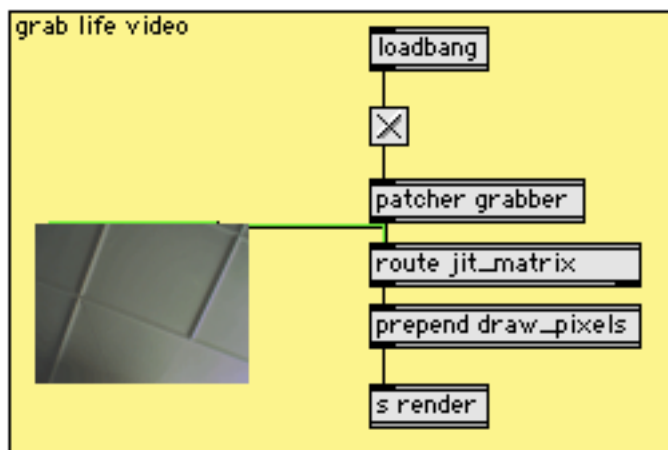
Solution attempt: When using the infrared camera solution the set should work with a see through display.

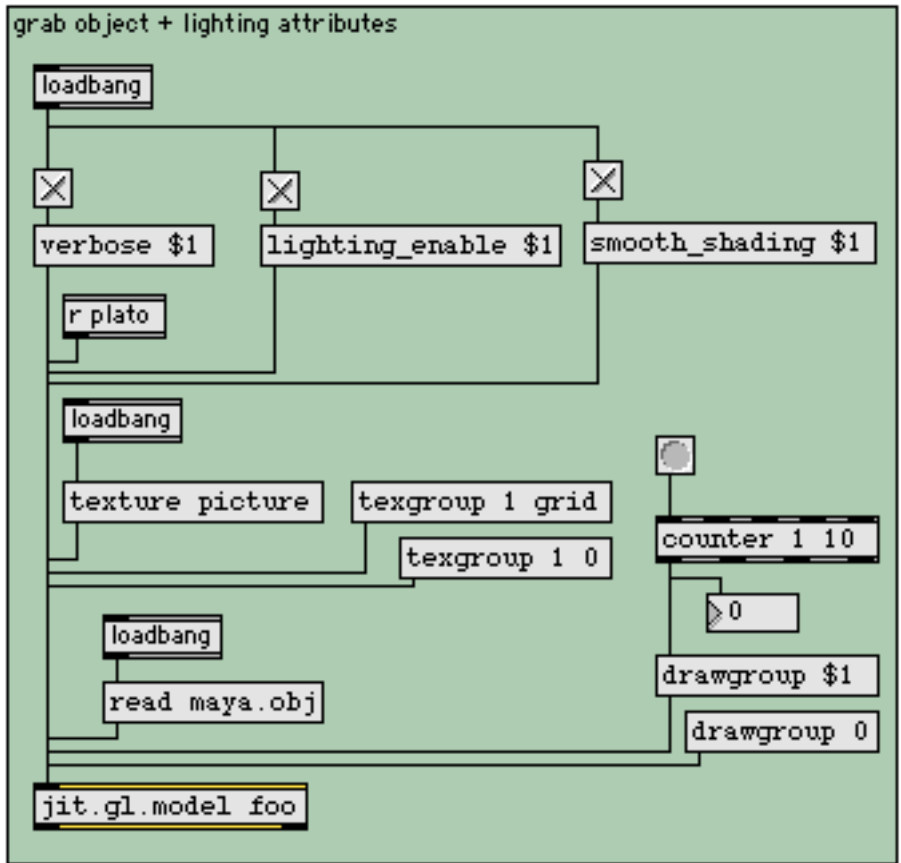
ADVANTAGES IN THE USE OF JITTER FOR AUGMENTED REALITY (AR)

{Illustrationes import from folder "jitter interface"}

Max/Jitter, with it's graphic interface offers the possibility to develop software without writing code on the base of C++ and the access to the basic parameters is still open.

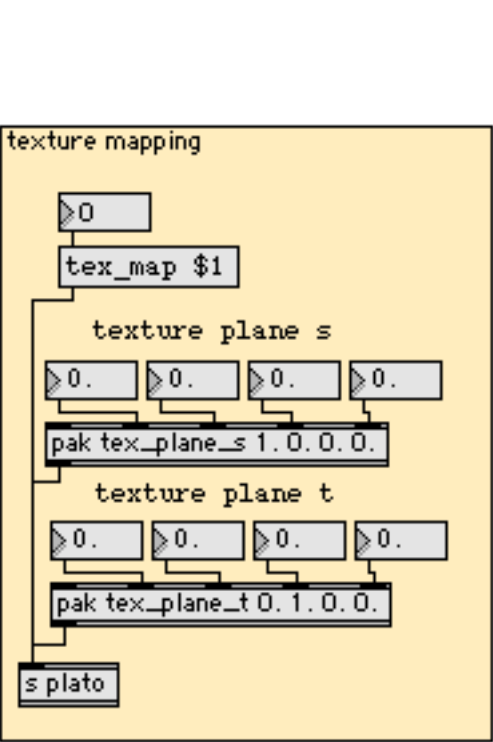
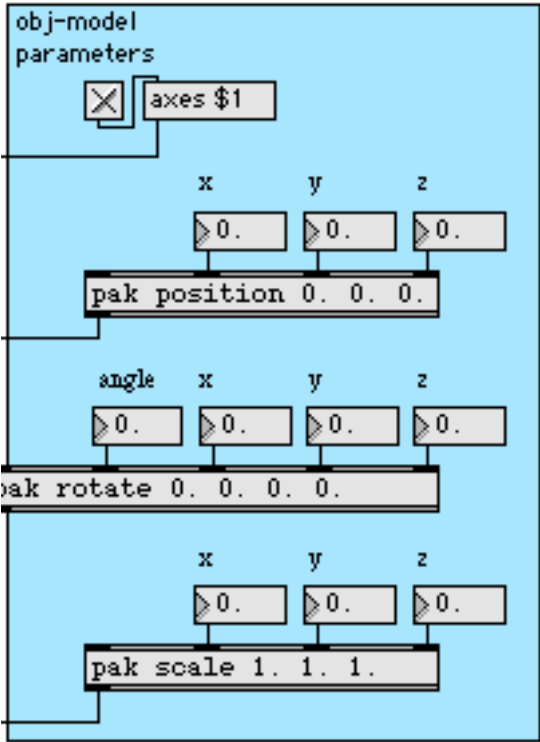
Jitter grabs life video with the "jit.qt.grab" object and is able to add several 3D-models at a time with the "jit.gl.model" object. With 3D-modeling tools like Maya or Cinema4D, 3D model groups can be created and imported. Different groups can be textured and hidden separately. Jitter has several objects to generate models with OpenGL too.



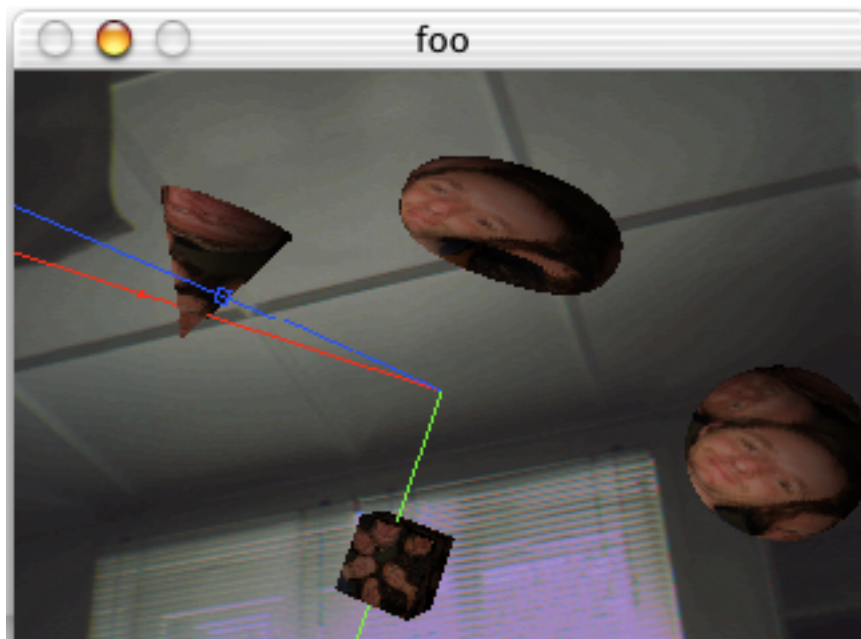


With the "jit.gl.render" object the two images can be superimposed. The virtual object's camera position and direction can be controlled by the incoming coordinates sent by ARToolKit via a socket. The two worlds can herewith be calibrated. Sensor triggers from the real world can be used to recall sets of 3D-objects.

The parameters of generated and imported 3D-objects, can be controlled. Textures can be generated or imported and applied as still image or video. The way of application of the texture to the object can be accessed and altered too.



The video image grabbed from the user camera can be influenced in real time with several jitter objects. Jitter accesses the whole palette of parameters QuickTime offers. These adjustments offer the possibility to alter the representation of the reality. Full screen option and auto start mechanisms are integrated too.



DISADVANTAGES

Jitter is a very young application, which came out in September 2002 and therefore still has some inconveniences, specially in the field of Open GL.

- No import or interaction with Nurbs
- Import problems using different 3D-creators
- Problems importing complex 3D-models
- No import of Animations
- Unstable with OS X

CONCLUSIONS

The ARToolKit-Jitter Model is when used with a see through HMD (after performance tests) a very powerful and easy to use instrument. The integrate real time video effects offer a big amount of possibilities to work on the video source as well as on the 3D-model. A very interesting option to examine the boarder between the two worlds and combine them in a most believable way.

The possibilities in the field of OpenGL are still a bit limited, compared to shockwave for example. Using a see through HMD alternative solutions could be examined.