

Creating Interactive 3D Web Content using AXEL

Teresa Lang

number1@mindavenue.com

The Technology

AXEL is a complete authoring software to create 3d interactive animation for the Internet. Developed by MindAvenue, AXEL makes it easy for designers to create interactive 3D content without scripting.

The Objective

This virtual piano was created to allow surfers to interact freely with a piano, inside and out, using either their mouse or keyboard. Lessons were added to teach musical notation and scales.

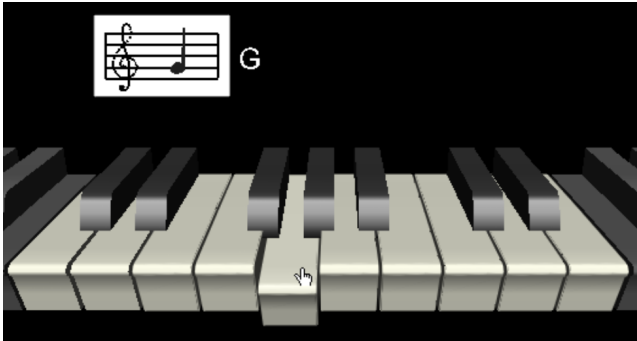


Figure 1. The Interactive Piano

Challenges

The challenges of creating this content were similar to creating any content for the Internet: download time, playback rate and intuitive interaction. In order to achieve an acceptable sound quality and to play more than one note at a time, one challenge was to optimize the streaming of the sounds without compromising sound quality. The next challenge was to keep the visual beauty and the refresh rate high. The last challenge was to make intuitive interaction without adding pages of instructions. The target audience for this content was the general public and the interaction had to be made as easy as possible.

Modeling and Visualization

To model the keys, we drew the profile of one white and one black key. Then we extruded the curves to create the geometry of the two keys. To copy the keys, we used instances instead of duplicates so that only one white and one black key needs to be downloaded. Then we added a white material colour to one instance and linked all the other white keys to that material; similarly all the black keys were linked to a single black material; this further reduced download time since only two materials need to be downloaded. Finally, we applied anti-aliasing only to the keys most affected rather than using it globally which would have slowed down the playback rate.

Interaction

Interaction can be defined as something that occurs as a result of something else. In AXEL, this means creating sensors that trigger reactions.

To make the notes of the piano go down as the surfer clicks them, we created mouse sensors for each key. We linked each sensor to

a Set Orientation reaction which makes the key go down when it is clicked. We also added PlaySound reactions to each key. Every sensor has some kind of a trigger that activates it. In the case of a Mouse Sensor, the OnLeftClick trigger was used.

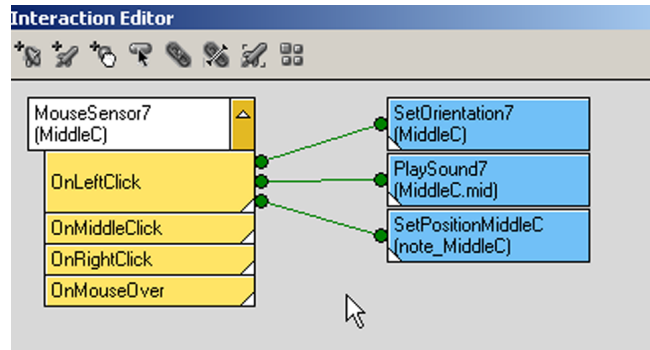


Figure 2: AXEL's Interaction Editor

Previewing, Testing and Tweaking

An important part of creating interactive content for the Internet is to test it in browsers on the web. You can also simulate what the surfer will experience by switching to Preview mode, this displays the content as if it were downloading and being viewed in a browser on the Internet. In this example, a few things weren't quite right and were easily fixed: the key went down when clicked, but it stuck there because there was nothing to tell it to go back to its original position. To fix this, we edited the trigger link so that the reaction was triggered only for as long as the sensor was held. Another easy problem to fix was that nothing indicated to surfers that they could interact with this content. They could just as well be looking at a jpg. Mouse Sensors have a parameter called Cursor Type which we changed to Pointing Hand so that as when surfers move their mouse over a key, the cursor changes to the pointing hand, indicating that they can click the key.

Optimizing Download Time

Sound proved to be the biggest challenge of the project. It was necessary to use wav file format in order to maintain acceptable sound quality. This resulted in stream files of between 300 and 500K. This was an issue for the target audience. Sounds were prioritized in the Stream Sequencer view to optimize this. The middle keyboard sounds were given a high priority, followed by the octaves above and below, allowing the surfer to interact with the middle keys before the rest of the content is completely downloaded.

Learning

With the basic functionality of a piano keyboard in place, we added elements to teach the names of the notes (using Text Layers), how the notes appear on the music staff (using Set Position Reactions) and how to play a scale (using a Macromedia Flash Movie Texture).

Contributors: R&D and Creative Departments of MindAvenue.

For more information about AXEL, please visit www.mindavenue.com