Anime Perspective

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1 Introduction

In traditional hand-drawn animation, the perspective view is not geometrically correct, unlike 3DCG. However, this perspective, which we may call anime perspective, is more natural for human eyes, especially for children. In this article, we present two anime perspective projection methods for seamlessly merging 3D models and traditional 2D animation. One is a view dependent deformer, Anime-Pers deformer, which offers functions, for example, of exaggerated scaling of foreground objects and of in-room view effect commonly found in hand-drawn animations. The other is Anime-Lens shader, which is based on a ray casting technique, is used for generating anime perspective images in a distant view.

2 Anime-Pers Deformer

The anime-pers deformer is implemented as a Maya deformer plug in, and is actually not an exact projection method. However, this deformer can be assigned for each 3D object in the scene so that we can manage to make an anime perspective by arranging each object deformation. More precisely, this deformer is applied to each lattice area, in which 3D objects are deformed and projected onto the screen in the same manner. This deformer then controls perspective within the lattice space by interactively changing position of a virtual vanishing point. The virtual vanishing point is then defined as a locator in Maya. After specifying the virtual vanishing point, the anime-pers deformer scan all points of the object, and modifies current target point’s position in the following steps (see Figure 2):

Step1. Calculate deforming weight of a target point.

Step2. Determine a deforming direction as shown in Figure 2, where the purple plane is the vertical to viewing direction, and contains the target point.

Step3. The deformer moves the target point’s position along deforming direction weighted with the value calculated in Step1.

The right image in Figure 1 shows an anime perspective example with this deformer. We can create this image, simply by assigning two lattice spaces. One is assigned to the left-half of the room and the other is to the right-half. Note that the right image in Figure 1 is not one-point perspective view, whereas the left is.

3 Anime-Lens Shader

Multi-perspective method is often used in drawing anime perspective images in a distant view. We can generate those images with Anime-Lens shader implemented as a mental ray lens shader, which can be considered as a simplified version of multi-perspective panorama in [Wood et al.]. Instead of merging many perspective images, we can make it by changing ray direction per pixel specified as follows.

In using the Anime-Lens shader, we first specify the image area on the screen where tweaking ray direction is to be performed per pixel. We then input the eye position, view direction offset and view angle. This shader then interpolates the eye positions and view direction offset values, respectively. Figure 3 shows an example image obtained by the Anime-Lens shader.

4 Animating a scene in anime perspective view

Making animation with anime perspective view is actually a difficult task. However, this would be possible, if the camera moves slowly in a narrow space. Of course, in such a relatively static scene, the anime perspective is preferable. As for a more dynamic camera, we should then employ another technique that combines normal perspective and anime perspective projection.

References