

Digital Tricks for Japanese Cel Animation

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This sketch illustrates our unique and original uses of digital technology in creating Japanese cel animation, through the works by OLM Digital, Tokyo, Japan. First we discuss the cases where merging 3D CG with cel-animated characters is focused on. Next we consider implicit use of the 3D techniques for making 2D painted, cel-based scenes more visually 3D and fantastic.

Merging a 3D scene with 2D(cel-animated) characters

In principle Western production pipeline is constructed, aiming at exact realization of the storyboard of an animation piece. Each process in the pipeline is explicitly distinguished from other processes. This also means that the role of the creators in a process is accurately prescribed. In other words this production pipeline might be called "top-down", and it brings an efficient way to achieve a desired result. On the other hand, in many cases, Japanese animation is created, starting out from *rough* keyframing based on the storyboard, and repeatedly arranging key frames by checking test sequence rendering. So the Japanese pipeline would be "bottom-up". For example, in the brand-new Pokémon movie, entitled "*CELEBI A Timeless Encounter*", many cuts are made by the bottom-up approach, where cel-animated characters are fit into a 3D background (see **Figure 1**). The bottom-up pipeline may force a traditional cel animator to have a rather strict 3D sense, which gives an alternative way to get the desired result.

Fast rendering tools would be indispensable in production work. This is very crucial for Japanese cel animation, because it must be made in such a short time as one year or so, even in the cases of making a cel-animated film. In making "*CELEBI*", an original fast volume renderer is developed for depicting shafts of light. This renderer is a non-photorealistic version of the fast volume renderer developed by Dobashi et al [2].



Figure 1 Frame from "*CELEBI A Timeless Encounter*"

This tool is unique in the sense that it allows fine parameter-tuning for non-photorealistic effects, such as decay of shafts, consistent with fast processing at high resolution rate.

Making 2D painted images more visually 3D

In Japanese cel animation, implicit use of 3D techniques for the cel-based 2D scene is often preferable to explicit use of the cel-shaded 3D scene (see [1], for example).

Camera projection mapping is such a good digital technique as to provide "visually 3D" effects, inputting a 2D-painted image of the scene to be animated. In the camera projection process, a pseudo-3D structure is constructed from the input 2D image, and then the resultant pseudo-3D model is animated with camera control restricted. An advanced use of this technique is illustrated in **Figure 2**, where a 3D blobby model is further added on the pseudo-3D model of the painted bridge. Then mask animation of the pseudo-3D model is used for describing crystallization of the bridge.

More examples of our implicit uses of 3D techniques for cel animation may also be described, such as the particles with patch-grid geometry for splash and wave expressions.

References:

- [1] Anjyo, K., Arias, M., Horry, Y., and Momose, Y.(2000). Digital Cel Animation in Japan *SIGGRAPH2000 Conference Abstracts & Applications*, pp.115-117.
- [2] Dobashi, Y., Kaneda, K., Yamashita, H., Okita, T., and Nishita, T. (2000). A Simple, Efficient Method for Realistic Animation of Clouds *Proc. SIGGRAPH2000*, pp.19-28.

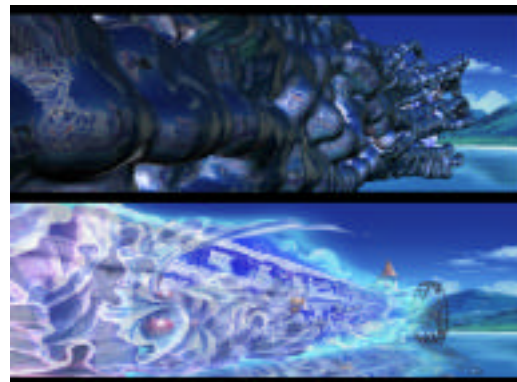


Figure 2 Frame from a promotion reel of "*Lord of the Unknown Tower*" (**bottom**) and 3D blobby hull of the bridge model (**top**)