

Titre: Capturing Environment Maps from Everyday Objects

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Durée: 2 à 3 mois

Lieu: REVES – INRIA Sophia Antipolis Méditerranée (<http://www-sop.inria.fr/revs/>)

In computer graphics, an environment map is an image that represents the environment surrounding a scene. Environment maps are a simple and effective way to simulate the lighting of complex environments, as illustrated in Figure 1a [1]. Environment maps are usually captured from real scenes using a shiny sphere that reflects the environment.

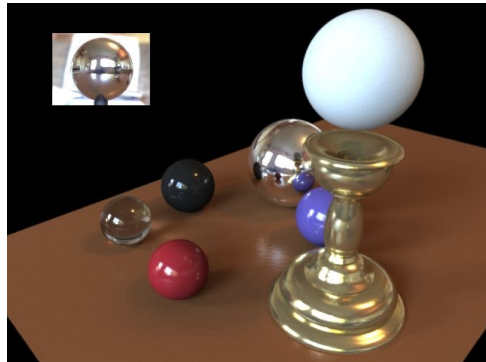
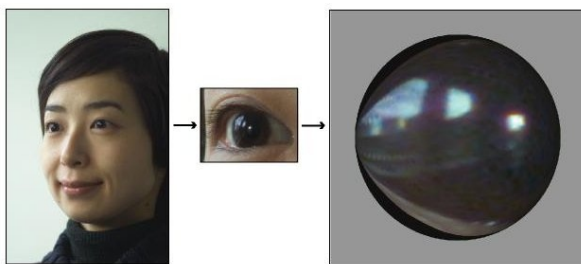


Figure 1. A shiny sphere (top left) is used to capture an environment map of a real scene. The environment map can then be used to illuminate synthetic objects in the scene.

The goal of this internship is to develop a method to capture environment maps from existing photographs, for which no shiny sphere is available. A first step of the internship will be to implement the method of Nishino and Nayar [2] that uses the eyes of people in a photograph to estimate an environment map (Figure 2a). A second step will be to extend the method to handle more complex reflective objects that one can encounter in his everyday life, such as teaspoons or cars (Figure 2b). Since the shape of complex objects can only be approximated from a photograph, we will investigate automatic or semi-automatic methods to detect and correct inaccuracies in the reconstructed environment map.



(a) Estimating an environment map from people's eyes [2]



(b) Estimating an environment map from common objects (spoon, car)

Figure 2. Capturing an environment map from reflective objects.

References

[1] Debevec. Rendering Synthetic Objects into Real Scenes. SIGGRAPH 1998.

<http://ict.debevec.org/~debevec/Research/IBL/>

[2] Nishino and Nayar. Eyes for Relighting. SIGGRAPH 2004.

http://www1.cs.columbia.edu/CAVE/projects/eyes_relight/