

3DS-TIP: 3D STEREOSCOPIC TOUR-INTO-PICTURE FOR KOREAN TRADITIONAL PAINTINGS

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ABSTRACT. *The production of stereoscopic contents using a stereoscopic camera requires a formidable task. To solve this problem, 2D-to-3D conversion has recently gained much interest in academic and commercial fields. As well, TIP (Tour-into-Picture) has been studied in many areas. The 2D-to-3D conversion generates a stereoscopic video from a monoscopic video. On the contrary, TIP can produce video from a single picture by navigating the inside of a picture. By combining the functionalities of the two techniques, this paper presents 3DS-TIP (3D Stereoscopic Tour-into-Picture) that is a novel approach of generating a stereoscopic video from a single picture for TIP. Unlike existing TIP methods providing 2D image or video, our proposed method delivers users with 3D stereoscopic contents. The method firstly makes input data being composed of foreground masks, a background image and depth maps. The second step is to navigate the picture and to obtain rendered images by either orthographic or perspective projection. A virtual camera is moved around the picture with the viewing position and angle being freely controlled. Furthermore, depth enhancement using Laws texture filter is applied to foreground objects in order to reduce a cardboard effect. In experiments, the proposed method was performed on two traditional paintings “Danopungjun” and “Muyigido” made in Chosun Dynasty. We have obtained a variety of stereoscopic animated videos which demonstrate the efficiency of the proposed method.*

Keywords: Stereoscopic conversion, TIP (tour-into-picture), 3D stereoscopic rendering, Depth map

1. Introduction. As 3D display has been spread recently [1-3], 3D stereoscopic contents are important for the success of 3D applications. In diverse 3D applications, the consistent supply of stereoscopic contents is demanded. For this, many kinds of 3D contents have been produced. For instance, stereoscopic video is acquired from a pair of camera [4]. 3D Stereoscopic animations produced using CG techniques are also found in 3D movies, games, entertainment and so forth. Beyond such popular contents, the production of novel contents is expected to support the proliferation of devices such as 3DTV, 3D monitor and 3D mobile phone. Following such trend, this paper presents a new class of 3D contents, where stereoscopic animation is made from a single image. There are two research works related to this approach. One is 2D-to-3D conversion and the other is TIP (Tour-Into-Picture).

The 2D-to-3D conversion has been introduced by many researchers [5-7]. The purpose of the automatic conversion is to produce stereoscopic video from monoscopic video in real-time. Among many proposed methods, the simplest is to make a stereoscopic image being composed of a current image and one of previous or delay images chosen from an image sequence. Okino et al. proposed a time-difference method that senses the direction