Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 87 (2016) 111 – 115

Procedia Computer Science

2016 International Conference on Computational Science

An Innovative Approach for Occlusion elimination in 3D Reconstruction

Priyanka.A[a], Neelima.N[a], Namithaa.K[a], Raveena.E.P[a]

Department of Electronics & Communications, Jain University, Bangalore, India- 562112.

Abstract

3D images and videos are a fest to the viewers. The transformation of 2D to 3D is very essential for innovative entertainment. The efficiency and correctness in the transformation leads to successful conversion of 2D to 3D. Basically, occlusion obstructs the vision. In the field of Computer Vision, occlusion has become a very mind breaking problem. This work aims at eradication of the occlusion in 2D images before converting it to 3D. 2D images are segmented and by using exemplar based texture synthesis the occluded region is packed with appropriate texture andthen the images are converted into 3D.

Peer-review under responsibility of the Organizing Committee of ICRTCSE 2016

2D to 3D conversion, Segmentation, Occlusion elimination, Adaptive K-means.

1. Introduction

In the present scenario, images and videos are the evidence and virtual sources available for present and future references. The clarity of the images plays a very important role. Any glitches in the video or image may not serve the purpose, especially in 2D to 3D conversion applications. If correct procedures are followed with at most accuracy the same video quality as the original is upheld even after conversion. 2D to 3D conversion has several applications in various fields. It is widely used in manufacturing industries to detect wear and tear in the machines. In medical sector, Imaging of organs and other body parts plays vital role during surgeries. It is with the help of imaging that medical field has seen such advancements and in customization of medical products and drugs. Every minute detailing is very import in textile industry and this is possible only with the help of 3D imaging techniques. Occlusion [12] [13] creates an irrelevance perception to the viewer's eye which degrades the quality of the converted 3D images. This problem will not serve the purpose of the application efficiently.
The exact contrast calculation of colours [1] is very essential for image quality maintenance. Among the ocean of algorithms available in the field of Computer Vision occlusion has become a very mind breaking problem.

Peer-review under responsibility of the Organizing Committee of ICRTCSE 2016
doi:10.1016/j.procs.2016.05.135

The better perception can be achieved by occlusion removal techniques. These techniques also helps in object recognition. 3D reconstruction [14] is one such area in which the converted 3D images involves unclear portion caused by the presence of occlusion. We propose an innovative approach for elimination of occlusion for better 2D to 3D conversion. This implies for 3D-TV also [2]. The proposed approach consists of two phases. At first the user defined 2D image is segmented properly by using Adaptive K-means segmentation [8] to identify the occluded region. Then by exemplar based region filling the removed portion is filled with the corresponding texture. In the proposed algorithm the pixel propagation estimation is kept in account to give a natural view for the image. This algorithm ensures that the pixel propagation of painted region is in parallel with the original picture information. This poses a bigger challenge. Keeping account of the original values, the textures to be filled and its values are computed by means of exemplar-based synthesis. The outcome of this algorithm is provided with several examples and results of this algorithm exemplifies the efficiency of this algorithm in occlusion elimination. This makes our algorithm more efficient and promising than the existing ones. The proposed approach consists of two phases which are described in the following sections.

2. Adaptive K-means Segmentation

Segmentation is dividing the image into multiple parts so that it can be used for further processing. Adaptive K-means segmentation is one of the fastest segmentation technique which has several advantages. This work aims for better and fast segmentation in order to find the occludedregion in the image. After segmentation the occluded object is removed and filled with the corresponding intensities in the object. A popular technique for segmentation is based on K-means such that the data is partitioned into K clusters [7]. In this method, the number of clusters is predefined and the technique is highly dependent on the initial identification of elements. As such, the technique can identify K segments [6] in an input data set by merging existing segments and by creating new ones while keeping the number of segments constant. The technique has been used to achieve animpressive speedup of a search process when other efficient search techniques may not be available. First K cluster centers [8] are defined randomly (or) based on some pre-defined criteria.

- Assign each pixel in the image to any one of the cluster which has the minimum distance between the pixel and cluster center.
- Re-compute the cluster centres by averaging all of the pixels in the cluster.
- Repeat last two steps till no pixels in the clusters change. This is known as convergence.

3. Occlusion Elimination

Image inpainting means masking or filling the missing and damaged segment [9] [10] of the image with appropriate color. This paper aims at elimination of occlusion in the 2D images before converting to 3D. inpainting technique ensures color reinforcement of images which are unpredictable. This paper provides a unique algorithm technique through which we can remove any portion of the digital image and mask it with the original background. This technique is flawless and unpredictable. Segmentation of the image layout helps in easy identification of unfilled areas. And also helps to differentiate between colours if multiple shades are present. The algorithm effectively hallucinates new colour values for the target region in a way that looks sensible to the human eye.There are two other previous algorithms which deals with the same kind of approach. They are Texture synthesis, which aims at generating large image samples from sample textures and Inpainting [11] [3] technique, for filling small image gaps. But these algorithms is constricted to two dimensional and linear objects. Though these traditional techniques are effective in replicating consistent texture, they have complexity filling holes in the images. The image inpainting technique propagates linear structure to target via diffusion. The algorithm presented here is constructed by combining strengths of both the algorithms. The outcome of algorithm has provided efficient and qualitative performance of exemplar based texture synthesis [10].