Abstract

With the increasing demands on 3D applications and the easy capturing of 2D images nowadays, building 3D models from 2D images receives much attention in the past few years. 3D modeling is widely used in several fields- 3D graphics in computer games, software architecture models and 3D printing. 3D models represent a physical body using a collection of points in 3D space, connected by various geometric entities such as triangles, lines, curved surfaces, etc. 3D modeling is the process of developing a mathematical representation of any three-dimensional surface of an object. Today, 3D models are used in a wide variety of fields. The engineering community uses them as designs of new devices, vehicles and structures as well as a host of other uses. A variety of machine learning algorithms are being studied and implemented to find or estimate the depth information which is unavailable in conventional 2D image. We apply Computer Vision algorithm considering aspect of binocular disparity where we use 2 images of same scene captured from different viewpoints. Then we obtain depth of the object and further construct depth map. After mapping the points from depth maps of various images captured we apply correct texturing to obtain full 3D model of the object. capturing one
eye’s view, and depth information is computed using binocular disparity. Here we focus only on binocular and multi-ocular images as input. The two or more input images could be taken either by multiple fixed cameras located at different viewing angles or by a single camera with moving objects in the scenes.

A three-dimensional (3D) visualization enables consumers to interact with products and creates a sense of being in a simulated real world. As the consumer gets a real view of the products they tend to get attracted towards the product thus increasing the sale. It gives us an edge over other competitors as 3D visualization is different and it stands out from others. It also makes shopping more convenient and easy for the customers. In this paper we focus only on binocular and multi-ocular images as input. We study computer vision algorithm, binocular disparity, silhouette and visual hull.

In computer vision algorithm, SURF and ORB features descriptors are used to extract information from images. Binocular disparity uses 2 images of the same scene from different viewpoints. In silhouette the object is separated from the background and silhouette cones are formed. Intersection of silhouette cones is called visual hulls.

References

1. Assoc. Prof. Dr. Ir. E. A. Hendriks, Dr. Ir. P. A. Redert, “Converting 2D to 3D- A Survey Information and Communication Theory Group (ICT), Faculty of Electrical Engineering, Mathematics and Computer Science, Delft University of Technology, the Netherlands, 2005
9. Fuad Al-Amin, David Shuang Liu, Katherine Chen, YooHsiu Yeh, “Learning 3D Models”, CS229 Final Project Report, Department of computer science and electrical engineering, Stanford University.
11. Fuad Al-Amin, David Shuang Liu, Katherine Chen, YooHsiu Yeh, “Learning 3D Models”, CS229 Final Project Report, Department of computer science and electrical engineering, Stanford University.
Index Terms

Computer Science  Image Processing

Keywords

Computer Vision algorithm, Binocular disparity, Silhouette, Visual Hull