3D RECONSTRUCTION OF EXTERNAL ANATOMICAL STRUCTURES FROM IMAGE SEQUENCES

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Three-dimensional (3D) reconstruction of objects from images has been one of the major topics in Computer Vision. Recently, volumetric methods have been successfully used in 3D reconstruction of objects with complex shapes. Comparing with stereo-based methods, they are more efficient in building 3D models of smooth objects [1]. They work in the object volumetric space and do not require a matching process between the images used, which is usually very complex with smooth objects. Volumetric methods represent the object with a finite set of geometric primitives, usually designated by voxels [1, 2].

The objective of the work here described is to build a 3D model of the object, with good precision and photorealistic appearance. For that, an image sequence around the object is acquired by an off-the-shelf CCD camera, without imposing any restriction on the motion involved. Then the camera is calibrated by using Zhang's method [3], the object is segmented in all input images and finally its 3D model is built. The employed volumetric approach uses octrees to represent the volume of the object, which is interactively refined in order to achieve the final shape of the object.

Two objects were experimentally used to test the approach adopted, a parallelepiped and a human hand model, and the results obtained were quite satisfactory.

The future work will be concerned with the implementation of an auto-calibration method and in the 3D reconstruction of deformable objects.

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References

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