Feature Detection of an Object by Image Fusion

Abstract

In this paper, we propose a novel method for feature detection of an object by fusion of range and intensity images. For this purpose, we have developed a data acquisition system with a laser source and camera interfaced with Silicon Graphics machine. 3-D mesh representation of the surface of the object is obtained from the acquired range images. Extraction of structural features from the range images has been performed by two methods i.e. coordinate thresholding technique and Laplacian of Gaussian (LoG) edge detector. Extraction of structural features from the intensity image of the object has been performed by the Hough transform technique and Canny edge detector. An approach using shape signatures has been proposed to detect corner points in the edge maps obtained using LoG detector as well as Canny detector. The extracted 3-D edge maps as well as the detected corner points have been mapped to 2-D plane. The methodology for manual fusion of edge maps with the help of affine transformation and the concept of automatic fusion of edge maps by affine transformation followed by iterative closest point (ICP) algorithm have been introduced in this work. The
automated technique for fusion overcomes the drawbacks associated with manual fusion. The fusion algorithm provides a composite image with more accurate and reliable information about the important features of the object.

Reference

217-221.

**Index Terms**

Computer Science

Image Processing

and Computer Vision

**Key words**

Range image

Intensity image
Features

Fusion

Control point