4M－11

Generation of motion detection and analysis for 3-D object Recognition

HAN SIK LEE

CHUNGBUK NATIONAL UNIVERSITY (KOREA)

Abstract

One of important in building a model-based vision system is how to many scene analysis are caused by the loss of direct depth information in a single picture.Segmentation techniques are complicated because depth discontinities are being implicity inferred from intensity, color or texture discontinuities. Consequentially our work is an attempt to recognize objects a spatial cluster of points with high difference use to distinguis the moving point from the points whose intensity changes due to noise.

1, Introduction

Motion of an object in a dynamic scene is a very strong cue to it's presence, and some animals, such as amphibian are thought to rely solely on motion in search of their prey. Consequentially motion of an object can be detected by finding corresponding points in a sequence of images. However, the same constrains cannot be used for limiting the search or establishing the global correspondences. If the object motion is small and much of the scene is static, the moving points can be detected simply by differencing the two views[1].

A spatial cluster of points with high differences used to distinguish the moving points from the points whose intensity changes due to noise.

2, Motion Detection

Detection of motion by first segmenting objects and then matching them in a sequence of views is simple in principle,but difficulties arise owing to errors of segmentation and to possible rotation or occlusion of objects. A complete survey of such and other motion-detection techniques may be found in [2]

Some techniques have tried to use the rate of change of intensity at the pixels in an image for the estimation of the velocity of moving objects and for their segmentation from the background. That for objects with homogeneous surfaces, only the points at the boundaries with a component normal to the object motion have a nonzero intensity change.

3, Motion Analysis

For a given point, an incremental change in intensity di, due to a spatial shift ds, is given by

$$di= -G.ds \qquad (1)$$

where G is the spatial intensity gradient and the negative sign is due to the motion of the underlying surface (rather than the observer). Taking derivatives with respect to time, we get

$$\frac{di}{dt} = -G.U= -(G_x U_x + G_x U_y) \qquad (2)$$

where U is the object velocity with components $V_x$and V_y along the x and y axes, and G_x and G_y are the component of the gradient G.

thus, given di/dt and G, constraints are placed on the object velocity, but the components U_x and $U_y$cannot be inferred directly. Fennema and Thompson used clustering of point in the $(U_x\ U_y)$ space to infer the magnitude and the direction of the velocity [3]. Thompson also combined such velocity information with intensity information using a region-growing approach to segment objects[4]. Another impotant technique for segmenting objects,given points of large intensity change, is described in[5]. and is based on an analysis of expected intensity changes when two surfaces move relative to each other.

Ullman has implemented a system of correspondence for motion by matching of local edges and line segments[6]. As in stereo, the local matches may be ambiguous. AMBIGUITIES ARE RESOLVED BY Testing whether a given set of matches could correspond to a rigid-body motion. Ullman shows that given three distinct orthographic views of four noncoplanar points in a rigid configuration, the structure and motion compatible with the three views are uniquely determined. Inference of nonrigid motion from moving light displays is described in[7].

Apparent velocities of the points in an image, optical flow, can also be useful for inferring the three-dimensional structure of the object surfaces under certain simplifying assumptions.

3, Conclusion

In this work we have studied Motion and It's Analysis estimating the three-dimensional positions of the visible surfaces of objects in a scene. Such it is helpful in scene segmentation.

Range can also be estimated from monocular images, using variations in intensity, texture gradients, and the contours in the image. such estimates require assumptions about the scene being viewed.

Reference

1) R.L.Lillestrand,"Techniques for Change Detection,"IEEE Transactions on Computers,Vol.21,july 1972,pp.654-659
2) H.H.Nagel,"Analysis Techniques for Image Sequences,"Proceedings of the Fourth International joint Conference on Pattern Recognition, Kyoto, Japan Nov 1979,pp.186-211.
3) C.L. Fennema and W.B. Thompson, "Velocity Determination in scenes Containing Several Moving Objects,"Computer Graphics and Image Processing Vol.9, Apr 1979.pp.3C1-315.