Estimation of Distance and Direction for Tracking of the Moving Object

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Abstract

Tracking of the moving object, which is realized by the computer vision, is used for military and industrial fields. It is the application technique with imply complicated processing for understanding the input images. But, in these days, the most moving object tracking algorithms have many difficult problems. A typical problem is the increase of calculation time depending on target number. For this reason, there are many studies to solve real time processing problems and errors for background environmental change.

In this paper, we used optical flow which is one of moving object tracking algorithms. It represents vector of the moving object. Optical flow estimation based on the regularization method depends on iteration method but it is very sensitive the noise.

We proposed a new method using the Combinatorial Hough Transform (CHT) and Voting Accumulation in order to find optimal constraint lines. Also, we used the logical operation in order to release the operation time. The proposed method can easily and accurately extract the optical flow of moving object area and the moving information.

We have simulated the proposed method using the test images. This images are included the noise. Experimental results show that the proposed method get better flow and estimate accurately the moving information.

1. Introduction

Three-dimensional (3-D) motion estimation is of relevance to many problems related to dynamic scene analysis such as 3D object reconstruction(Prazdny, 1983; Adiv, 1989), object tracking(Burt, Bergen, Hingorani, Kolczynski, W.A. Lee, Leung, Lubin and Shvaytser, 1989; Broida and Chellappa, 1989), and robot navigation(Nelson and Aloimonos, 1989; Subbarao, 1990). One way to estimate the 3D motion is to evaluate its perspective projection on the image plane. This is usually called "velocity field", and represents the apparent velocity of the image pixels from one frame to the next.

One of the most notable approaches to this problem is based on the estimation of a measure of the change of image brightness in the frame sequence, commonly referred to as optical flow. Optical flow represents an approximation of the velocity field which is a purely geometric concept. Verri and Poggio(1989), and Nagel(1989) have analysed operating conditions for the equality of optical flow and velocity field. Under a uniform light source, the same equality holds when the object is composed of planar patches and has Lambertian surfaces, patterns are locally rigid and motion is translational and contained in a plane parallel to the image plane. Whether these conditions are verified or not, in many applications optical flow is a sufficient approximation of the velocity field and can be reasonably employed in its place.