A Method for Human Posture Estimating and Motion Tracking based on Image Segmentation

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1 Introduction

In recent years, interest in the motion recognition of a human body from an image sequence has been growing, for applying to the gesture recognition, motion analysis of sports player and so, on. To get the motion data of body, some researchers use wearing movement sensors(such as data-glove), and others make marks on the human body to find out feature point from to strains on subject. On the other hands, there are some method using only image processing technique in which no instrument is needed. However, usual image processing methods have limited use (such as only walking, only restricted gesture), and can not recognize occluded point.

It is importance to divide human image to regions of parts(such as body, arm) exactly, because recognizing human motion has been occluded. So, it is necessary to track a region of part. For these reason, We propose a method to track that is matching using a region with region information. At region information for human motion has been occluded, we use optical flow that is same property on same object. However optical flow has many error and has few reliance as that is calculated in a local area, we use human model and make each optical flow information to a set of information at all in a each regions of parts, so we use optical flow for global information that is reliably using local information. In this proposed method, we estimate human posture and tracking motion in that human motion has been occluded, with optical flow and human model.

2 Optical Flow

The optical flow show a pseudo velocity field of a moving object in the image sequence. To estimate the movement vectors, several methods have been presented. In our study, we use the gradient method to estimate it.

Optical flow is usually used to movement vector, but optical flow is not movement flow in rotation. The gradient method mainly is analyzed at velocity field, in rotation, it is necessary that we think optical flow to not movement vector but velocity vector. In our study, we treat rotation and use flow vector at veracity vector, so we try to recognize human motion with velocity field.

3 Recognition and Tracking of human motion

In this research, our propose method recognize human motion in exist occlusion case. Therefore we think human to an articulate object, which consists of jointed rigid parts, so we model these parts in the image as generalized cylinders and describe them in terms of ribbons to process them in two dimensional image.

First, In our method, for regions has been occluded make divide each parts, we use optical flow. However optical flow has many error and has few reliance as that is calculated in a local area, we use human model and make each optical flow information to a set of information at all in a each regions of parts, so we use optical flow for global information that is reliably using local information. Therefore we get global velocity parameter using local velocity information(optical flow) in each parts(ribbons).

Second, for we analyze human motion in few times, we assume that motion of next frame is equal to motion of current frame. We make up the candidacy of next velocity field using region information of human model, from each velocity parameter of current ribbons. For we match the candidacy with flow field that is actually calculated, we track each parts with a unit of region, amend the place of each ribbon in human model, so the process estimating human posture is continued to next frame of image sequence.

4 Experiments

To verify our propose method, we experiment with two image sequences(one no exist occluding motion and exist occluding motion). The motion of a human body was taken with a 6mm digital video camera, which can take 30 frames per second.

First, we describe the process result of no occluded motion. In our method, although background image is known, a human silhouette image may be able to extract. In our method, normalized-correlation is better than the method pulling background image. We are satisfied with the result of recognition of human motion. At the motion of bend and stretch its arm that is changeable suddenly, in proposed method, the change is very little in very little time, so the result is good. Second, when the frame has some occlusions, motion estimation is satisfactory, but this case is worse than no occluded. Each, this due

to become dim flow field to make smooth with gauss filter(Because the gradient method is based on an assumption that the intensity pattern on a image of object is smooth). Another, our method don't think turning on direction of arm axis.

5 Conclusion

In this thesis, we propose a pose and motion recognition method on assumption that thought general use. This method uses only image processing in which no instrument to get the motion data, and think about occlusion problem.

Using this method, no occluding motion is recognized motion and human posture ,as a result satisfied result obtained. Using this method occluded motion be worse no occluding motion, as a result. The result at occluded motion is better than method which thought general use, but there is restrictions that body is fixing.

In future, we will try to decrease the restrictions(such as motion, posture).