

Occlusion Extraction of Multiple Partially Objects from Video Sequences

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Abstract

Occlusion means hiding of an object by another object during multiple human tracking. For multiple human tracking, it is important to maintain the history of objects before and after occlusion. This work highlights to fill the missing parts from the past history of object if available, when occlusion is detected. When dealing with multiple objects tracking, separate the object state into three parts; Before, During, After occlusion. An Improved Mean Shift Tracking algorithm (IMST) is special for occlusion target tracking. Occlusion can be detected by calculating the Centre of mass of both the objects, when the distance between them is zero. By comparing the frames, the occluded part is identified and the missing part is filled from the matched frame when occlusion is detected.

Keywords: Multiple human Tracking (MHT), Frame Matching (FM), Improved Mean Shift Tracking (IMST), Simple Interactive Object Extraction (SIOX).

1. INTRODUCTION

Object tracking is an essential component of an intelligent video surveillance system. More accurate and Real-time object tracking will greatly improve the performance of object recognition and high level understanding. This paper introduces a multiple human object tracking system; it detects and tracks multiple objects in crowded scene with occlusion. This system consist of (i) Moving object segmentation (ii) Removal of non-object pixels of the segmented region (iii) Occlusion Detection (iv) Object separation from the occlusion (v) Match the occluded part with the previous frames

(vi) Fill the missing part of the current object from the matching object.

Major contribution of this system is to track the objects in occlusion, separate the object from the occlusion group and track the separated object individually.

The object of interest is separated from the current frame by filling the missing parts from the part of the previous matched part.

2. METHODOLOGY

2.1 Frame Grabber

Frame grabber is used to detect the number of frames and individual frame in the input video. This frame is used to create image that have been split from the video.

Process:

- Get video location from user.
- Read data from that location.
- Read the video from that location`
- Captured video convert into frames using frame grabber algorithm.

2.2 Object Segmentation

Image segmentation is the process of partitioning a digital image into multiple segments (Sets of pixels also known as super pixels). Segmentation is to simplify and change the representation of an image into something that is more meaningful and easier to analyze.

In segmentation we used mixture Gaussian model for background modeling. Mixture Gaussian models relying upon the distribution of the pixel value, we present a two level (pixel level and frame level) background maintenance algorithm for Real-Time segmentation and background updating. This is to avoid problems (high computational cost and slow adaptation to a new background model) associated with mixture Gaussian background modeling. The basic idea of the pixel level background updating is based on an assumption that the pixel value in the moving object's position changes faster than those in the real background.

2.3 Tracking

Object tracking is the main process in video supervising process. The object tracking is handling by compare the previous image and current images using Absolute Difference Method (ADM). Sum of absolute difference (SAD) is an algorithm for

measuring the similarity between image blocks. It works by taking the absolute difference between each pixel in the original block and the corresponding pixel in the block being used for comparison. These differences are summed to create a simple metric of block similarity.

The state of a person is represented as a rectangle which contains the pedestrian image patch and slides in the image to represent its position and scale at each frame. An improved mean shift tracking algorithm which is special for occlusion target tracking is used. The iteration number of improved mean shift tracking algorithm is smaller than that of traditional tracking algorithm.

2.4 Occlusion detection

For occlusion detection the distance between the centres of mass of two objects in a frame is calculated. If the distance is zero, then occlusion will be detected. There are two modules in occlusion detection;

- Object separation from each frame in video sequence.
- Centre of mass calculation of each object.

2.5 Occlusion Handling

- The occluded frame is identified by the improved mean shift tracking algorithm.
- The occluded part of the video frame is detected by separating the objects.
- Separating the object from each frame and then finds the centre of mass for the occluded object.
- Using the Frame Matching (FM) the occluded part is matched with the previous frames to find the correct match of the missing part.
- Mean shift is a procedure for locating the maxima of a density function given discrete data sampled from that function.
- It is useful for detecting the modes of this density.

3. ANALYSIS OF THE PROPOSED WORK

It performs experiments on a wide range of video sequences downloaded from the standard datasets. The input is a video file and split into number of frames. Perform background subtraction and segmentation process and then apply morphological operations to remove the noise object is separated for each frames and Centre of mass is calculated to detect the occlusion.

4. CONCLUSION

The proposed method contributes to the tracking field in several aspects. It adapts its priors to changing color and texture features. It tracks the complete region of the non-rigid objects. It can recover occluded object parts. But the complete occlusion of similar looking objects may cause ambiguities. In the proposed work occlusion could be detected by calculating the distance between centers of mass and if the difference is zero, it concludes that the objects are in occlusion. Occlusion is handled by comparing the occluded part of a frame with the part of the similar previous frames and the occluded part is filled with the matched part. The proposed system will work not only on partial occlusions, but also work effectively on full occlusions.

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