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Video Inpainting Using Patch Sparsity

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Abstract- A computer vision technique is proposed to remove a moving object in video sequence. Recently there are many approaches have been proposed. So we come to know that this not enough for providing the fast and good quality of video. So in this proposed system we combine the two methods which provide us the fast and good quality of video i.e. PCA algorithm and patch sparsity technique. Our idea is to provide fast detection of object from the frames by using the principal component analysis and filling the hole with more accurate patch using patch sparsity technique.
Keywords- Patch Sparsity, PCA algorithm, Inpainting.

I. INTRODUCTION

Video is sequence of frames. Normally 25 frames in 1 sec referred as video, less than 25 frames will not be considered as a video since the display of those will appear as a flash of still image for the human eye. Video has become an important media of communication in the world, for that purpose we need good quality of video, but due to some noise distortion and scratches on the physical media due to that video gives us blured image and some time video get stopped playing for removing this kind of problems we have to remove that object from sequence of the frame this is called as video inpainting. Video Inpainting is the process of removing of the unwanted object and restore missing or contaminate regions present in a video sequence by utilizing space and Time information from the neighboring scenes for getting good quality in the output video. Video inpainting also plays an important role in the field of image processing and computer vision as that of the image inpainting.

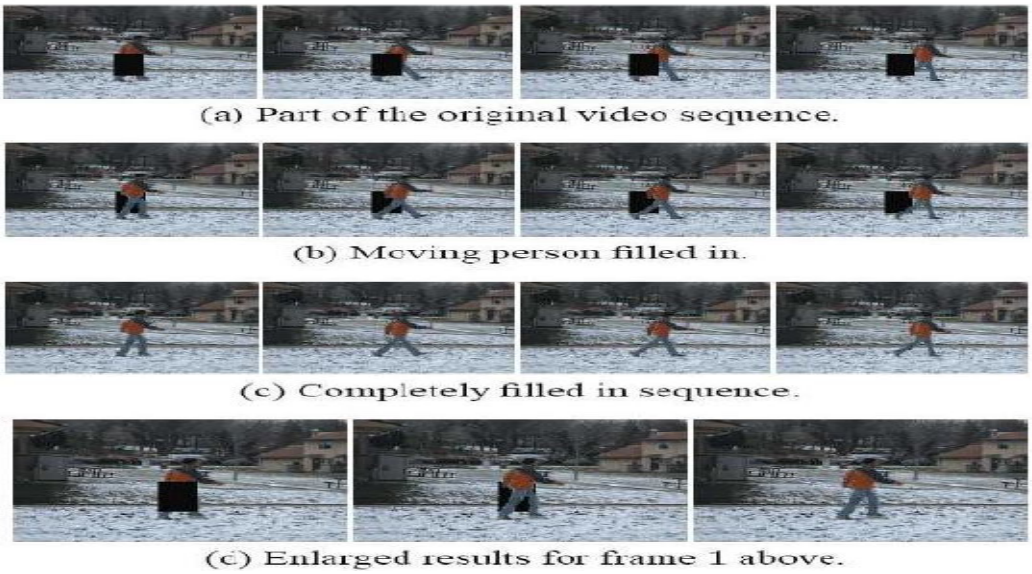

Fig 1: Video Inpainting method

For removing object from the video we are using the technique known as patch sparsity. This technique is worked into two ways first is pixel oriented and second is patch oriented. Patch is basically a part of image in this technique after removation of unwanted object the hole is created this hole is filled by the patch by using neighboring scenes. This technique is use for filling of large size of holes and it provides good quality of image.

II. LITERATURE REVIEW

Video inpainting is a particularly challenging problem. Difficulties arise due to the possibilities of camera motion, the requirement to handle both static and dynamic regions, as well as the pose and scale variation, lighting and shadows, background clutter, deformation and occlusions that are commonly present in a video. The problem is usually made tractable by imposing some limiting constraints and solving for a less complex subclass of the problem. Common constraints include a static camera, the handling of small ranges of motions only, and a limited size of region to be repaired.

The literature shows many problems with video inpainting and approaches to solve them. Some of them are explain in brief Bertalmio et al. [1] investigated the extent to which ideas from computational fluid dynamics could be applied to image and video inpainting. Here the authors only consider spatial information in a video and perform the inpainting on a frame by frame basis leading to limited applicability of the algorithm. Patwardhan et al. [5] suggest a rather simpler method for inpainting stationary background and moving foreground in videos. To inpaint the stationary background a relatively simple spatio-temporal priority scheme is employed where undamaged pixels are copied from frames temporally close to the damaged frame, followed by a spatial filling in step which replaces the damaged region with a best matching patch so as to maintain a consistent background throughout the sequence.

In their paper [4], Jia et al. propose an inpainting method that aims to tackle the challenging issue of inpainting under the presence of severe occlusion. The authors segment a video into a moving object layer and a static background layer. The techniques of layer segmentation and homography blending are used to recover static background pixels. Moving foreground pixels are repaired by sampling motion data followed by the application of 3D tensor voting so as to maintain temporal coherence and motion periodicity. Missing dynamic foreground pixels are then inferred by spatial and temporal alignment of the sampled motion data. This work is significantly more complex than other proposals in the literature, but this added complexity enables the algorithm to handle a range of camera motions, including zoom-in, zoom-out, rotation about a fixed point, and panning.

Wexler et al. [2] take account of the spatial and temporal dimensions in their space-time video completion approach which enables the model to handle video sequences of complex dynamic scenes. Here the authors attempt to solve the inpainting problem by sampling a set of spatial-temporal patches (a set of pixels at frame t) from other frames to fill in the missing data. Global consistency is enforced for all patches surrounding the missing data so as to ensure coherence of all surrounding space time patches. This avoids artifacts such as multiple recovery of the same background object and the production of inconsistent object trajectories. This method provides decent results, however it suffers from a high computational load and requires a long video sequence of similar scenes to increase the probability of correct matches.

It is quite common for most of the approaches in the literature to require the user to specify the damaged region to be repaired. However in [6], the authors manually show how it is possible to identify regions to be repaired in an automatic fashion using motion cues. This is certainly an

important step for the widespread adoption of video inpainting technologies amongst the commercial and private communities.
In this paper we will going to discuss the video inpainting proposal putting step forward which describes a simple, fundamental approach to the problem making it ideal for the purposes of introducing and illustrating the core concepts in the field. The reader is encouraged to consult the further reading references at the end of this article for pointers to other papers describing the alternative methods of video inpainting.

III. PROPOSED SYSTEM

Video inpainting is basically removal of unwanted object from the sequence of frame. We are proposed a system which provide the facility of inpainting the video. There are two main methods which are useful for doing video inpainting , first is the detection of object in multiple frames and second is inpainting i.e. removation of object. Detection of object is done by the principle component analysis(PCA).PCA is a useful statistical technique that has found application in fields such as face recognition and image compression, and is a common technique for finding patterns in data of high dimension.PCA is a linear transformation that transforms the data to a new coordinate system such that the direction with te greatest variance lies on the first coordinate (called the first principal component), the second greatest variance on the second coordinate, and so on.
Inpainting is the process of removal of object in image, for the inpainting process exemplar based patch sparsity algorithm is used. This algorithm is based on the patch sparsity. It means the hole created after removal object from frame this hole is filled by the patch from the neighborhood pixel to create the patch and this patch is filled at the place of hole. This algorithm uses the patch that's why it provide fast an accurate result, due to use of patch is fill the large hole in the image.

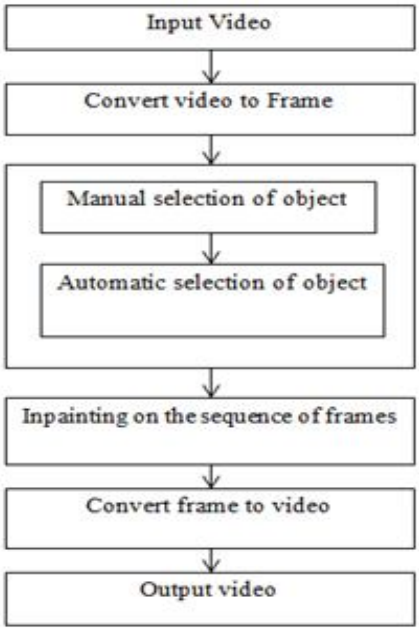

Fig 2: Flow of Video inpainting

Figure 2 shows the flow of video inpainting process or proposed system, in this system we first take the input video and then the video is converted into frame after converting into the frame we select

the first object which remove from the frame after that same object is selected from the multiple frames after that the patch sprsity algorithm is used for the inpainting.

CONCLUSION

In this paper we basically focusing on the removing of object form the sequence of frame and detection of object in the multiple frames we used the PCA algorithm which gives us fast and accurate detection of object forinpainting. Patch sparsity method is used in which the patch at the structure with larger structure sparsity is given higher priority and is used for further inpainting. The sparsest linear combination of candidate patches under the local consistency was synthesized by the patch sparse representation. Video is represented by the display of the sequence of the image frames. Hence the inpainted image frames of each time frame is displayed as the inpainted video. Provide the sharp and good quality of video as it take patch to fill the hole.

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