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Occlusion Detection for Video Inpainting Coherence Problem

Dr. Sheshang Degadwala[1], Dhairya Vyas[1], Arpana Mahajan[3]
[1]Associate Professor, Sigma Institute of Engineering, Vadodara, Gujarat, India
[2]Managing Director, Shree Drashti Infotech LLP, Vadodara, Gujarat, India
[3]Assistant Professor, Computer Engineering Department, Sigma Institute of Engineering, Vadodara, Gujarat, India

ABSTRACT

The amazing interest for all inclusive appropriation and utilization of picture and video content our different system has forced the computerized purchaser hardware industry to dispatch a practically endless assortment of electronic gadgets equipped for gaining, preparing, altering and putting away these appealing kinds of substance. A PC vision procedure is proposed to evacuate an undesirable item in a video arrangement for computerized handling. As of late different enhancements have been utilized in video creation. We propose a novel system of video inpainting which applies to both static and free moving camera recordings. The technique can be utilized for object evacuation, mistake covering and foundation reproduction. The proposed approach will decrease the calculation unpredictability and furthermore give outwardly satisfying outcomes.

Keywords : Inpainting, GMM, Exemplar Method, Occlusion Detection

I. INTRODUCTION

The wide utilizations of computerized camera and the digitization of old photographs inpainting has become a programmed procedure which is worked on advanced pictures. More than scratch evacuating the inpainting methods are likewise applied to protest expulsion, content locale and other programmed change of pictures and video. [13]

Figure 1 Inpainted result (a) Original image (b) Inpainted image [13]

Image inpainting is a strategy of filling obscure picture area with known data from the encompassing of the obscure district so that the outcome is consistently acknowledged.[13]

Video inpainting is turning out to be increasingly more significant in the field of computerized media lately. Video inpainting alludes to a field of PC vision that plans to evacuate protests or reestablish absent or polluted locales present in the video succession by using spatial and transient data from neighboring scenes. The superseding objective is to create an inpainted zone that is consolidated consistently into the video with the goal that visual lucidness is kept up all through and no mutilation in the influenced region is perceptible to the human eye when the video is played as an arrangement. We should

guarantee that spatial and fleeting textures both ought to be kept up.[2]

(a) Part of the original video sequence

(b) Moving person filled in

(c) Completely filled in sequence

Figure 2 video inpainting to repair a damaged video[2]

In figure 1.2 here they are utilizing a video inpainting calculation to fix a harmed video. The harm comprises of the huge dark district in the video arrangement, conceivably caused bit misfortune because of transmission over a problematic system. Picture (a) portrays the first video arrangement - notice here how the harmed area totally impedes the base portion of the individual and the related foundation. Picture (b) shows the initial step of the inpainting calculation which fills in the missing part of the individual. Picture (c) finishes the procedure by filling in the missing foundation, with Image.

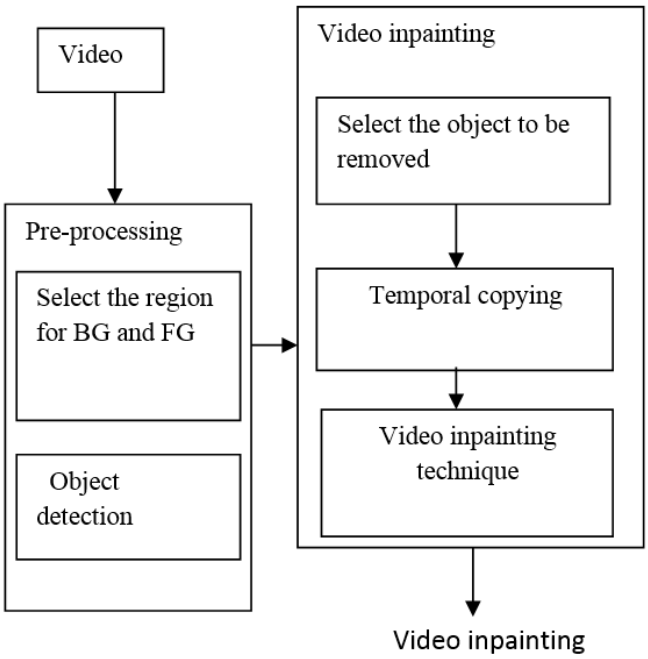


Figure 3 Overview of Video Inpainting process [1]

Appeared in Fig 1.3, the pre-handling step, we develop object location Method for foundation and forefront independently. At that point, object identification technique is utilized to recognize foundation from frontal area. In the progression of video inpainting, we initially fill the missing foundation however much as could be expected by duplicating pixel by pixel data from different edges, and afterward Inpaint the rest of the gaps out of sight by video inpainting procedure [1].

Contrast between picture inpainting and video inpainting is that picture inpainting methods just think about spatial data and doesn't consider the critical transient part present in video grouping. The reasons are [2].

1. Image inpainting techniques only consider spatial information where as for video inpainting temporal information.
2. Image inpainting is valid interpolation. Whereas for video inpainting use extrapolation.
3. Image inpainting considers less number of pixels. Whereas for video inpainting considers huge number of pixels.

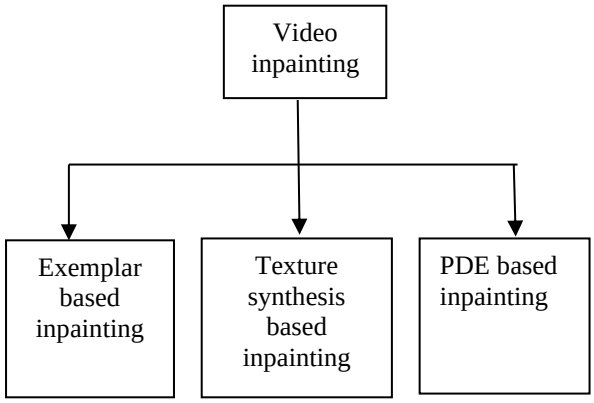
Reasons are just thought of spatial parts that prompts very serious picture antiquities coming about in inpainted video. This is because of presumption that edges is interjected in easily way that isn't valid for measurement of time. Because of specific pixel containing foundation in one edge, non-smooth fleeting changes are produced. It is conceivable that inpainted video outlines taken independently have no obvious ancient rarities. Video played in a grouping do the antiquities obvious themselves to the human eye. In this way video inpainting is all the more testing at that point picture inpainting.[2]

Right now proposed a quick and proficient video finishing strategy dependent on impediment location and by utilizing model based inpainting procedure and will attempt to take care of the impediment issue.

The outstanding of the paper is arranged as follows. The section I is introduction about the basic video inpainting. An overview of the difference between image and video process, object detection method and video inpainting techniques. The section II shows overview on object detection methods and video inpainting techniques. The section III gives the comparative analysis of these different techniques. The section IV describe about occlusion detection flow and finally conclusion is described in section V.

II. RELATED WORK

Video inpainting is an especially testing issue. Troubles emerge because of the potential outcomes of camera movement, the prerequisite to deal with both static and dynamic areas, just as the posture and scale variety, lighting and shadows and impediment that are by and by normal in video. Video inpainting techniques [5]



The writing is packed with a changed cluster of video inpainting proposition each upholding various ways to deal with the issue, Bertalmio et al. [3] researched the Partial Differential Equation (PDE) based system to show up for outskirt of the district iterative way is utilized. It will easily inpaint outside of the outskirt to the inward locale. It Produce great outcomes whenever missed areas are little and target locale is non-finished, yet take long time if target district is huge. Some obscuring impact is introduced in video grouping.

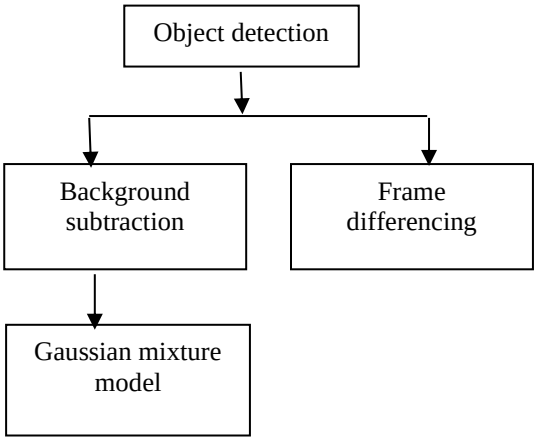
Patwardhan et al. [1] recommend a fairly more straightforward strategy for inpainting stationary foundation and moving forefront in recordings. Here to inpaint Texture Synthesis based inpainting procedure is utilized to fill missed areas and evacuate harmed region utilizing comparative neighborhoods of the missed pixels. Surface Synthesis based inpainting strategy is utilized to Inpaint little area and can-not handle regular scenes successfully.

Model based technique by Criminisi et al. [4] look through most conceivable fix from source district and duplicates pixels of the discovered fix straightforwardly to the missing area. Model based inpainting method is thinking about structure and surface area.

This technique consists of 2 basic steps.

1. Priority is given to all the patches.
2. Best matching patch is selected.

(A) Object detection techniques [5]



In [5] the nearness of moving articles is dictated by figuring the distinction between two back to back casings. Its computation is straightforward and simple to actualize. It has a solid versatility, for an assortment of dynamic situations, yet it is commonly hard to acquire total blueprint of moving article, capable to show up the unfilled condition, subsequently the discovery of moving item isn't precise.

In [6] Background subtraction is foundation demonstrating. It is the center of foundation subtraction calculation. Foundation Modeling must touchy enough to perceive moving articles. Foundation Modeling is to yield reference model. In foundation subtraction, every video arrangement is contrasted against the reference model with decide conceivable variety. The distinction between current casings and the reference outline regarding pixels offer significance to presence of moving items. The foundation subtraction strategy is to utilize the distinction technique for the present picture and - foundation picture to recognize moving items, target acknowledgments however delicate to the adjustments in the outside condition.

In [8] Gaussian Mixture Model (GMM) is a parametric likelihood thickness work spoke to as a weighted entirety of Gaussian segment densities. GMMs are parametric model of the likelihood dissemination of consistent estimations or highlights in a biometric framework. It incorporates shading based following of an article in video. It is basic to distinguish moving items from a succession of recordings outlines. The Gaussian Mixture Model for foundation subtraction technique in that outline pixels are erased from the necessary video. GMM is receptive to the different changes, for example, brightening, beginning and halting of moving items. Reconnaissance is the observing of the conduct, exercises or other changing data as a rule of individuals and regularly in a clandestine way.

III. COMPARATIVE ANALYSIS

A comparative analysis of object detection methods and video inpainting techniques are shown in table I and table II respectively.

TABLE I: COMPARISON OF OBJECT DETECTION METHODS

Methods	**Frame Differencing Method[5]**	**Background Subtraction Method**	
		Approximate Median Filter[6]	**GMM[8]**
Processing time	Low to High	Medium	Low
Accuracy	Low	Medium	High

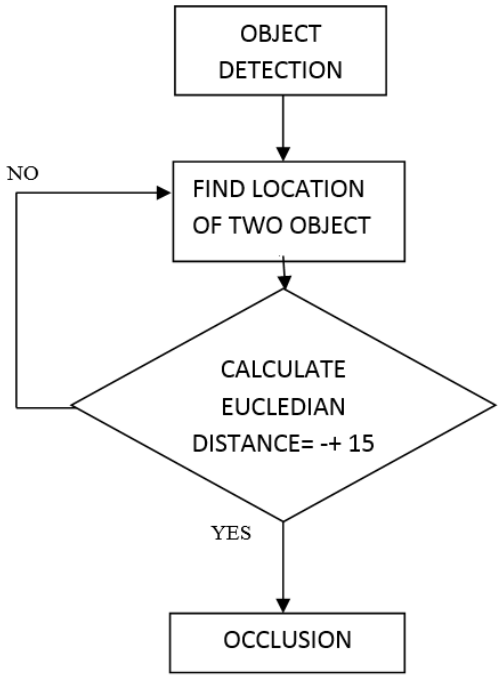
TABLE II: COMPARISON OF VIDEO INPAINTING TECHNIQUE

Techniques	***PDE based Inpainting [3]***	***Texture Synthesis based Inpainting [1]***	***Exemplar based Inpainting [4]***
Processing time	High	High	Low
Handle hole size	Small region	Small region	Large region
Region	Only used structure	Used both texture and structure	Used both texture and structure
Accuracy	Medium	Medium	High

IV. PROPOSED WORK

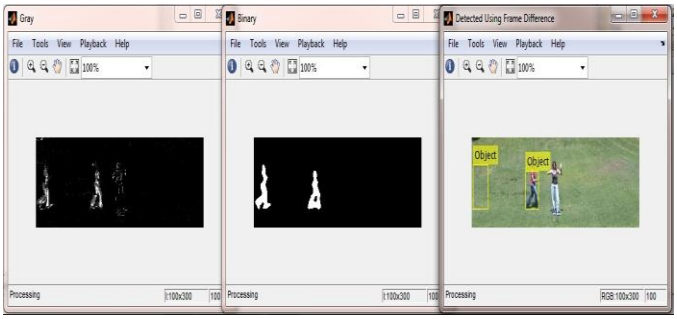
Our proposed strategy depends on outline neighborhood similitude by utilizing model based inpainting procedure and by 3D opening filling to finish the harmed foundation after the expelling object. The item can be static or dynamic or we can think about certain logos or stamps.

(A) OCCLUSION DETECTION FLOW

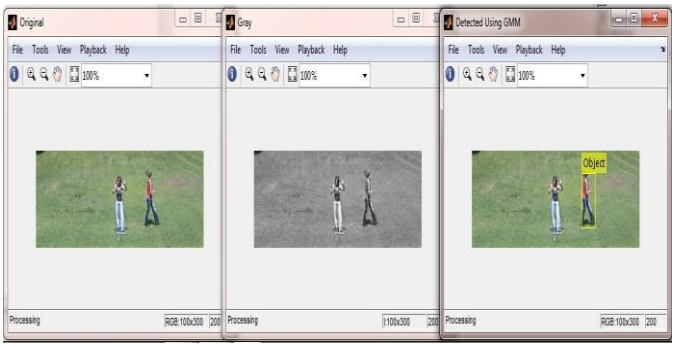


In occlusion detection flow , we have to follow the step accordingly first the video is to be converted in number of frames then by the object detection methods similar frame differencing , background removal to separate the foreground and background object and here we are using the background subtraction technique i.e. GMM (Gaussian Mixture Model). Second find the location of the two object and then the parameter euclidean distance is to be used to compute the space of object and if the value is accurate and it is around -+ 15 then the occlusion will be observed.

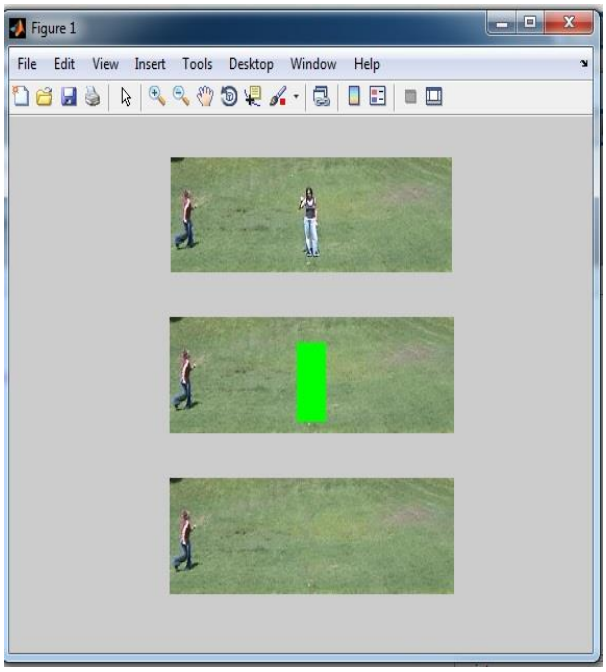
V. RESULTS



Result of background subtraction



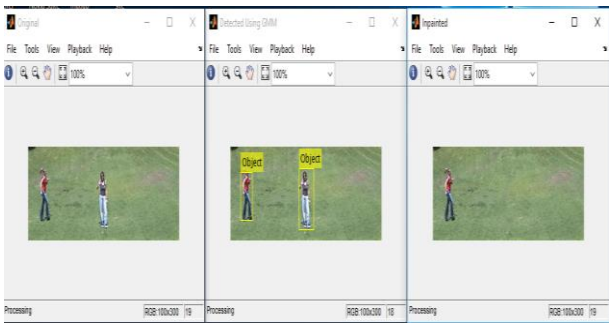
Result of Gaussian mixture model(GMM)



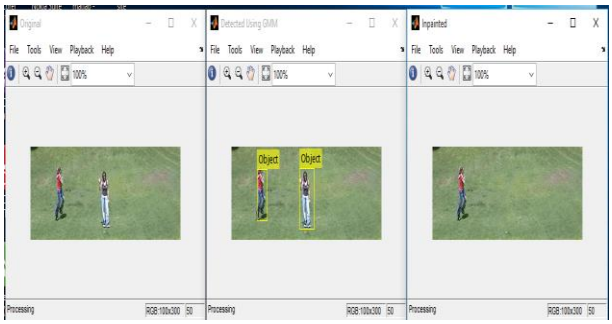
Inpainting result of image using exemplar technique

Inpaint Results: Stable Object

Frame No-19

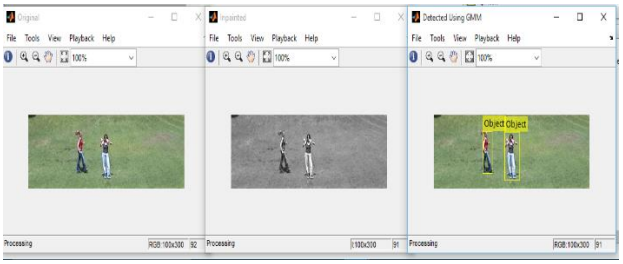


Frame No-50

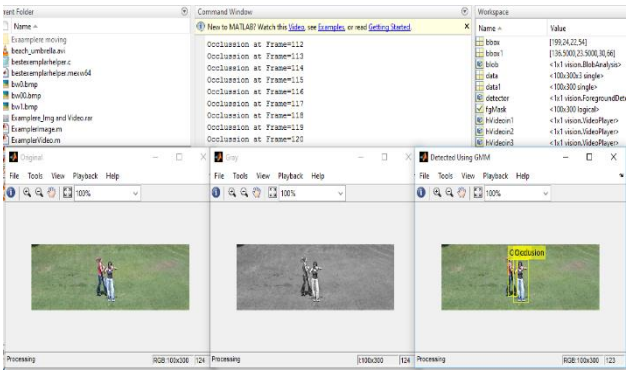


Occlusion Detection Results:

At Frame No-91: No Occlussion



At Frame No-112: Occlussion Start



VI. CONCLUSION

Right now, are three significant commitments upgrades of model based inpainting, the division of foundation and frontal area utilizing GMM and impediment discovery. The previously mentioned impediment issue examined in the paper has been inquired about widely by numerous analysts. The work that has been proposed addresses to the previously mentioned issue incompletely and would be endeavor to relieve the impediment issue however much as could be expected.

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