

# Robust Based Video Inpainting

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## Abstract

Inpainting refers to application of sophisticated algorithms to replace corrupted portions of image data. Video inpainting is major video enhancement technique used for repairing of damaged video. In this paper, we proposed the video inpainting algorithm for repairing damaged areas in frames. The proposed algorithm uses two key techniques namely motion completion and frame completion. Motion completion recovers missing motion information in damaged areas to maintain temporal continuity. Frame completion repairs the damaged frames and maintains the spatial continuity.

**keywords:** Video inpainting, frame completion, motion completion, masking.

## 1. Introduction

Nowadays, converting a cultural artifacts such as videos into digital format becomes important. However as they become old, quality of such videos decreases after digitization and contains damaged data. In video, data is available in digitized format. As time passes digitized data may get damaged, so quality of the videos becomes poor. In order to improve the quality of such videos there are various video enhancement techniques by using which we can achieve good quality of video. These techniques are video inpainting, video stabilization and video denoising. But in case of video denoising and video stabilization many issues and problems are needed to be considered. These methods give average result for a particular frame but in case of consecutive frames the quality of video degrades.

Video inpainting is one of the video enhancement techniques in which the damaged frames are extracted from the video and those frames are replaced by the new frames. Hence video inpainting removes the damaged frame from the video and finally gives the good quality video as output. Video inpainting is one of the most challenging techniques which help users to remove unwanted objects & repair portions where content is

damaged. To deal with the video inpainting problem initially focus was on repairing small parts of an image using interpolation techniques. Video inpainting has become more popular because of its application in our daily life. Inpainting methods work in two phases. First phase inpaints the damaged portion of an image using data from the same frame. The second phase searches both the current and neighbouring frames to find the reference data used for inpainting. Inpainting process must use the same reference block frequently to inpaint missing areas and information to other frames.

## 2. System Design

Our proposed video inpainting algorithm involves three steps: motion completion, frame completion and motion map construction. In the first step, motion completion tries to replace missing motion information to help process to realiable reference data. In the second step, frame completion maintains spatial continuity of referenced content before it is placed onto the corresponding missing area. This step is very important when luminance in an old film is unstable.

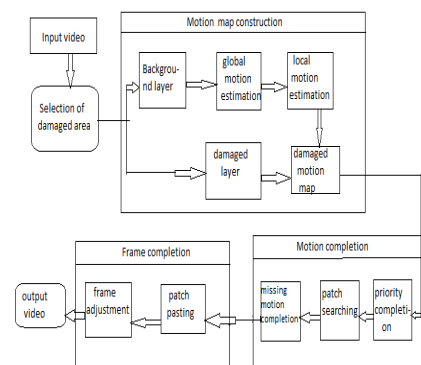


Fig 1| System Design

2.1 Motion map construction: Motion map construction is preprocessing procedure. If true

motion information is available for both the damaged layer and background layer then video inpainting process can easily find the background layer by tracking the true motion so search reference information to complete the missing areas. Motion map construction is divided into two steps. First, unstable luminance is responsible for degradation of motion estimation and intensity normalization procedure to stabilize the video content. Second consists of global and local motion estimation for preserving the motion flow of every block.

**2.2 Motion completion:** Motion completion recovers motion information for missing area by propagating motion vectors. The motion vectors obtain motion map construction for recovery of motion information for lost area. It is divided into two procedures. First priority computation examines the completion sequences for each lost block. Second patch search process to find the similar patch in spatial as well as temporal domains to recover the missing information.

**2.3 Frame completion:** In frame completion after the missing motion information is recovered from the motion map, we implement the frame completion for repairing lost areas. Frame completion involves two steps. Firstly in frame adjustment space time volume is constructed and patch pasting process will extract the similar undamaged patch the space time volume and paste them into damaged area.

### 3. Algorithm

- 1) a. User (u) this actor handles system functionality  
 set of  $\{u\} = \{1, 2, \dots, N\}$
- 2) a. Provide input gray scale video  $= IP = \{1\}$   
 b. Extract frames from video  $f = \{1, 2, \dots, N\}$   
 c. Apply analysis tool  $\{AT\} = f$
- 3) a. Masking frames and find nearest neighbour search (NNS) frames.  
 b. Inpainting damaged frame using NNS frame and masking frame.
- 4) a. Check input video is provided or not.  
 b. Check input video format.  
 c. Check analysis tool  $\{f > 0\}$
- 5) a. If the video provided by the user is invalid then system will get exception.

b. If  $AT = \{f < 0\}$

c. If the input provided by the user is right then system will give success message and if input provided by user is wrong then system will give failure message.

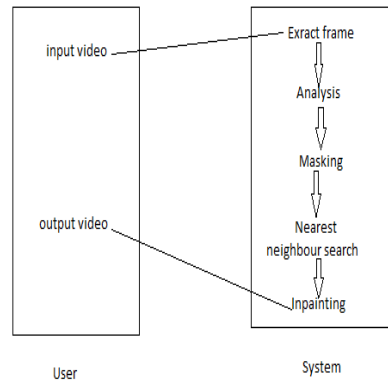


Figure 2) Video inpainting algorithm

### 4. Requirement

- Windows XP
- Microsoft word
- GUI (Graphical user interface)
- Rational rose
- Netbean
- Jdk (Java development kit)

### 5. Data Flow Diagram

As name indicates data flow diagram is a flow of data through the system by using graphical representation. Structured design of processing of data can be visualize using these diagram. It contains different data items which flows from external source of data to internal source through the internal process..

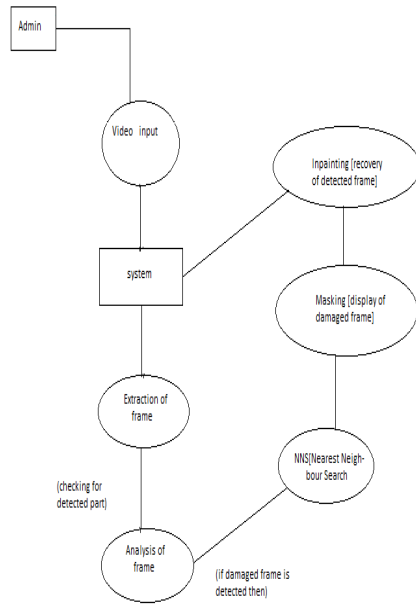


Fig 3) Data flow diagram

## References

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## 6. Features

6.1 Maintainability: In case of redesigning and easy review, system will developed using standard software development conventions

6.2 Availability: The system will be available on software demand.

6.3 Reliability: System will provide services to the user according to his login information and it will reliable with maximum period.

## 7. Conclusion

We conclude that the algorithm proposed in this paper repairs all the damaged areas and reduces the intensity of video flicker. It improves the temporal continuity and for the inpainting on damaged areas it searches the best matched result. It recovers lost or missing portions of video by using original undamaged information from all videos.