

# Video Inpainting and Secure QR Code Watermarking

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**ABSTRACT:** our life's important part is Image. The video and image inpainting is useful to remove the unwanted parts or holes from the image without changing the original content of image. In this paper we have proposed a novel video inpainting method and then secure QR code watermarking technique. We have used super resolution image inpainting method on the video inpainting which can easily remove the holes from the images and then apply QR code on output video of image inpainting. For QR code watermarking we have used DCT method. Our method shows the accurate output as compare to the other inpainting methods. We have selected super resolution algorithm for inpainting and DCT method to watermark the inpainted video. In the proposed system we have to apply QR based video watermarking on the inpainted video file. For watermarking we have used DCT algorithm. The time taken to video inpainting is depends on in how many frames that part is appears. The result analysis shows that proposed system is helpful for removing holes from the images as well as from videos.

**KEYWORDS:** Video Inpainting, DCT, Discrete wavelength transform, QR code single-image super-resolution, Watermarking.

## I. INTRODUCTION

Today, number of researches are performing research on the images and for that research field, image has become useful phenomenon. For capturing memories, the images are only used in old days. But now images have changed their face. There may be two-dimensional, or three-dimensional images. The photos or videos may be captured by using digital or analogous cameras of other capturing devices. Today, images can be very helpful for encryption, processing, authentication, sharing etc. purpose. The main purpose of videos or images is to store the memories of some important moments. In image, due to extra part or distortion sometimes useful images get discarded or deleted. For restoring image or painting seems as natural as its original version a super resolution (SR) algorithm is very useful for guessing and filling in the lost image information. By using image inpainting on video we have to remove the target object from the video file. To recover the selected part from the image we need to select the area to inpaint and then pass particular frame to the super resolution algorithm. For removing the objects which are not required, the Exemplar-based inpainting is very useful. There is more efficient algorithm is a Super-resolution algorithm which can produce very efficient output as compare to other inpainting algorithm.

Inpainting was use for scratch removal. The removal of object, text and other automatic modification of images are include in the next applications. To remove objects from images and fill the hole by taking information from neighborhood is the process of object removal. There are number of methods to removing the object from the image.

Even we can remove the object by using paint software. Also there are other software's which can easily remove the object from image.

This technique observe the image and start replacing the selected part from left to right. Here some automatic image inpainting methods are there. This play an important role by the image inpainting technology in computer graphics and has many applications such as old films renovation, remove object from photos and videos. This method try to replace the unwanted part of image by using different restoring techniques. So by using image inpainting method one can replace the original image part which are related to the other parts of images or it may be different than the image part.

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To improve the image quality from remove-undesired object, there varies the reason behind region completion varies. The object removal starts with find the undesired points or pixels, making the area where the object previously occupies a hole. These hole can be fill up with the help of graphical holes filling technique.

From the LR HR method we are using the dictionary method in which pixels can be obtained from the dictionary. The image pixels can be removed with exact matching pixels from the dictionary database. The super resolution method use the Bergman iterations technique to recover the parts from the image. The HR image is estimated with the height and width of image. There is proposed a new regularization method which is based on multi scale morphological filters

## II. RELATED WORK

Region filling and removal of object by exemplar method:-A novel algorithm have been proposed to remove the large object from the image.Novel algorithm & exemplar based algorithm combines two methods for better algorithm which fill the missing region of an image[2].But formation of structure can get by only one algorithm.In this method the background is filled from source region after removing the large object from the image.This algorithm can recover linear images as well as two dimensional images[2],[4]. The curved structure in the images as well as depth ambiguity cannot be handles by the proposed algorithm. Regularization of image with partial differential equation: - This method increases the work of waters hated image inpainting which proposed a vector based image segmentation using partial differential equation method[1],[5].Regularization is used to minimize region in the image.After sharpening of the image combine the no of regions of the images[3]. Exemplar based method:- Image Inpainting means rebuild image or discard some region of image so image can look natural[4]. Fragment based image Inpainting:- It apply the fragmentation method on low confident area of the image. The low confident are as filled by high confident area.Iterative process of image smoothing and sharpening are introduce in this method[3]. Image inpainting by Texture Synthesis:-This is old algorithm for image inpainting.The missing region is filled using the neighboured pixel of the missing parts[4].It depend on user area solution.Texture Synthesis has 3 types "Statisstical","Parametric","non-parametric" method[1],[5]. Hybrid inpainting :- This method use texture synthesis method & partial differential equation method.Image divide two parts i.e.texture & structure part[2]. In recent days, there has been an attempt to assist the farmer by telephony service but, this service is not 24X7.

Hour's service. Sometimes, the farmers are not able to connect with experts due to communication failures. Another important problem is that in a critical situation, if the farmers are not able to explain or if the disease is a new one, then farmers would not be able to identify the diseases of the crops. Image of crop get better solution as the agree scientist can see the image and verify the exact issue for the remotely diagnosis disease. On the same way patient can send skin image or face images to expert doctor through the developed application to get health advice. Now a day's image information system become important with high powered workstation and advanced broadband network etc. On the web page large collection of images are available or videos also available on web page. Multimedia required high amount of storage memory effective index needed their and retrieve visual information from image database. In recent years, image classification has become an interesting researched in application. In this section we discussed some of the famous existing water marking techniques. Mobasseri proposed spatial domain watermarking on compressed videos. In [13] Authors can showing watermarking in raw video and also the possible way to retrieving by the decoder by exploiting the inherent processing gain of DSSS (Direct Sequence Spread Spectrum). It ensures security in user data and privacy in the watermark pattern used for embedding. The User of the system is provided with a application through which he interacts with the system. The user register and login. The data owner can maintain his image or multimedia data on the cloud. By using DCT watermark technique the data owner will be embedded data to multimedia image. While embedding the data owner will be provided key matrix by the intermediate server. This matrix will encrypt the user data before it is embedded. These server can maintain the data and the key for decryption, data owner then watermark image provide to server. Server find out watermark data in CS domain and authenticate watermark image owner. Valid owner can uploaded data on cloud.

In our studies Data Holder and the Watermark Owner are supposed to work on the Server and user side. Data holder having different multimedia and image data. As using DCT watermark owner having one particular pattern. Image, watermark pattern and key protocol create a bridge of keys for embedded process. The server keeps tracks of these keys and the embedding process. On basis on these keys data storage and watermark pattern server provide

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watermark detection system to find out multimedia image watermark or no. Before uploaded data on cloud server will be check owner of watermark pattern and data holder. As the keys for decryption is managed by the server it protects the user Private data and also preserves the watermark pattern.

## A. Encryption/Decryption

Data encryption/decryption is done using AES (Advanced Encryption Standard) which specifies a cryptographic algorithm that can be used to protect electronic data. The AES algorithm is a symmetric block cipher that can encrypt (encipher) and decrypt (decipher) information. Encryption can convert data to the cipher text, decrypted data convert in to the cipher text its called plain text.

## B. Compression/Decompression

The algorithm is designed to be fast to implement but is not usually optimal because it performs only limited analysis of the data.

## C. Data Hiding

For the data transformation usually DCT, FFT and wavelet methods has used. The feature of the transform domain technique they can take important properties of other domain for the overcome limitation of pixel-based methods or to Support additional features. For instance, designing a watermarking scheme in the DCT domain leads to better implementation compatibility with popular video coding algorithms such as MPEG. Generally, the main drawback of transform domain methods is their higher computational requirement.

## III. PROPOSED SYSTEM

Here we are going to apply several number of technic. Finally to produce output the combination of all the result is generalized. Then the under separate super resolution method output produced is pass.

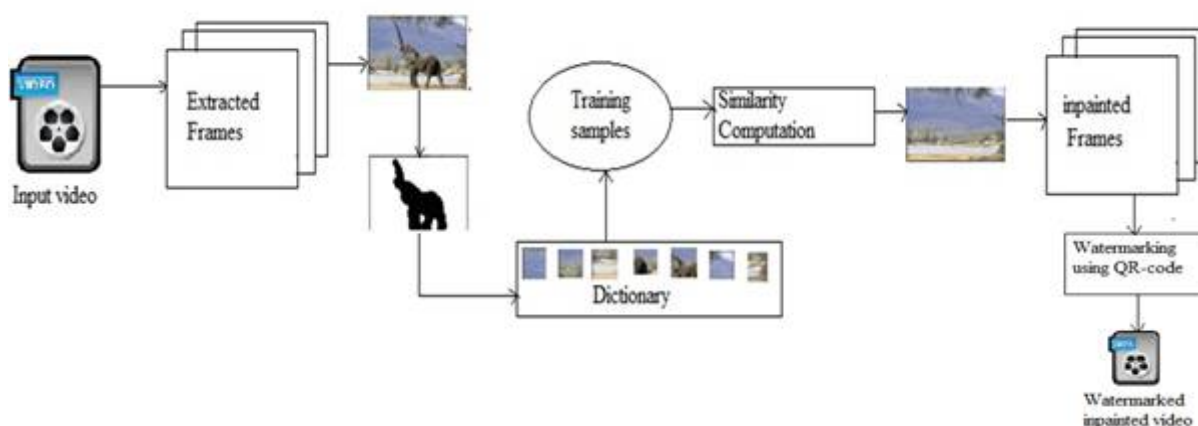


Figure 1. Video Inpainting

As input either dictionary values or adjacent values Super resolution algorithm takes two values. During the scanning of the input image are known as dictionary values the values which are store in the database. And values which are calculated by the analysis of the all the adjacent pixel to that pixel to be examine are known as neighborhood values.

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The super resolution algorithm search for pixel which can be best fit into the lossy area of the image which results to the efficient method output.

Template matching, non-local method, negative matrix factorization are the propose methodology's three basic techniques. For finding small parts of an image Template matching is a technique in digital image processing which match a template image. Non-local means is an algorithm in image processing for image de-noising. Which take the mean value of a group of pixels surrounding a target pixel to smooth the image.

### A. Algorithm

1. Register the LR images.
2. Guess the HR image  $F()$ .
3. Iteration n:  
Simulate the imaging process to create  $g(k)$  from  $F()$ .  
Compare and  $g(kn)$  &  $g(k)$ .  
Correct  $F()$  in the direction of the error.
4. Output  $F()$ .

### B. Video Watermarking Process:

Algorithm for Embedding Process:

- Step 1: Read the video file and extract RGB P-frame, B-frame, and I-frame.
- Step 2: Read the I-frame image as a cover image.
- Step 3: Generate a QR code image with company name.
- Step 4: Apply SVD to I frame and get three singular coefficients as  $u, \Sigma, v'$
- Step 5: Add logo with components of an SVD image to get an SVD cover image
- Step 6: Apply DWT on both SVD cover image and QR code image to get combined image
- Step 7: Take the inverse DWT on the combined image to get Watermarked I frame
- Step 8: Finally watermarked I frame image to get the watermarked video files.

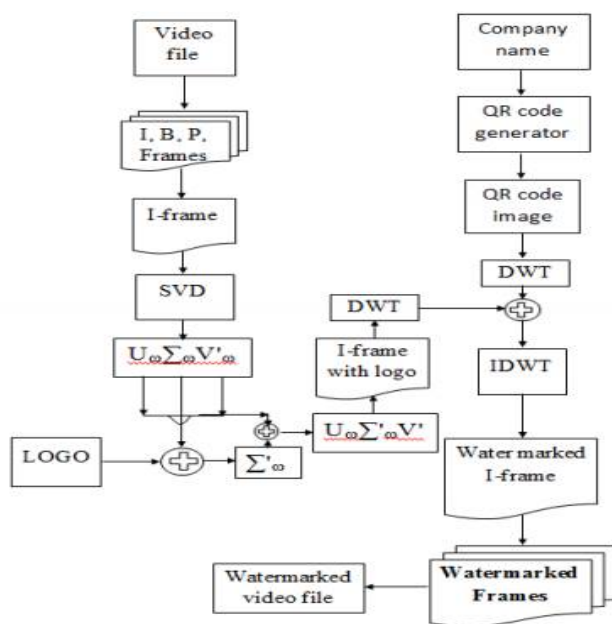


Figure. 2 QR code Embedding

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### C. Extracting Process:

In this process to watermarked image and access the logo by applied SVD.DWT apply on digital video, and I frame image extract form wavelet, take the IDWT for access the QR code image. Finally extract the verification text. The schematic showing the extract process.

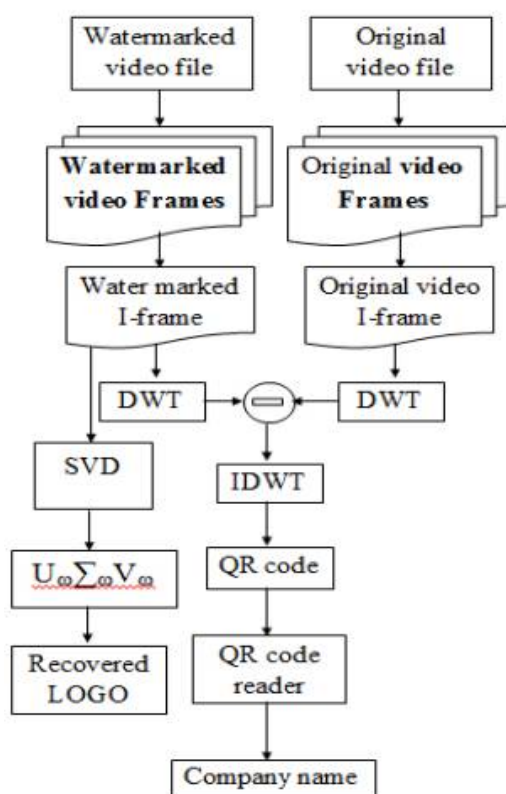


Figure. 3 Block diagram of the extracting process

### Algorithm for Decoding Process:

- Step 1: access the watermark video file and extract from watermark I Frame.
- Step 2: Read the original video file and extract original Video I frame.
- Step 3: Apply DWT on both videos I frame.
- Step 4: Subtract watermarked video I frame coefficient with original video I frame coefficient and take Inverse DWT to get a QR code image.
- Step 5: By using QR code reader extract company name From QR code image.
- Step 6: Apply SVD on watermarked I frame to recover the logo by using the singular value component

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## IV. EXPERIMENTAL RESULTS

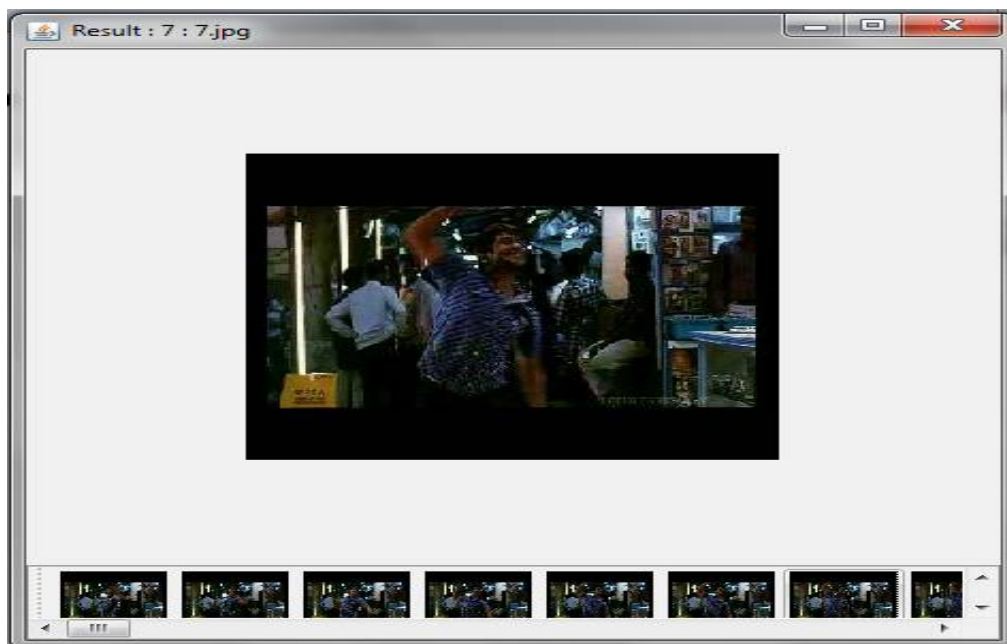


Figure 4. Input Video

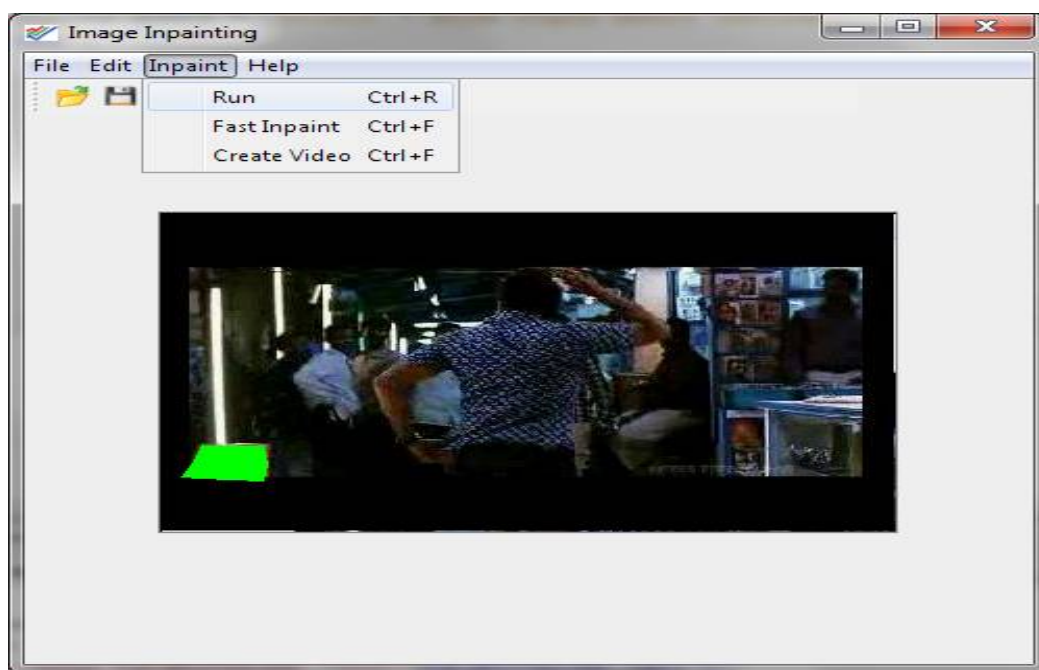


Figure 5. Part to Remove



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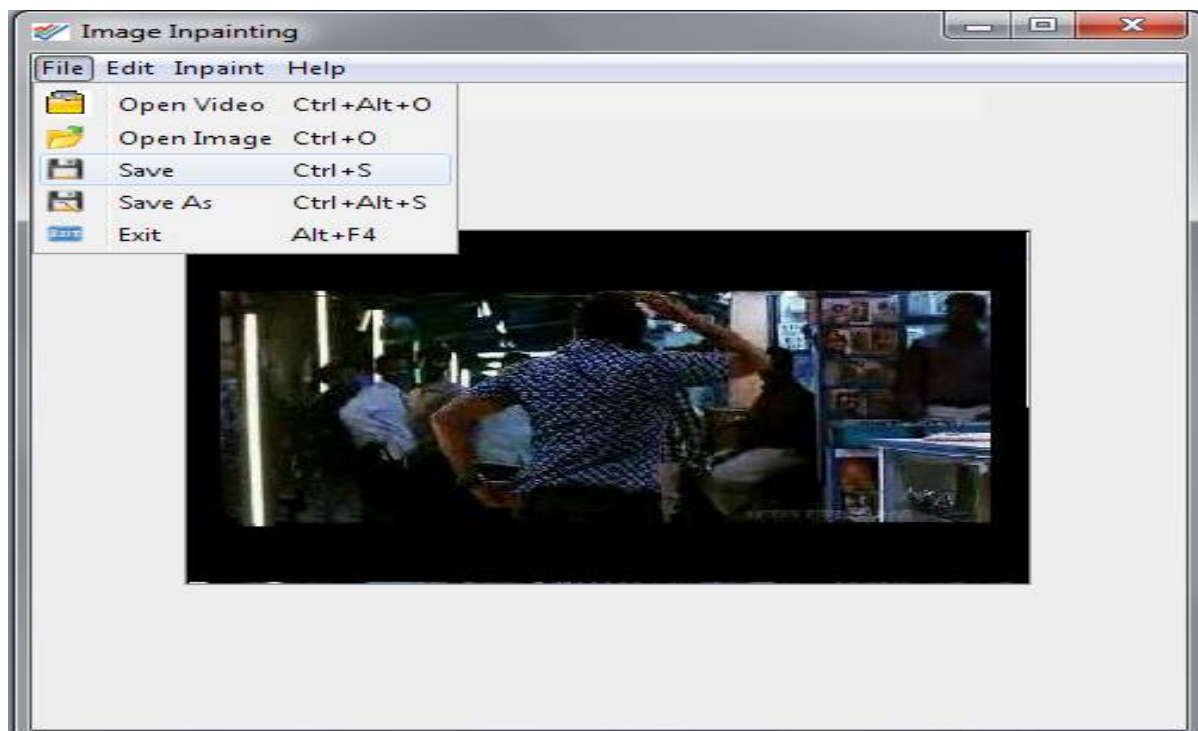
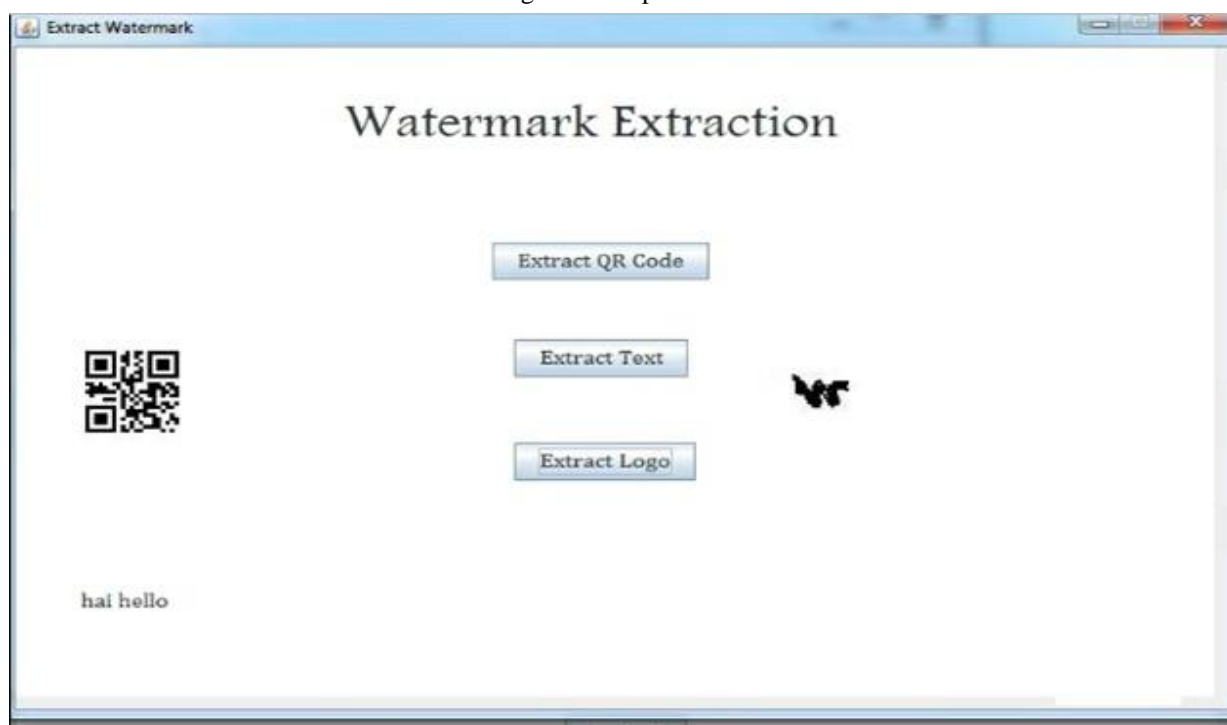


Figure 6. Output Video



7. Logo and QR code Extraction from Video

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## V. CONCLUSION

This inpainting method is able to give better output and it has ability of overcoming the limitations of the all existing work done by previous authors by finding exact match of the pixel. It uses the super resolution algorithm to fills the gaps in the image. Here it can result in better and efficient output because we are combining multiple Image inpainting techniques.

In this QR code encoding process and achieved best performances. In the first method watermark was in build in the dimensional element. And the other side text messages in the QR code image. So, the dual process given two authentication detail. The logo is located very safely in the QR code image. This method is convenient, feasible and practically used for providing copyright protection. Experimental results show that our method can achieve acceptable certain robustness to video processing.

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