Enhancement of Degraded Video

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Abstract- **Enhancement technique for degraded video that relies on examples, i.e. based on codebooks containing examples of "how non-degraded images should look like". Real-time systems using Median filter based standards of still image or video. Median filter based video enhancement produced results but with lesser clarity, less PSNR value and more Mean square error. Therefore the overall objective is to improve the results by combining with PCA and non-linear enhancement. The proposed algorithm is designed and implemented in MATLAB using image processing toolbox. The comparison has shown that the proposed algorithm provides a significant improvement over the existing techniques.**

I. INTRODUCTION

Image and video processing has been developed rapidly as an important research field at present, since demanded by various and numerous areas of applications such as in biology, archaeology, medicine, spaceflight, and display industry. Images and video enhancement is one of the most important and interesting area of video processing. We already have numerous processing algorithms and modules to enhance images. For all that, these algorithms or modules are usually imperfect. Exceptionable results could be produced, if they didn't tune appropriately. In practical, the processing module often has been fixed or work as an integrated algorithm. We need to repair them on the ground of the exits processing modules. Video enhancement drawback will be developed as follows given associate input inferiority video and also the output prime quality video for specific applications. This work tries to boost the standard of video.

Digital video has become associate integral a part of lifestyle. It's well-known that video enhancement as a vigorous topic in pc vision has received abundant attention in recent years. The aim is to boost the visual look of the video, or to supply a "better" remodel illustration for future automatic video process, like analysis, detection, segmentation, and recognition [1-5]. Moreover, it helps analyses background data that's essential to grasp object behavior while not requiring pricy human visual review [6].

A specific application of the super-resolution drawback is in mixed-resolution video, i.e., in video with whole completely different resolutions on time. The solutions given in previous works [2], [8] avoid associate ill-posed draw back by pattern key-frames as example. In those, dictionaries unit created as samples of high-resolution photos. Patches of low-resolution photos unit then matched to the low resolution version of the lexicon entries. Once a match is found, the low-resolution image is super-resolved with the assistance of the full-resolution entry. Such a method is here extended and tailored to general repeatable kinds of image degradation.

An important difference between the enhancement and restoration of 2-D images and of video is the amount of data to be processed. Whereas for the quality improvement of important images elaborate processing is still feasible, this is no longer true for the absolutely huge amounts of pictorial information encountered in medical sequences and film/video archives. Consequently, enhancement and restoration methods for image sequences should have a manageable complexity, and should be semi-automatic. The term semi-automatic indicates that in the end professional operators control the visual quality of the restored image sequences by selecting values for some of the critical restoration parameters.

The most common artifact encountered in the abovementioned applications is noise. Over the last two decades an enormous amount of research has focused on the problem of enhancing and restoring 2-D images. Clearly, the resulting spatial methods are also applicable to image sequences, but such an approach implicitly assumes that the individual

pictures of the image sequence, or frames, are temporally independent. By ignoring the temporal correlation that exists, suboptimal results may be obtained and the spatial intra-frame filters tend to introduce temporal artifacts in the restored image sequences. In this paper we focus our attention specifically on exploiting temporal dependencies, yielding inter-frame methods.

II.   LITERATURE SURVEY

In the literature [15]–[17], several approaches for super resolution are often found and square measure sometimes classified as frequency- and spatial-based-domain. In some works on frequency-domain super-resolution, the authors additionally extend the super-resolution downside by adding noise and blur into low-resolution pictures [18], [19].

 A selected application of the super-resolution downside is in mixed-resolution video, i.e., in video with totally different resolutions on time. The solutions bestowed in previous works [20], [21] avoid AN ill-posed downside by victimization key-frames as example. In those, dictionaries square measure created as samples of high-resolution pictures. In this paper, we tend to target video improvement considering each areas of self-enhancement and frame-based fusion improvement. Research within the field started as early as within the 70s with the appearance of computers and therefore the development of efficient video processing techniques.

We tend to conjointly discuss connected image improvement techniques, since most video improvement techniques area unit supported frame improvement. We tend to don't aim at covering the complete field of video improvement and its applications. It's a broad subject that's still evolving. E.g. we tend to don't discuss contributions, that area unit created by ITU and ISO normal during this space. There square measure connected works supported video quality improvement [22], spatiotemporal filtering [23], video debluring [24], or video denoising. Studies concerning a flicker [25] additionally yield video improvement supported temporal correlation. To the simplest of our data, we tend to square measure the primary to use AN example based approach for video improvement, that square measure appropriate for cloud-based applications [26].

Tomasi projected a bilateral filtering technique for image filtering in [9] that exploits the native image structure throughout filtering. By augmenting the definition of the proximity between pels by incorporating conjointly the pixel values, instead of solely the abstraction locations, Bilateral filtering overcomes the well-known blurring result of a Gaussian filter, and exhibits edge-preserving property, that is fascinating for several image and video process tasks.
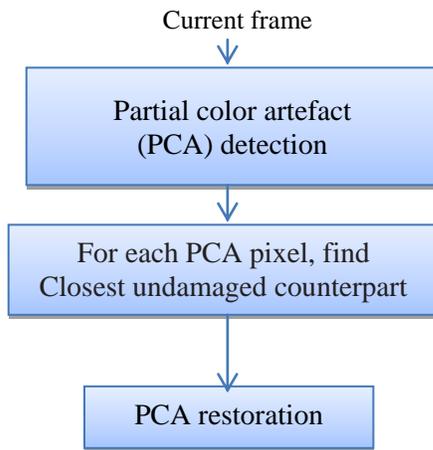
Tschumperl´e et al. [7] projected a typical framework for image restoration that is predicated on the repetitive native diffusion within the image plane radio-controlled by the native structure tensor. Treating image restoration as a regression task on the 2nd image plane, Li [10] and Takeda et al. [8] projected severally to boost the regression performance via regression kernels custom-made to the native structures within the image.

Li [11] any developed AN implicit mixture motion model for video process that exploits the native spatial-temporal structures existing in videos. The generalization of 2dimensional kernel regression to 3- dimensions has conjointly been studied in [13] for video super resolution. To sum up, one common measure for the success of these models is that the exploration of the native image structures in pictures and videos.

III.   PROPOSED SYSTEM
A.   Intensity Flicker Correction

Intensity flicker is defined as unnatural temporal fluctuations of frame intensities that do not originate from the original scene. Intensity flicker is a spatially localized effect that occurs in regions of substantial size. Figure 19 shows three successive frames from a sequence containing flicker. The earliest attempts to remove flicker from image sequences applied intensity histogram equalization or mean equalization on frames. These methods do not form a general solution to the problem of intensity flicker correction because they ignore changes in scene contents, and do not appreciate that intensity flicker is a localized effect. In section we show how the flicker parameters can be estimated on stationary image sequences.

Current frame

Partial color artefact
(PCA) detection

For each PCA pixel, find
Closest undamaged counterpart

PCA restoration

IV.   RESULTS AND ANALYSIS

We apply the PCA based filtering degraded video sequences algorithm to a low-quality video sequence. The video sequence (320 X 240) is compressed using MJPEG codec (each frame is a bmp image) at quality 50. Fig.2a show frame 15,20,25,30 of the degraded video input and the High quality output, respectively.

Degraded frames

Flicker noise and Bilateral filter

Proposed PCA Enhanced Video sequence
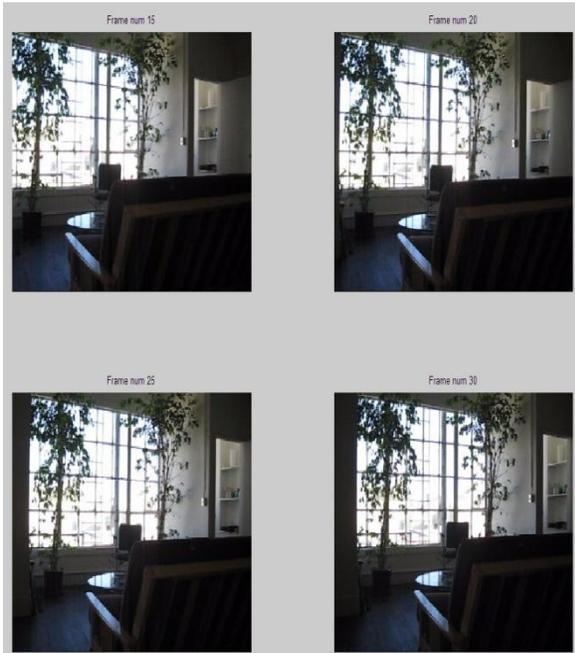
Parameter	Value
Mean Square Error	62.6945
Peak Signal to Noise Ratio	30.15dB
Normalized Cross-Correlation	0.9975
Average Difference	-0.3941
Structural Content	1.0009
Maximum Difference	49
Normalized Absolute Error	0.0658

Performance analysis: This section contains the cross validation between existing and proposed techniques. Some well-known image performance parameters for digital images have been selected to prove that the performance of the proposed algorithm is quite better than the existing methods. Table 1 has shown the quantized analysis of the mean square

error. As mean square error need to be reduced therefore the proposed algorithm is showing the better results than the available methods as mean square error is less in every case.

Average Difference. As Average Difference needs to be minimized; so the main objective is to reduce the Average Difference as much as possible.

Normalized Absolute Error. As Normalized Absolute Error needs to be reduced.

Maximum Difference. As Maximum Difference needs to be minimized; so the main objective is to reduce them Maximum Difference as much as possible.

Structural Content. As SC needs to be close to 1, therefore proposed algorithm is showing better results than the available methods as SC is close to 1 in every case.

V. CONCLUSION

This proposal attempted to introduce an algorithm of repairing low quality video enhancement module based on trained filter. In this report, the fundamental knowledge was represented firstly. The proposed algorithm repaired the low quality sequences well approached to the target sequence. These results evidentially proved the proposed algorithm and showing the nice performance of trained filter.

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