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IR based image processing techniques for media applications

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ABSTRACT

A compression artifact (or artefact) is a noticeable distortion of media that includes images, audio and video caused by the application of lossy data compression that involves discarding some of the media's data so that it becomes simplified enough to be stored within the desired disk space or be streamed within the bandwidth limitations. At low bit rates, any lossy block-based coding scheme introduces visible artifacts in pixel blocks and at block boundaries. These boundaries can be transforming block boundaries, prediction block boundaries, or both, and may coincide with macroblock boundaries. Because this quantization process is applied individually in each block, neighboring blocks quantize coefficients differently. This leads to discontinuities at the block boundaries. These are most visible in flat areas, where there is little detail to mask the effect.

Keywords— *Artifact, IMAGE Processing, Nearest Neighbor, Medical*

1. INTRODUCTION

Image inpainting, or image completion, is an image processing task of filling in the missing region in an image in a visually plausible way. Applications include image restoration (e.g., scratch or text removal), image coding and transmission, photo-editing (object removal), virtual restoration of digitized paintings (crack removal), etc. In literature, two categories of image inpainting approaches can be distinguished: diffusion- and patch-based.

Diffusion-based methods fill in the missing region by smoothly propagating image content from the boundary to the interior of the missing region. The problem of propagating linear structures, e.g., object lines and boundaries that are interrupted by the hole, is then often formulated in terms of solving partial differential equations. Although these approaches yield good results when inpainting long thin regions, they experience difficulties in replicating texture, which is largely due to their local nature. Patch-based methods fill in the missing region patch-by-patch by searching for well-matching replacement patches (i.e., candidate patches) in the undamaged part of the image and copying them to corresponding locations. While these approaches share some ideas with patch-based texture synthesis they focus additionally on structure propagation either by defining the filling order using human intervention or decomposing the image into structure and texture components. Compared to diffusion-based methods, patch-based methods typically produce better results, especially when inpainting larger holes.

2. RELATED WORK

Asok Bandyopadhyay, Amit Chaudhuri et al (2016) Most of the conventional suites for thermal image processing provide only very basic tools to process thermal images which pose challenge to the medical professionals and analysts to interpret the combination of both functional and morpho-structural imaging for solving their medical issues.

Younghee Kwon, KwangIn Kim et al (2016) in this paper, the quality of degraded images is a key problem in image processing, but the breadth of the problem leads to domain-specific approaches for tasks such as super-resolution and compression artifact removal. Recent approaches have shown that a general approach is possible by learning application-specific models from examples; however, learning models sophisticated enough to generate high-quality images is computationally expensive, and so specific per-application or per-dataset models are impractical. To solve this problem, we present an efficient semi-local approximation scheme to large-scale Gaussian processes.

Vahid Bastani (2010) proposed an algorithm for image compression focused around an image in painting [29] system. Initially the image regions that can be precisely recuperated are located. At that point, to lessen the information, data of such locales is evacuated. The remaining information other than essential details for recovering the removed regions are encoded to deliver output data. At the decoder, an inpainting method is applied to retrieve removed regions using information extracted at the encoder.

Qiang LI (2014), proposed a novel algorithm that uses Compressed Sensing (CS) in the frequency domain rather than most existing algorithms which are pixel based, to recreate corrupted images. With a specific end goal to reconstruct image, the authors first disintegrated the picture into two functions with diverse basic characteristics - structure component and textual component.

Christine Guillemot (2013), depicted an exemplar-based picture inpainting algorithm locally linear neighbor embedding technique with Low-Dimensional Neighborhood Representation (LLE-LDNR). Linear regression is then introduced for enhancing the K-NN search. The performance of the LLELDNR with the enhanced K-NN search method is surveyed for two applications: loss concealment and object removal. Instead of using a similarity kernel, the weights are processed utilizing locally linear embedding with low-dimensional neighborhood representation (called LLELDNR in the sequel).

Li Zhiqiang (2013) disintegrated the coding algorithm of JPEG, advances the JPE Gencoder and decoder control processes. The article combines JPEG compression algorithm with chaotic encryption algorithm, which can viably save the storage space for image and guarantees the secure transmission of image information. In this paper, the actual characteristics of DSP hardware platform were taken into consideration.

Mitchell A. Golner (2002) proposed a region based variable quantization scheme, where the quantization granularity in diverse preselected regions of the image is varied at the discretion of the user. The techniques developed in this work are compatible with the popular JPEG Still Image Standard for compression of continuous-tone grey-scale and color images. Further, region selection techniques and algorithms that complement variable quantization techniques are introduced.

3. METHODOLOGY

Reduction of Ringing Artifacts in Text and Graphics Regions. The overview of our method is shown in Fig.5We first consider gray-level images. The results will be extended to color images at the end of this subsection. For each textual region, a gray value histogram is first built. Three pieces of information are derived from the histogram, namely, the gray value of the background, a threshold that separates the text and the background, and a Signal-to-Noise Ratio (SNR) level for the region.

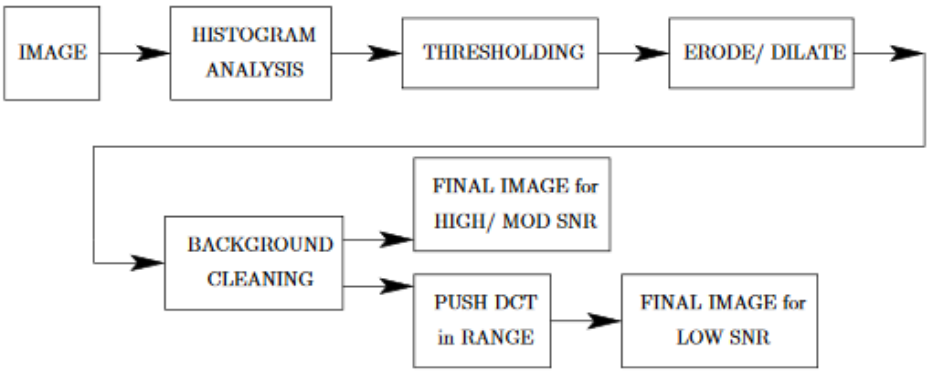

Fig. 1: Overview of the method

Since in most text regions, the background pixels are dominant in number, it is easy to determine the background color of the image by either choosing the most frequent gray level or the weighted average of several frequent gray levels as the background color of the image region. From the histogram, we also determine a threshold value that can be used as a metric to assign each pixel as a member of the text or background.

4. RESEARCH PROBLEM IMPLEMENTATION

In our base paper Edge based geometric shape features were extracted using generalized “Hough Transform” algorithm and they were trained as Geometric Shape pattern as ear has arbitrary geometrical shape. Similar patches in an image are clustered and a low rank matrix is obtained. Then they have used Hough Transform algorithm to extract the feature of the image. The Hough transform is only efficient if a high number of votes fall in the right bin, so that the bin can be easily detected amid the background noise. This means that the bin must not be too small, or else some votes will fall in the neighboring bins, thus reducing the visibility of the main bin. Also this algorithm transform must be used with great care to detect anything other than lines or circles. Which total depends upon the user input image, then geodesic distance is used only to weigh the patches in the matrix to find out the difference between different blocking artifacts.

A statistical image analysis algorithm has been included in the "infrared image analysis module" from the beginning where Mean, Standard Deviation, Median, Mode, Skewness, Kurtosis, First, Second and Third order Moment, Root Mean Square (RMS), Norm and Shanon Entropy, Energy and Maximum temperature value of the extracted Region of Interest are automatically recorded with every snap. These Infrared image Capture (16 bit IR image) 8 bit greyscale image 8 bit temperature array Image coordinates are extracted using Image Registration process ROI-wise greyscale and binary image extraction for different purposes using Thresholding and morphological operations Thermal information extraction form temperature array of corresponding ROI Image analysis (Histogram, Statistical Features) Feature Ranking (Extraction of best features) Training of Pattern using SVM algorithm Pattern Matching of new subjects using SVM algorithm determination of Accuracy of the system counting the no of TP, TN, FP, FN Output of Medical Screening for subjective evaluation statistical values are treated as discriminating features for classification in machine learning algorithm. Instead of using ll the features in machine learning algorithm, best three significant features are ranked using information gain theory and trained for machine learning system.

5. CONCLUSION

The features and database are gradually increasing for developmental improvement of the system. In this regard implementation of new and innovative computational methods is going on to yield better performances. Video filters, motion estimation, Video Processing Techniques used in Traffic. Applications stabilization techniques are presented in the paper. Motion smoothening is the scope for the future the computation cost can also be reduced to improve the efficiency of the estimation and stabilization in future work.

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