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A Survey On "Image Retargeting Quality Assessment: A Backward Registration Approach"

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Abstract: This paper demonstrate the result of a recent large-scale subjective study of image retargeting quality on a gathering of images produced by several representative image retargeting methods. The image retargeting operators can be broadly categorized into two types: discrete and continuous approaches. In this paper, interpret the image retargeting in a unified system of resampling system period and forward resampling. This paper creates the impression that the geometric change estimation is a productive approach to clear up the relationship between the images. This paper gives a unified interpretation of image retargeting and shows that the geometric change estimation is an efficient way to clarify the relationship between the original and retargeted images. This paper formulates the geometric change estimation as a backward registration issue with the MRF and gives a reasonable and viable arrangement. Under the geometric change guidance this paper develops a novel ARS metric, which is effective and outperforms other existing techniques on freely accessible datasets. Experimental result is the image fusion.

Keywords: Image retargeting quality assessment, fast feature, geometric change, backward registration, Image fusion

I. INTRODUCTION

Content-aware media retargeting has drawn much attention ingraphics and vision research in recent years recently, the expanding pattern of broadly utilized show Gadgets imposed the demand for image adaptation to different resolutions and aspect ratios. There are many image retargeting operators which can change an image into arbitrary sizes whilekeeping the major visual information to cater for the varieties of display resolutions [1]. Saliency identification assumes essential parts in numerous image processing applications, for example, regions of interest extraction and image resizing. Existing saliency identification models are built in the uncompressed area. Since most images over Internet are ordinarily put away in the compressed domain such as joint photographic experts group (JPEG) [3]. The image retargeting techniques have been proposed to modify the source images into arbitrary sizes and simultaneously keep the salient content of the source images [4]. The image retargeting operators can be broadly categorized into two types: discrete and continuous approaches [6]. Image retargeting is a strategy that conforms input images into arbitrary sizes and simultaneously preserves the salient regions of the input images. The basic idea of image retargeting is to find significance map of an input image, and expand (or shrink) the image using less important regions in the image, so that observers perceive few changes in the retargeted image.

II. OBJECTIVES

a. Give a unified interpretation of image retargeting and demonstrate that the geometric change estimation is a productive approach to clear up the relationship between the original and retargeted images.
b. Formulate the geometric change estimation as a backward registration issue with the MRF and give a functional and viable arrangement.

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c. Build up a novel ARS metric, which is successful and outperforms other existing strategies on freely accessible datasets.

III. LITERATURE SURVEY

A. Liu et al. [1] in this paper, they have first devised a quality estimator to spatially measure the shape distortion. Then explainedand analyzed the drawback of spatial quality estimators and introduce frequency domain quality estimator to remedy the said drawback. Next, they have used machine learning to fusion different quality estimators (two of them areexisting estimators and the other two are proposed in this paper, each of them account for different aspect of distortion),which is more convincing and meaningful than ad-hoc methods.The effectiveness of the proposed image retargeting quality assessment (IRQA) scheme has been demonstrated withthe public benchmark IRQA databases (totally 296 retargeted images). Compared with seven other representativeIRQA schemes, better performance (i.e., more consistent with the human judgment) is achieved. Besides its highaccuracy, another advantage of the proposed method is its efficiency as it has lower computational complexity.

C. Hsu et al. [2] proposed a novel objective metric for visualquality assessment of retargeted images; the proposed approachis among the initial attempts in thismuchmeaningful andless-investigated area of research in visual quality evaluation asmost of the existing methodologies in perceptual visual qualitymetrics cannot successfully apply in this context because of thenon-uniform content changes in retargeted images. The maincontribution of the proposed metric lies in that the perceptualgeometric distortion and information loss are taken into accountsimultaneously, thereby better characterizing the human perceptionon the visual quality of a retargeted image compared withexisting metrics. They have proposed a FR method for measuring the geometricdistortion of a retargeted image based on the local variationin the SIFT flow image estimated from the original and retargetedimages. Note that a FR method in retargeting cases aredifferent from one in general visual quality evaluation developedso far, since the reference image available here is with adifferent size and significant content change compared with theimage(s) being evaluated. Furthermore, a visual saliency map isderived to characterize human perception of the geometric distortion.Based on the estimated SIFT flow image and saliencymap, we have also proposed a method for measuring the informationloss due to image retargeting.

Y. Fang et al. [3] Saliency detection was broadly utilized as a part of different image processing applications. Existing saliency detection algorithms were implemented in the uncompressed domain. However, images over Internet were typically stored in the compressed format of JPEG. In this paper, they proposed a novel saliency detection model in the compressed domain. In addition, they also design a novel adaptive image retargeting algorithmin the compressed domain based on the proposed saliencydetection model. First, they extracted the intensity, color, and texture featuresfrom DCT coefficients in the JPEG bit-stream to calculatethe DCT block differences based on Hausdorff distance.Combining the Gaussian model for the Euclidean distances between the DCT blocks, they utilized the DCT block differencesto obtain the saliency map for JPEG images. Experimentalresults showed that the proposed saliency detectionmodel in the compressed domain outperforms the existingones.

Furthermore, based on the proposed saliency detection model, they design a novel adaptive image retargeting algorithmin the compressed domain. The saliency map fromour proposed saliency detection model was used as thevisual significance map for our image retargeting algorithm.The multioperator operation including the block-based seamcarving and the image scaling is utilized for image resizing.Different from the existing studies which use the imagesimilarity to determine the number of seam carving operation,the texture homogeneity was defined to determine the numberof the removal block-based seams in this paper.

L. Ma et al. [4] an image retargeting database is built through the subjective study in this paper. Based on the subjective ratings of the human viewers, the database is examined from the points of view of retargeting scale, retargeting strategy, and source image content. Additionally the freely accessible quality metrics for the retargeted images are evaluated on the built database. By fusing the metrics together, which independently depict shape distortion and content information loss, the performance can be improved.

M. Rubinstein et al. [5] they have presented the first thorough study on image retargeting methods. They gathered a set of images as a benchmark and conducted a large scale user study comparing eight state-of-the-art retargeting algorithms. They further presented an analysis of the correlationbetween various image distance measures to user resizingpreferences. Authors of a newly suggested retargeting operator (or retargetingmeasure) will now be able to: (i)

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use our survey system to performan extensive user study that compares their results and all the previousresults we have gathered; (ii) analyze their collected data usingthe proposed evaluation methodology; and (iii) present quantitativeresults as to the performance of their algorithm relative to previoustechniques.Several interesting insights were discovered.

A. Shamir et al. [6] attempt to summarize the recent advances in visualmedia retargeting, while classifying the existing body of workinto two rough categories: discrete and continuous approaches.While the concepts and the algorithms used in both categories arequite different, clear common grounds and parallels exist: bothtypes of methods try to achieve the best possible retargeting resultby optimizing an appropriate energy functional, and they dothis by removing (or shrinking) unimportant visual content in orderto leave room for well-preserved salient visual information.Both types of approaches have their advantages and disadvantages:roughly speaking, discrete methods generalize cropping and thushandle removal of unnecessary content well, which is especially evidentfor high-frequency, textured image content (such as foliage,sand, water, etc.). Continuous approaches tend to avoid discontinuityartifacts and typically preserve the overall shapes of imageobjects more coherently. Interestingly, some continuous methodsdo not heavily penalize extreme shrinking of unimportant imageregions, in which case these regions may shrink to nearly vanishingwidth, effectively resulting in complete content removal, just likein the discrete methods.

M. Rubinstein et al. [7] they presented an algorithm for combining multiple retargeting operators. They defined the resizing space as a space combining several resizing operators. They presented an algorithm to find the optimalpath in resizing space, given a global objective function that measuresthe similarity between the source and target images. They furtherproposed the Bi-Directional Warping (BDW) function to measurethis similarity. Remarkably, all levels of our algorithm benefitfrom dynamic programming. It is used to compute Seam Carving,used to compute a-symmetric alignment for BDW image similaritymeasure and finally, it is the basis of the algorithm to find theoptimal multi-operator path. Our approach was tested on a largenumber of images and videos, many of which were difficult casesfor previous single retargeting operators. We also validated our resultsby comparing them with ground truth data, collected in the user study. In addition, they described a simple and intuitive user interfaceto interactively explore the resizing space and achieve highquality results.

M. Rubinstein at el. [8] they propose an improved seam carving operator for image andvideo retargeting. Video retargeting is achieved using graph cuts and they have shown a construction that is consistent with thedynamic programming approach. Furthermore, they offered newinsight into the original seam carving operator and proposed aforward-looking energy function that measures the effect of seamcarving on the retargeted image, not the original one. They haveshown how the new measure can be used in either graph cut ordynamic programming and demonstrated the effectiveness of ourcontributions on several images and video sequences.

L. Wolf et al. [9] video retargeting is the way toward changing a current video to fit the dimensions of an arbitrary display. A compelling retargeting aims at preserving the viewers' experience by keeping up the data substance of essential regions in the frame, whilst keeping their aspect ratio. An efficient algorithm for video retargeting is presented. It consists of two stages. First, the frame is examined to recognize the significance of every region in the frame. Then, a transformation that respects the analysis shrinks less important regions more than vital ones. Our examination is completely programmed and on local saliency, motion detection and object detectors. The performance of the proposedalgorithm is demonstrated on a variety of video sequences,and compared to the state of the art in image retargeting.

Z. Wang et al. [10] Objective methods for assessing perceptual image quality have traditionally attempted to quantify the visibility of errors between a distorted image and a reference image utilizing a variety of known properties of the human visual framework. Under the assumption that human visual observation is highly adapted for extracting structural data from a scene, they present an option system for quality assessment based on the degradation of structural data. As a specific example of this concept, they develop a Structural Similarity Index and demonstrate its promise through a set of intuitive examples, as well as comparison to both subjective ratings and state-of-the-art objective strategies on a database of images compressed with JPEG and JPEG2000.

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IV. PROPOSED SYSTEM

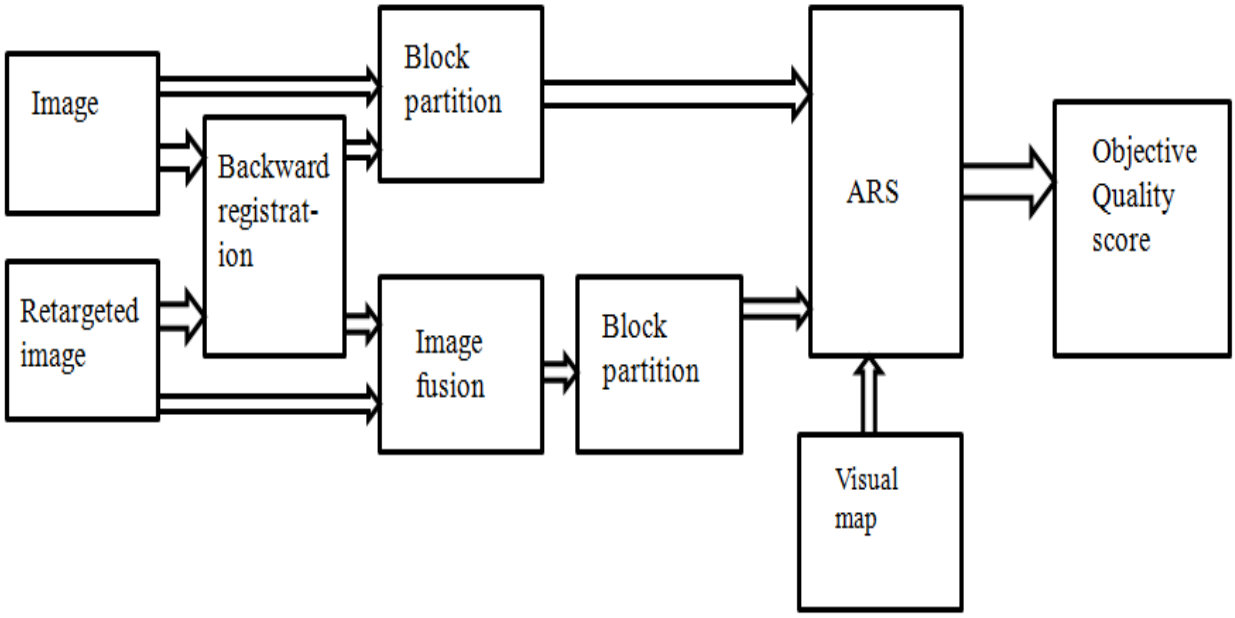

Fig 1: Block diagram of proposed system

Above figure shows the block diagram of proposed system. The relationship between the original and retargeted images is complicated because of various types of artificial modifications. To create powerful IRQA measurements, it is important to discover the undergone image retargeting modification to clarify the relationship between the original and retargeted images. To solve the backward registration problem to reveal the geometric change during image retargeting. There are two input first, original image and second, retargeted image. The image retargeting operators can be broadly categorized into two types: discrete and continuous approaches. This framework provides a practical and effective solution. After that achieve better overall performance by balancing information loss and visual distortion. But the disadvantages are that the mobile phones and personal digital assistants (PDAs) typically have limited resolution due to their small form factor. Due to this image fusion block is added here.

V. CONCLUSION

This paper demonstrates that the geometric change estimation is a productive approach to clarify the relation-ship between the original and retargeted images. This paper detailed the geometric change estimation as a backward registration issue through MRF and provided an effective and practical solution. Under the direction of the geometric change, this paper built up successful ARS metric by exploiting the local block changes to evaluate the visual quality of retargeted images.

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