Foreground Extraction in the Compressed Imaging Domain using Saliency detection Technique

Radhika P. Fuke, M V. Sarode

Abstract: Salient region detection in images is very useful for image processing applications like image segmentation, object detection and recognition. In this paper, an improved approach to detect salient region is presented Using saliency detection technique. Existing saliency detection models are built in the uncompressed domain. Since most images over Internet are typically stored in the compressed domain such as joint photographic experts group,a novel saliency detection model in the compressed domain in this paper. The intensity, color, and texture features of the image are extracted . Detection of irregular visual patterns in images and in video sequences is useful for a variety of tasks. Detecting suspicious behaviors or unusual objects is important for surveillance and monitoring. Identifying spatial saliency in images is useful for quality control and automatic inspection.

Keywords: Compressed domain, image retargeting, joint photographic experts group, saliency detection, denoising.

I. INTRODUCTION

Most traditional object detectors need training in order to detect specific object categories, but human vision can focus on general salient objects rapidly in a clustered visual scene without training because of the existence of visual attention. Therefore, humans can easily deal with general object detection well, which is becoming an intriguing subject for more and more research. Here in this paper uses saliency detection Visual saliency is an efficient way of capturing the most noticeable part in a scene, and can give the most usable cues. Saliency detection plays important roles in many image processing applications, such as regions of interest extraction and image resizing. Existing saliency detection models are built in the uncompressed domain. Since most images over Internet are typically stored in the compressed domain such as joint photographic experts group,a novel saliency detection model in the compressed domain in this paper. The intensity, color, and Texture features of the image are extracted from RGB color Space in the JPEG bit-stream. Saliency value of each block is obtained based on the features of an image and feature map fusion. Based on the proposed saliency detection model, further design of an image retargeting algorithm in the compressed domain. The proposed image retargeting algorithm utilizes multioperator operation comprised of the block-based seam carving and the image scaling to resize images.

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The proposed image retargeting algorithm effectively preserves the visually important regions for images, efficiently removes the less crucial regions.

Compression is used just about everywhere. All the images you get on the web are compressed, typically in the JPEG or GIF formats. Compression of digital data is based on the various computational algorithms which can be implemented either hardware or in software compression technique are classified into two categories:-

Lossless and lossy, lossless technique are capable to recover the original representation perfectly, lossy technique involve algorithm which recover the presentation to be similar to the original one. The lossy technique provide higher compression ratio and therefore they are more often applied in image and video compression than lossless technique.

In addition, the saliency technique would be accompanied by image denoising technique using Median Filter Digital images play an important role both in daily life applications such as satellite television, magnetic resonance imaging, computer tomography as well as in areas of research and technology such as geographical information systems and astronomy. Data sets collected by image sensors are generally contaminated by noise. Noise can be introduced by transmission errors and compression. Thus, denoising is often a necessary and the first step to be take before the images data is analyzed. It is necessary to apply an efficient denoising technique to compensate for such data corruption. It describes different methodologies for noise reduction (or denoising) giving an insight as to which algorithm should be used to find the most reliable estimate of the original image data given its degraded version. Image Denoising has remained a fundamental problem in the field of image processing.

II. LITERATURE REVIEW

While several approaches to introduce saliency detection. There are two categories of approaches to automatically estimate saliency: bottom-up methods, and top-down methods. A popular approach for computing bottom-up saliency was proposed by Itti et al.[1] It is inspired by the human visual system, and is based on low-level features: color, intensity, and orientation. A multi-resolution pyramid of the image is built, and significant changes in the features are searched for and combined into a single high-resolution map. [2]. Based on the feature-integration theory, many saliency detection models have been proposed to extract the salient regions for various image processing applications [3]–[4].Later Fan et al. [2] estimate interesting regions by bottom-up (saliency map) and top-down analysis (face and text detectors) and then determine a path for browsing through the image contents. It is given by a sequence of pan and zoom operations, inspired by the RSVP technique.

Liu et al. [3] extends the work to determine an optimal path to maximize the information displayed in the minimum amount of time. Liu et al.detect regions of interest (ROIs) and sequentially display them, either cropped or rescaled to the size of the device. They do not pan while browsing as in the previous works; they simply display the ROIs sequentially, claiming that panning slows down the process. In [5], Goferman *et al.* built content-aware saliency detection with the consideration of the contrast from both local and global perspectives. Hou *et al.* used a concept called spectral residual to build a saliency detection model in [6]. The authors claimed that the saliency map was obtained based on the log spectra representation for images. Later, Guo *et al.* found that Hou's model was actually caused by the phase spectrum and they devised a phase-based saliency detection algorithm. This algorithm obtains the final saliency map by using inverse Fourier transform on a constant amplitude spectrum and the original phase spectrum of the input image .Le Meur *et al.* proposed a visual attention model based on the understanding of the HVS behavior [7]. The contrast sensitivity functions, perceptual decomposition, visual masking, and center–surround interactions are utilized for detecting salient regions. One traditional image resizing method is to scale images by down sampling. Avidan *et al.* proposed the popular image retargeting algorithm named seam carving [8]. A seam is defined as eight-connected path of low-energy pixels (from top to bottom or left to right) in images. These pixels include only one pixel in each row or column. The seam carving aims to reduce the width (or height) by removing those unimportant seams. Later, Rubinstein *et al.* extended this algorithm to video retargeting by introducing the forward energy method [9], Other advanced image retargeting algorithms have also been proposed. Wolf *et al.* introduced a video retargeting algorithm through introducing a linear system to determine the new pixel position [10], Jin *et al.* presented a content-aware image resizing algorithm through warping a triangular mesh over images by regarding salient line features and curved features as important regions [11],Recently, Rubinstein *et al.* conducted a user study and found that applying multioperators (such as seam carving, cropping, and so on) can obtain better results than those from only single operator in image retargeting. In this paper, the authors proposed a multioperator media retargeting algorithm that combines the seam carving, scaling, and cropping operators to resize images. The size amount for each operation is determined by optimal result for maximizing the similarity between the input image and the retargeted image.

III. PROPOSED WORK

The saliency detection technologies, which exploit the most important areas for natural scenes, are very useful in practice, since they make the perceptual-friendly image processing possible by understanding the functionalities of the human visual system (HVS). The saliency detection technologies have already been used widely in many multimedia applications such as coding, retrieval, adaptation, and streaming. First design a saliency detection model in the compressed domain. Furthermore, based on the saliency detection model, it is possible to design an adaptive image retargeting algorithm in the compressed domain. The saliency technique would be accompanied by image denoising technique using this technique the image would be first checked for noise, and this noise would be removed, thus providing us a high quality image for processing, before applying the technique of saliency based detection**.** Three features including the intensity, color, and texture are extracted based on the RGB color space to build the saliency detection model. The intensity, color, and texture features can be extracted from image by using these four features (one intensity, two color features, and one texture feature) to obtain four feature maps, Shown in the **fig1.** Then it will use the hyper complex representation fusion method to combine these four feature maps to get the saliency map for JPEG images. In the form of iteratations shown in the **fig2**. To attain an accurate and coherent fusion of multiple features, it introduces hyper complex representation depending on the default weighted for each feature map is combined color, intensity and texture features and applies various fusion methods for saliency detection. and finally got the saliency map of an original image shown in fig.3. Next is saliency detection will detect salient pattern 'y' in the image and removing not moving pattern From it and 'z' which is the output image is obtained by subtracting original image from 'y' which is the salient pattern shown in the fig 5, 'z = x – y ' and filter the z to preserved the edge. After detection image is retarget the retargeted image is shown in fig 6.

IV. EXPERIMENTAL RESULT

Here shows the result of the Experiment Figure 1 shows First original image after applying denoising by median filter R, G, B, Map is detected from calculation RG, BY Map is obtained Figure 2 shows that the iterations obtained from image. To be finer saliency map shown in the figure 3.from that saliency map salient region will detected. This is actual output of the experiment shown in the figure 4 and by changing the size of an image retargeted image will obtained shown in the figure 5.

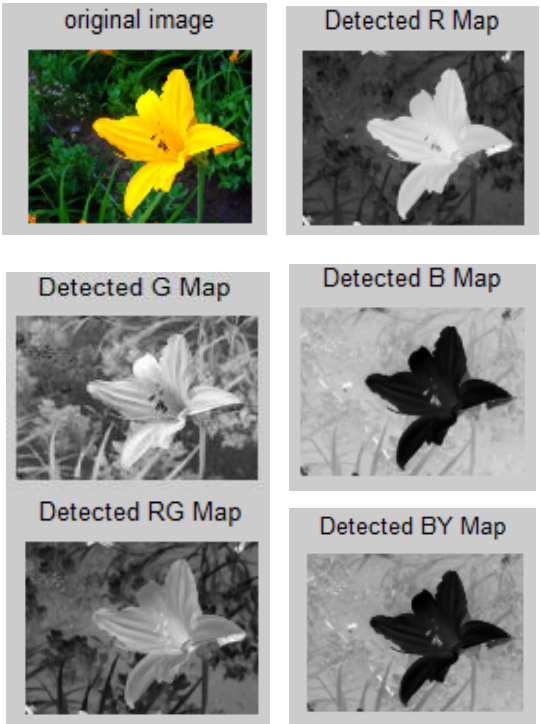

Figure 1.Example of Feature map

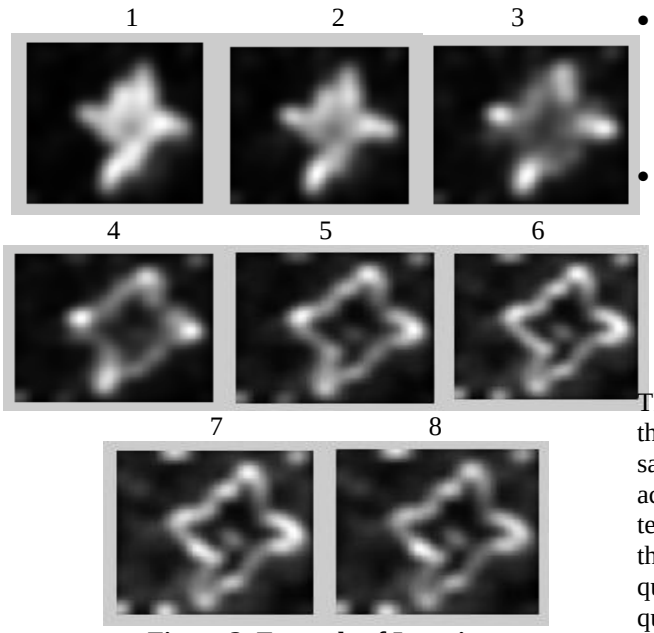

Figure 2. Example of Iterations

Figure 4.Final Saliency map obtaining after iterations.

Figure 5. Detected region 'y'.

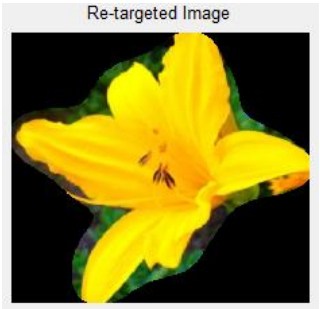

Figure 6. Retargeted image.

V. APPLICATIONS

Automated video surveillance: In these applications computer vision system is designed to monitor the movements in an area, identify the moving objects and report any doubtful situation. The system needs to discriminate between natural entities and humans, which require a good object tracking system.

- Robot vision: In robot navigation, the steering system needs to identify different obstacles in the path to avoid collision. If the obstacles themselves are other moving objects then it calls for a real-time object tracking system.
- Traffic monitoring: In some countries highway traffic is continuously monitored using cameras. Any vehicle that breaks the traffic rules or is involved in other illegal act can be tracked down easily if the surveillance system is supported by an object tracking system.

VI. CONCLUSION

Thus Saliency detection models are widely used to detect the salient objects for it can provide the positions of the salient objectsin images. The saliency technique would be accompanied by image denoising technique, using this technique the image would be first checked for noise, and this noise would be removed, thus providing us a high quality image for processing. By denoising; the image quality would improve, thus giving us better results for our proposed technique.

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