Image Retargeting With Visual Attention Video Compression Using Saliency

Jamila Fathima.J[1] Pooja.C[2] Devaraj.P[3]
[1,2,3]Department of computer science engineering
[1,2,3]saveetha School Of Engineering, Saveetha University

Abstract— In this paper we propose a method to compress video on image retargeting with visual attension based on using saliency maps. This method allows saliency to increase in high quality parts of the frame, and allows saliency to reduce in non-ROI (Region of Interest) parts. To retargeting the image first extract the saliency maps from the frame, then ROI part of an image assigned as higher pixels count which is salient map image and lower pixels are non-salient image region. We compare our method from existing system H.264/AVC rate distortion optimization (RDO) by introducing a saliency distortion term in the distortion metric to propose method JPEG 2000 and H.264/AVC-10 and verify that, at the cost of visual quality in non-salient image regions, this method achieves a major improvement of the visual quality of salient image regions.

Key words: Image Processing Tools, video compression, Visual saliency.

I. INTRODUCTION

Visual attention may be a resolution to the incapability to fully process all locations in analogous. Though this solution produces a problem. If you are only going to process one region or entity at a time, how do you select that target of attention? Visual salience helps your brain achieve practically efficient selection. Early stages of visual processing give rise to a distinct subjective perceptual quality which makes some stimuli stand out from among other items or locations. Our brain has evolved to rapidly compute salience in an automatic manner and in real-time over the entire visual field. Visual attention is then attracted towards salient visual locations.

Compression has been engaged in all contemporary codes as images enclose considerable statistical and visually biased redundancy, and videos exhibit even more redundancy in between frames. This surveillance is the starting point for frequent approaches to reduce the size of an image while maintaining image quality . Advanced video codes such as H.264/AVC-10, which allow for high compression while maintaining high video quality that exhibits also data error. We propose an image retargeting video compression using saliency to allocate more pixels to the important part of the image in a ROI parts. The retargeting is followed by a multi-resolution approach in which different bands of the image are compressed with different ratios, using compression algorithms. This methods are existing form of ROI , saliency of non-ROIs is allowed to decrease, and the saliency of ROIs is allowed to increase so long as the quality within ROIs is good. This allows more flexibility in selecting coding parameters while producing visually pleasing results. Hence, the complexity of the new method is significantly lower than that of our earlier method.

II. VISUAL SALIENCY ATTENTION

The core of visual salience is a bottom-up, stimulus-driven signal that announces "this location is sufficiently different from its surroundings to be worthy of your attention". This *bottom-up* deployment of attention towards salient locations can be strongly modulated or even sometimes overridden by *top-down*, user-driven factors. Thus, a lone red object in a green field will be salient and will attract attention in a bottom-up manner . In addition, if you are looking through a child's toy bin for a red plastic dragon, amidst plastic objects of many vivid colors, no one color may be especially salient until your top-down desire to find the red object renders all red objects, whether dragons or not, more salient.

Visual salience is sometimes carelessly described as a physical property of a visual stimulus. It is important to remember that salience is the consequence of an interaction of a stimulus with other stimuli, as well as with a visual system (biological or artificial).

As a straight-forward example, consider that a color-blind person will have a dramatically different experience of visual salience than a person with normal color vision, even when both look at exactly the same physical scene .

As a more controversial example, it may be that expertise changes the salience of some stimuli for some observers. Nevertheless, because visual salience arises from fairly low-level and stereotypical computations in the early stages of visual processing (details in the following section), the factors contributing to salience are generally quite comparable from one observer to the next, leading to similar experiences across a range of observers and of behavioral conditions.

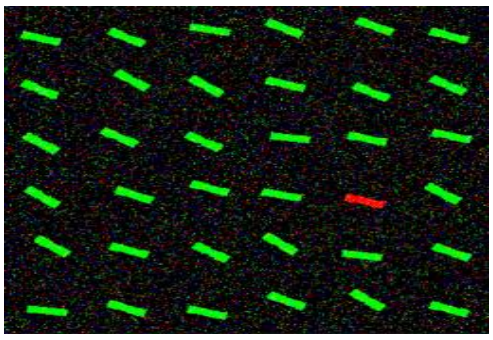

Fig. 2: Visual saliency attention

One item in the array of items strongly *pops-out* and effortlessly and immediately attracts attention. Attention is immediately drawn to the salient item, no matter how many other items (called *distractors*).This suggests that the image is processed in parallel (all at once) to determine salience at every location and to orient towards the most salient location.

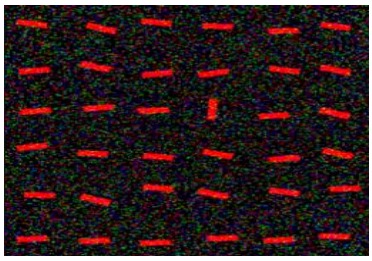

Fig. 2: Visual saliency attention

In this display, the vertical bar is visually salient. Comparing this example to the previous one suggests that local visual properties of a given item **do not determine** how perceptually salient this item will be; rather, looking at a given item within its surrounding context is crucial. Compare, for example, the red bar in the top-left corner of this image to the salient bar in the image above: both bars are red, roughly horizontal, and they both have very similar local appearances. Yet the one in the top-left corner here has low salience and attention is much more strongly attracted to the more salient vertical bar, while the red bar in the above image is highly salient.

III. IMAGE RETARGETTING

In this method we introduce a technique of Downscaled and Upscaled for encode and decode an image frame. The scaling is based on saliency in a non- uniform way: Most of the reduction in resolution occurs in non-salient regions.

The original input image (eg.JPEG 2000) is downscaling and then encoding the image and when it is upscaled it return back to its original size of an image. The total file size of the encoded image comprises the file size of the downscaled image, the difference image, and the set of grid coordinates, which is required to upscale the downscaled image back to its original shape.

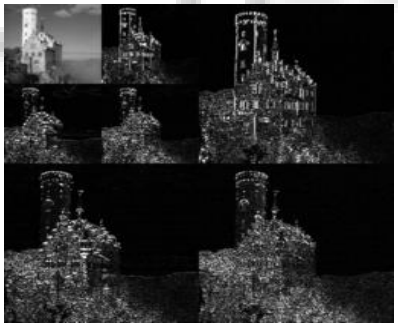

Fig. 3: JPEG 2000 IMAGES

IV. SALIENCY MAPPING

Fig. 4: Original image marked with ROI parts

Fig. 5: saliency mapped image for ROI parts

Saliency mapping is generated in above image (b) and it can be used for video compression. These images are assigned with ROI and non-ROI parts. The ROI which is Region of Interest that means we can extract the interested part and mapped with saliency which provides the high quality of an image than the non-ROI parts which provides low quality. So , the ROI parts of an image grabs the viewer attention from the non-ROI parts of an image and proposed the saliency estimation method for video compression.

V. CONCLUSION

By using MATLAB, Thus we presented an approach called visual attention on image retargetting video compression using saliency. Our method has most noticeable benefits if the source video contains a large amount of changes (e.g., due to object or camera motion) that result in many high frequency details. As the increasing interest for video streams face the rim of capacity limits of wireless channels, and compression provides a path to maintain quality in the critical regions while reducing storage and bandwidth demands.

This results indicate that the proposed method is able to improve the visual quality of encoded image retargeted as high and provides wonderful visual attention without any interruption.

From these methods we can implement the saliency mapping video compression with higher quality.

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