**IMAGE RETARGETING:**

**1. INTRODUCTION**

With the recent advances in imaging technology, digital images have become an important component of media distribution. Images are frequently used in news stories, and people post their pictures online to be seen by family and friends. Images, however, are typically authored once, but need to be adapted for consumption under varied conditions. As an example, pictures are often printed on paper that can vary in size, or the area available for the picture may have a different aspect ratio than the original image has for layout reasons. Dynamically changing the layout of web pages in browsers should take into account the distribution of text and images, resizing them if necessary. The use of thumbnails that faithfully represent the image content is important in image browsing applications. In addition, a variety of displays can be used for image viewing, ranging from high-resolution computer monitors to TV screens and low-resolution mobile devices.

This diversity of image consumption conditions introduces a new problem: images must be resized for optimal display or use in different applications. The process, also known as image retargeting or image resizing consists of modifying the image’s aspect ratio and size in order to best satisfy the new requirements .Traditional image resizing methods, such as uniform scaling, letter boxing and static cropping, usually have weak performance in image retargeting, for they only consider the display space limitation but not the image content .Image retargeting has retained in the front rank of most widely-used digital media processing techniques for a long time. To adapt raw image material for a specific use, there is often the needs of achieving a target resolution by reducing or inserting image content. To protect certain important areas, some used significance maps based on local low-level features such as gradient, dominant colours, and entropy. However, high-level semantics also play an important role in human’s image perception, so usually it is necessary to better understand the content of an image to help to choose a more feasible scheme for retargeting operation.

**1.1 DESCRIPTION OF THE IMAGE RETARGETING PROBLEM:**

A digital image of size m × n can be represented by a 2D discrete grid of pixels with m rows and n columns, where each pixel has a value that encodes its colour or intensity information. For example, in the case of RGB colour images, each pixel is represented by a triplet [R,G,B] corresponding to its red, green, and blue channels. Pixels in grey-level images are represented by a single value that corresponds to an intensity level. The image retargeting problem can be stated as follows. Given an image I of size m × n and a new size m’ × n’, the goal is to produce a new image I’ of size m’× n’ that will be a good representative of the image I. As also pointed by Shamir and Sorkine (2009), there is no clear definition or measure to date as to the quality of I’ being a good representative of I. In loose terms, they define the three main objectives for retargeting as:

1. The important content of I should be preserved in I’.

2. The important structure of I should be preserved in I’.

3. I’ should be free of visual artefacts.

**2. SYSTEM ANALYSIS**

To address image retargeting problem, some content-aware methods are proposed. They calculate the energy (i.e. the importance) of each pixel in the original image and try to reduce the information loss by preserving high energy pixels in retargeting. To achieve acceptable effect in display, some aspects are also considered, for example, avoiding distortion in the retargeted image. In this way, the objective of image retargeting is treated as retaining the high energy pixels in the original image with some constraints. Existing typical content-aware image retargeting methods can be roughly classified to two categories. The first one enhances the high energy parts of the original image by pre-defined strategies. Chen et al proposed an attention based cropping method, which retains the minimum region covering important objects by cropping and then resizes the retained region by scaling. Liu et al improved the method by displaying the different objects in image successively with an optimal path, which is applicable to the condition when there are many objects should be retained. Liu et al. proposed a fisheye-view warping method, which warps the original image to the target screen by pre-defined non-linear functions. Setlur et al proposed a decomposition based method, which decomposes the original image into objects and background, scales each one of them independently and then recombines them to generate the retargeted image. Though their strategies for object enhancement are different, the effects of them are all influenced by whether the pre-defined strategies are suitable for the original image. To overcome this problem, the second category treats image retargeting as an energy optimization problem, i.e., retaining the high energy pixels by optimization algorithms. Avidan et al proposed a significant method named “seam carving”, which utilizes dynamic programming algorithm to iteratively remove the unnoticeable pixels from the original image.

**3. ISSUES**

The main issue with traditional resizing or down sampling is that by uniformly throwing away information, it ignores the fact that some parts of the image are more important than others. Intelligent retargeting should attempt to make an informed choice as to what regions of an image are determined to be important. These regions should be large enough to be recognized by giving more space to these regions and less space to other parts of the image. Truly understanding what is important in an image requires a thorough understanding of what the image contains and what the viewer needs.

**4. PROPOSED SYSTEM**

In this paper, we propose a novel image retargeting approach that realizes global optimal energy retainment in the retargeted image. The core of our approach is formulating energy retainment

to a constrained 0-1 integer programming problem. To solve the problem in polynomial time, we relax it to a linear programming problem, and propose a corresponding pixel fusion based method to generate the retargeted image. Moreover, we further improve the feasibility of our approach in implementation by combining with preliminary scaling and relaxing the pixel position constraints.

**5. GOALS**

Using global energy optimization to formulate Image retargeting as a constrained 0-1 integer programming on energy, and transform it to a linear programming with a corresponding pixel fusion based method to generate the final retargeted image. Moreover, two strategies can be provided to improve the feasibility of our approach in implementation by reducing the numbers of variables and constraints in the optimization.