Abstract algorithm is based on the concept

abstract In this paper, we show how to use the concept of Dirichlet Tessellations to compress , store and reconstruct an image without affecting on its size and represent it with an acceptable quality, using Matlab R2017a. Dirichlet Tessellation is simply defined as the division of the space into geometric shapes by generating a finite set of distinct points , Each shape contains one of the distinct points and comprising that part of the space nearer to that distinct point than to any of the other points . We used two algorithms for image compression , The first algorithm is selecting a set of distinct points that are distributed uniformly on an image and store their locations along with pixel values .

And in the second algorithm , a random selection of distinct points , which are distributed in regions containing more details , using the edges detector algorithm to detect these details . In order to reconstruct the image , saved distinct points are placed at their corresponding locations in a new image that is formed , where two algorithms are also used , The first algorithm is based on the concept of a growing region . it’s region -based image segmentation method , by examining the pixels adjacent to the saved distinct points and delimiting whether pixels should be added to the regions of saved distinct points depending on the region’s membership criteria such as pixel intensity . The second algorithm uses one of the characteristics of Dirichlet Tessellations , which is dividing an image into polygonal regions based on the distinct points that were saved , each pixel in the confined plane of saved distinct points will have the same characteristics of that points , This is done by taking each pixel in an image and calculating the minimum distance between pixel location and saved sites using the distance

equation , This process is repeated until each pixel assigned its values and all color regions are specified in the image . introduction Image compression is a technique for reducing excess data in an image and procreates it in an efficient form, which means representing the image with less number of bits per pixel while preserving the edges and accurate information in an image in order to be able to store or transfer. There are two types of compression lossless compression and lossy compression. The image compression method used relies upon the quality desired for the restored image.

In case the image compression technique should provide a high quality result with no losing data, A lossless compression method is used. This method is used where a high rung of accuracy is an absolute necessity for the restored image. This is often used in the compression of texts and medical images.

When the restored image loses some of its data, A lossy compression method is used. This method is based on reducing duplicate data while preserving the basic details of the image, where the image is restored without noticing of any change in its important structural properties, the restored image is somewhat identical to the original image with an acceptable quality, This is usually used to compress images and videos. In this paper, we suggest a method of lossy compression based on the concept of Dirichlet tessellations.

compress the image To compress the image , we need to reduce the image by eliminating some information , especially unnecessary information without effecting on the general structure of the image , this

type of compression is called lossy compression . the first step reduces an image by using Dirichlet Tessellations technique , This technique is used to generate image map by choosing a distinct points in an image and store their locations along with pixels value (RGB) of that points , using two algorithms of Dirichlet Tessellations . ? first algorithm choose pixels uniformly . ? second algorithm choose pixels randomly depending on edges detection algorithm . edge detection It is just a process of locating the edges of objects in an image , It is a very important step to comprehend image features . Edges usually indicate to items in the image where the gray value changes considerably from one pixel to another . It symbolizes region in the image with sharp intensity variation representing object boundaries .

The reason behind detecting sharp edges in the image is for capturing important events . An edge detector reduces the amount of data to be processed and remove useless information , while conserving the important structural properties of an image , It is a good way to solve the problem of the large space occupied by the image in computer memory and transmission over the Internet . Different methods are being used to detect edges in image processing among these is Sobel operator . The Sobel operator applies a 2-D spatial gradient metering on image , It uses a couple of horizontal and vertical gradient masks , which are 3×3 for edges detection function . The Sobel detector is incredibly delicate to noise in an image , it effectively highlights them as edges , image smoothing .

decompression of image The concept of decompression the image is simple , We only need to define some features that are distinguishing

regions in the image , usually depends on the original image to know the important information for segmentation and the result that we want . In order to reconstruct the image , saved distinct points are placed in their corresponding locations in a new image that is formed, where two algorithms are also used for decompression . region growing Growing regions are a simple way to fragment image based on regions. It is also categorized as an Image fragmentation method based on pixels because it includes the choosing of initial pixels (seed points) . This technique is based on similarity regions or homogeneous regions in the image by comparing each pixel adjacent to the seed points and delimiting whether pixels should be added to the regions of seed point .

The concept is simple , We just need seed points to represent the property we need from the original image , first step place the saved distinct points as initial regions , These regions are then grown from these saved distinct points to adjacent points based on the area membership criteria such as pixel intensity , If adjacent pixels have the same intensity value with the saved points we add them to the regions of saved distinct points . These regions continue growing until they encounter other regions . Dirichlet Tessellation A set of distinct points that divides the space into polygonal regions or geometric shapes , which we call tiles .

The resultant space subdivision is known as a Dirichlet Tessellation , it is one of the most useful constructs associated with such a point configuration . the concept is tiling of the new image that is formed using one or more geometric shapes , without any interpenetration and no lacunae . Polygons or geometric shapes are generated from saved distinct points .

Each polygon defines an effect area around its saved distinct point , so that any pixel inside the polygon will have the same characteristics of the saved distinct point of that polygon .

This is done by taking each pixel in an image and calculating the minimum distance between pixel location and saved distinct points using the distance equation .