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A Compatitive Study Of Wavelet Filters For Image Enhancement

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ABSTRACT

Denoisig is the technique used to retrieve the image from the noisy image environment. It uses the visual content of images like color, texture, and shape as the image index to retrieve the images from the image pixels. The purpose of the work is to retrieve images with less noise .Images with noise in the database can be reduced with different techniques including the denoising method and the detection and removal of the existing parameters to detect the new proposed project.

1.INTRODUCTION

The process of digitisation does not in itself make image collections easier to manage. Some form of cataloguing and indexing is still necessary – the only difference being that much of the required information can now *potentially* be derived automatically from the images themselves. The extent to which this potential is currently being realized is discussed below. The need for efficient storage and retrieval of images – recognized by managers of large image collections such as picture libraries and design archives for many years – was reinforced by a workshop sponsored by the USA's National Science Foundation in 1992 [Jain, 1993]. After examining the issues involved in managing visual information in some depth, the participants concluded that images were indeed likely to play an increasingly important role in electronically-mediated communication. However, significant research advances, involving collaboration between a number of disciplines, would be needed before image providers could take full advantage of the opportunities offered. They identified a number of critical areas where research was needed, including data representation, feature extractions and indexing, image query matching and user interfacing. One of the main problems they highlighted was the difficulty of locating a desired image in a large and varied collection. While it is perfectly feasible to identify a desired image from a small collection simply by browsing, more effective techniques are needed with collections containing thousands of items. Journalists requesting photographs of a particular type of event, designers looking for materials with a particular colour or texture, and engineers looking for drawings of a particular type of part, all need some form of access by image content. The existence – and continuing use – of detailed classification schemes such as ICONCLASS [Gordon, 1990] for art images, and the Opitz code [Opitz et al, 1969] for machined parts, reinforces this message. What kinds of query are users likely to put to an image database? To answer this question in depth requires a detailed knowledge of user needs – why users seek images, what use they make of them, and how they judge the utility of the images they retrieve. As we show in section **Error! Reference source not found.** below, not enough research has yet been reported to answer these questions with any certainty. Common sense evidence suggests that still images are required for a variety of reasons, including. illustration of text articles, conveying information or emotions difficult to describe in words,

- display of detailed data (such as radiology images) for analysis,
- formal recording of design data (such as architectural plans) for later use.

Access to a desired image from a repository might thus involve a search for images depicting specific types of object or scene, evoking a particular mood, or simply containing a specific texture or pattern. Potentially, images have many types of attribute which could be used for retrieval, including:

- the presence of a particular combination of colour, texture or shape features (e.g. green stars);
- the presence or arrangement of specific types of object (e.g. chairs around a table);
- the depiction of a particular type of event (e.g. a football match);
- the presence of named individuals, locations, or events (e.g. the Queen greeting a crowd);
- subjective emotions one might associate with the image (e.g. happiness);
- metadata such as who created the image, where and when.

Each listed query type (with the exception of the last) represents a higher level of abstraction than its predecessor, and each is more difficult to answer without reference to some body of external knowledge. This leads naturally on to a classification of query types into three levels of increasing complexity [Eakins, 1996; Eakins, 1998]:

Level 1
comprises retrieval by *primitive* features such as colour, texture, shape or the spatial location of image elements. Examples of such queries might include “find pictures with long thin dark objects in the top left-hand corner”, “find images containing yellow stars arranged in a ring” – or most commonly “find me more pictures that look like this”. This level of retrieval uses features (such as a given shade of yellow) which are both objective, and directly derivable from the images themselves, without the need to refer to any external knowledge base. Its use is largely limited to specialist applications such as trademark registration, identification of drawings in a design archive, or colour matching of fashion accessories.

Level 2
comprises retrieval by derived (sometimes known as logical) features, involving some degree of logical inference about the identity of the objects depicted in the image. It can usefully be divided further into:

a) retrieval of objects of a given type (e.g. “find pictures of a double-decker bus”);

b) retrieval of individual objects or persons (“find a picture of the Eiffel tower”).

To answer queries at this level, reference to some outside store of knowledge is normally required – particularly for the more specific queries at level 2(b). In the first example above, some prior understanding is necessary to identify an object as a bus rather than a lorry; in the second example, one needs the knowledge that a given individual structure has been given the name “the Eiffel tower”. Search criteria at this level, particularly at level 2(b), are usually still reasonably objective. This level of query is more generally encountered than level 1 – for example, most queries received by newspaper picture libraries appear to fall into this overall category [Enser, 1995].

Level 3
comprises retrieval by *abstract* attributes, involving a significant amount of high-level reasoning about the meaning and purpose of the objects or scenes depicted. Again, this level of retrieval can usefully be subdivided into:

a) retrieval of named events or types of activity (e.g. “find pictures of Scottish folk dancing”);

b) retrieval of pictures with emotional or religious significance (“find a picture depicting suffering”).

Success in answering queries at this level can require some sophistication on the part of the searcher. Complex reasoning, and often subjective judgement, can be required to make the link between image content and the abstract concepts it is required to illustrate. Queries at this level, though perhaps less common than level 2, are often encountered in both newspaper and art libraries.As we shall see later, this classification of query types can be useful in illustrating the strengths and limitations of different image retrieval techniques. The most significant gap at present lies between levels 1 and 2. Many authors [e.g. Gudivada and Raghavan, 1995a] refer to levels 2 and 3 together as *semantic* image retrieval, and hence the gap between levels 1 and 2 as the *semantic gap*. Note that this classification ignores a further type of image query – retrieval by associated metadata such as who created the image, where and when. This is not because such retrieval is unimportant. It is because (at least at present) such metadata is exclusively textual, and its management is primarily a text retrieval issue.

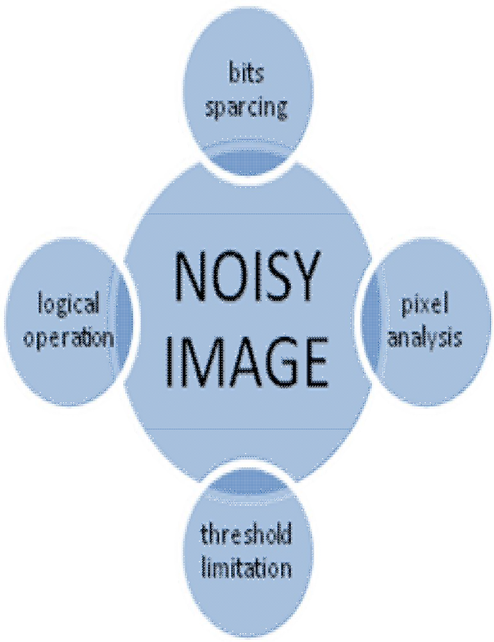


Figure 1: DENOISING Technique

2. RELATED WORK

Author	Year	Work done
M Rama Bai , Dr V Venkata Krishna	2012	This paper examine the distribution of intensity values of neighbourhood of a given pixel and determine if the pixel is to be classified as an edge and new morphological approach for noise removal edge detection is introduced for both binary and gray scale images.
Mitra Basu	2011	It described a survey of Gaussian-based edge detection techniques and detects the locations of these intensity transitions. The edge representation of an image drastically reduces the amount of data to be processed, yet it retains important information about the shapes of objects in the scene.
Mohamed A. El-Sayed	2009	It describe the hybrid entropic edge detector presented and it uses both Shannon entropy and Tsallis entropy, together. The proposed method is decrease the computation time with generate high quality of edge detection.
Manimala Singha and K.Hemachandran	2001	This approach is presented for denosing by combining the color and texture features called Wavelet-Based Color Histogram Image Retrieval (WBCHIR).
Zhi-Hua Zhou, Ke-Jia Chen, and Yuan Jiang	2000	It describe that applying semi-supervised learning and active learning together to DENOISING

3. PROPOSED WORK

The proposed method is a variant of the Canny edge detection technique. In Canny's method the first step is to smooth the image to eliminate the noise in the image. For this task Gaussian smoothing filter is adopted which does not preserves the edges. So we adopt Adaptive filter which preserves the edges of the objects while smoothing the image. The steps of the Image edge detection using Adaptive filter technique are as follows:

1) Use the Adaptive filter for Smoothing image: The first step is to remove or minimize noise in the original image before trying to locate and detect any edges.
2) The Adaptive smoothing is a class of typical nonlinear smoothing technique.
3) The adaptive filter is based on the neighborhood of each and every pixel for their mean value which preserves the edges in the given image. The algorithm for smoothing the image using Adaptive filter is as follows:

Algorithm

1) Initialize
a) Input image
b) Initialize termination condition, t (number of iterations)
2) Find the images that are equivalent to original image in red, blue and green color Spaces
3) Find the number of rows and columns of the image
4) Find the eight neighborhood pixels of each pixel
5) Compute the difference (di) of each pixel with its neighboring pixels in R,G and B color spaces respectively
6) Normalize the di values between 0 and 1
7) Compute Ci = (1-di)t
8) Multiply each Ci with corresponding neighborhood pixel in R,G and B color spaces respectively repeat steps 4 to 7 for each pixel in the image i.e rows x columns
9) Concatenate the above three images(R,G and B color spaces) repeat steps 2 to 8 until t is satisfied.

4. OBJECTIVES

Our objective is to design an algorithm to work on the parameters of the corrupted noisy images. The algorithm includes the following steps to find the edges of the images:

4.1 Firstly the noise is removed from the corrupted image to find out the correct edges of the image.
4.2 Close parameters (Noise Level at different Densities, PSNR, Noise Suppression) are determined to recognize the image properly.
4.3 On the basis of close parameters, noisy pixels are replaced by the most appropriate values and the edges are determined efficiently.
4.4 At last we will get a noise free image.

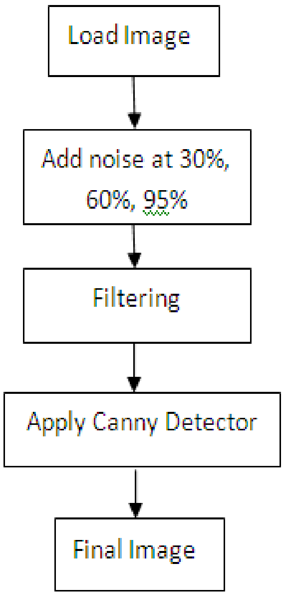
5. PROBLEM STATEMENT

Edge detection is an important pre-processing step for any image processing application, object recognition and emotion detection. Edge detection is very helpful in case of noise free images. But in case of noisy images it is a challenging task. Noisy images are corrupted images. Their parameters are difficult to analyse and detect. Our problem statement is based on the evaluation of the parameters of noisy images. The problem statement solution is calculated with the help of wavelet packet system. Algorithms help us to calculate the parameters of noisy images.The parameters of working would be Noise level at different densites, Noise suppression rate and PSNR.

Eculidian Distance= $\sqrt{(Vpi - Vqi).(Vpi - Vqi)}$ where i=1 to n.

6. METHODOLOGY

6.1 Create Database and upload desired image.
6.2 Add noise in the image at 30%, 60% and 95% level.
6.3 The remove the noise from the image by using filter and apply the Gaussian filter, Adaptive mean, hybrid Mean to obtaining three filtered image (noise free image).
6.4 Calculate the PSNR value and Compare the results.
6.5 Finally we will detect the edges of the image and then retrieval the image from the Database.



7. RESULT & CONCLUSION

In the work till now, we have implemented the general edge detection techniques to check out how a image gets fetched out from the database. For this purpose it is required to have a database which consists of images which can be processed through the coding platform. After the creation of the successful database, it is required to check out that over which parameters the processing is possible. Checking out the parameters depends upon what kind of images has been taken for the consideration. There are several features over which an image can be judged. Some of them are the outer edges of a image, if a colour image has been taken into the consideration, it is required to check out the colour combination pattern of the images .Now the color combination is basically formed of three colours. They are red green and blue .They play a vital role in the content based image retrieval. Now it is difficult to find out that which type of parameter which suit to which kind of image .Hence a work here also is required to be done. The noisy image will be divided into three categories. The three categories would be red, green and blue and then a pixel management would be done to check out whether the ratio of the found arguments matches our requirement or not. As in the proposed methodology, it has been mentioned that, the processing will go through each and every pixel. Every image in the data base will be portioned into the pixels and its red green and blue components would compare with the previous stored components. Now, if the found component value will be found to be more it would move to the queue downward and hence in such a manner each and every image would be compared and they would be stored into an array. Finally a sorting would be done to find out the best suited image after the removal of the noise from the image.

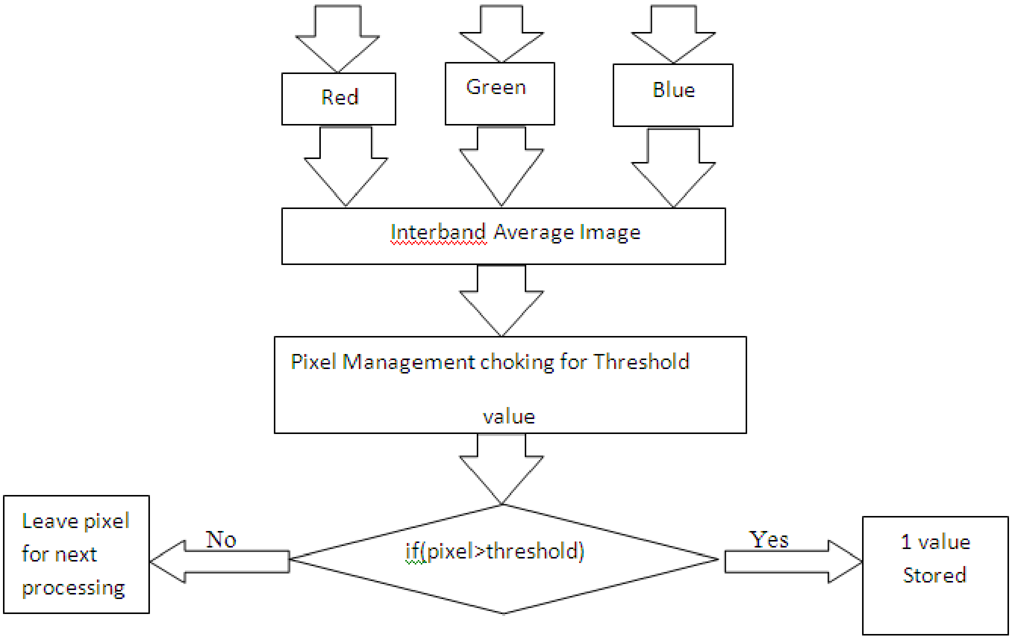


Figure2: Flowchart of Working

Calculate

TL =1/m*n L(p,j) where L is lower bit
TU =1/m*n U(i,j) where U is upper bit
TV=1/m*n V(i,j) where V is variant bit
Compare I1(TL,TU,TV) with dbImg1 (TL,TU,TV)

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