Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 5, Issue. 1, January 2016, pg.140 – 144

Review on Quality-Aware Image using Different Techniques

Duleshwari G.Wankhade[1], R.D. Sushir[2]

[1]Department of Electronics and Telecommunication & Amravati University, India

[2]Department of Electronics and Telecommunication & Amravati University, India

[1] duluwankhade@gmail.com; [2] rupeshsushir@gmail.com

Abstract*— Image Quality assessment plays an important role in various image processing applications. It is still an active area of research. A great deal of effort has been made in recent years to develop objective image quality metrics that correlate well with perceived human quality calculate or subjective methods. Most full reference(FR) technique were derived based on pixel to pixel error such as mean square error(MSE) or peak signal to noise ratio(PSNR),structural similarity index metric(SSIM) etc. This paper reviews different techniques used for image quality assessment. Quality aware image is used RR (Reduced reference) method that makes the image quality assessment task feasible as compare to NR and FR.

***Keywords*— "Image quality assessment", "objective & subjective method", "Quality aware images" ,"full reference", "Reduced reference".**

I. INTRODUCTION

DIGITAL images are nothing but a diversity of distortions during compression, transmission, processing, and again reproduction. In order to maintain, manage and probably enhance the image quality and video data quality being convey, it is important for data management systems to be capable to quantify and determine quality corrupt on the fly. Since maximum amount of the image data will finally be consumed by humans, the most consistent means of assessing image quality is subjective evaluation. However, subjective testing is time-consuming and expensive. On the other side, most objective image quality method or video quality assessment methods proposed are not applicable in this concept because the original images as references of *full-reference* (FR) methods are required to access them. That's why, it is highly desirable to the reference image do not required full access by elaborate quality assessment algorithms.

With the development of imaging and multimedia technologies, visual information, recorded by images has become the main source for knowledge acquisition. The images which degrade

the visual quality may be introduced by process of visual data acquisition, processing, transmission, and storage, some artifacts or noise. The sensor is captured and converted into digital signal in a typical digital imaging system and the image. This raw digital image signal is then processed to decrease the noise and is cramped for storage or sending. When the end user is finally displayed on the screen by the image, it could not be similar like as the original version because various kinds of distortions has expose by it. The combination of many factors might be ranged from motion blurring, Gaussian noise, sensor inadequacy, compression, error during transmission by the sources of distortion. The computational models and the perceptual quality of a given image is provided to measure by the objective of image quality assessment. Recently, the quality of images and videos have been designed by number of techniques. The accurate indicator of quality from an end-user frame of reference has received increased attention with the growing for condensation and communication of digital image and video services over wired and wireless networks. Subjective and objective are categorized in two parts of Image quality methods. The subjective assessment of image is done on the bases of subjective analysis. Some measurable evaluate on the base while objective image quality assessment methods.

II. LITERATURE REVIEW

A. Blind Quality Assessment Of JPEG2000 Compressed Images Using Natural Scene Statistics, 2003

Digital images are now a part of our everyday lives, and the great attention in the research community has received by the problem of automatically calibrating their quality. Most image quality assessment algorithms in the literature are image and assume that a 'reference' i.e original image is applicable against which a distorted or treated image can be compared. However, the quality of images without explicit knowledge of the reference images can quickly judged to observers by human. Assessment**,** also known as no-reference quality assessment, in which an algorithm assigns quality scores that are consistent with human attention of quality, but without any explicit comparisons with the reference image. In this paper, for images compressed by JPEGZOOO using natural scene statistics (NSS) is compress a blind quality assessment algorithm is presented. Paper show how reasonably absolute NSS models can help us in making blind, but accurate, predictions of quality.

B. Reduced Reference Entropic Differencing Framework for Image Quality Assessment, 2011

In this develop a new framework of reduced reference quality aware algorithms that are information theoretic. The algorithms evaluate the moderate difference between scaled entropies of wavelet coefficients of reference and distorted images, obtained at the output of a neural noise channel. A family of algorithms are proposed depending on the sub-band in which the quality computation is carried out and the amount of information required from the reference image. The algorithms allow for bidirectional computation of quality, by which we mean that the quality of the distorted image can also be computed at the reference, if relevant information from the distorted image is made available. This feature has potential applications in image/video quality monitoring in networks, which requires feeding back the quality at different nodes in the network to the sender.

C .Comparative Analysis of Image Quality Assessment Using HVS Model,2014

This paper describes the qualities of the images sending over the different mediums are used by assessing the image quality assessment techniques. In this paper represent full reference model of objective quality assessment is used. A method of full reference model have access to a „perfect version‟ of the image against which compare it with a „distorted version‟ of that image. Paper describing how the introduction of noise or other interference parameters is

affect by quality of the image. The effects are calculated in terms of some compute metrics PSNR, SNR and MSSIM. In this paper the concept of comparison between the above metrics of original image with the distorted image can be understand.

III. METHODS

A. Subjective Methods

It is known that subjective image quality varies from one individual to another: usually, the scores given by different characteristics are not identical. The observers score depends on his general experience, on his personal acknowledgment and may vary according to his mood. To solve this problem, an average score is computed over all observers. This Mean Opinion Score is indicated by MOS or the Difference Mean Opinion Score. Clearly, subjective quality assessment is expensive and annoying as it has to be performed with great care in order to obtain meaningful results. Also, subjective methods are in general not applicable in environments which desire real-time processing.

MOS classes:

1. very poor quality 2. poor quality 3. good quality 4. very good quality 5. excellent quality

B. Objective Methods

There are three methods are given below

1) *No Reference (NR) models***:** It is also called “blind models” methods, in which the QA algorithm has admittance only to the distorted signal and must estimate the quality of the signal without any awareness of the 'perfect version'. NR methods can be used in any application where a quality measurement is required because they do not require any reference information.

2) *Reduced Reference (RR) models***:** In this partial information about the 'perfect version' is available. A side-channel be present through which some information about the reference can made available to the QA algorithm. RR QA algorithms use this partial reference information to referee the quality of the distorted signal of the scene.

3) *Full Reference (FR) model*: In this method quality assessment algorithm have access to a 'perfect version' of the image or video against which it can compare a 'distorted version'. The 'perfect version' usually comes from a high-quality acquisition device, before it is distorted by, say, compression artifacts and transmission errors. There are in general two classes are, simple statistical error metrics and human visual system feature based metrics.

a) Simple statistics error metrics:

i) MSE**:** It stands for the mean squared difference between the original image and distorted image. The mathematical definition for MSE is:

$$MSE = \left(1/M \times N\right)\sum_{i=1}^{M}\sum_{j=1}^{N}(a_{ij} - b_{ij})^2$$

ii) PSNR**:** Defined as the ratio between the maximum possible power of a signal and the power of corrupting noise that affects the fidelity of its representation. It is given by:

$$PSNR = 10\log_{10} 255^2 / MSE$$

b) human visual system (hvs) feature based metric:

i**)** SSIM: The structural similarity index is a method for measuring the similarity between two images. The SSIM index is a full reference metric. The measure between two window x and y of common size N×N is given as follows

$$SSIM(x,y)=\frac{\{(2\mu_x\mu_y+C_1)(2\sigma_{xy}+C_2)\}}{\{(\mu_x{}^2+\mu_y{}^2+C_1)(\sigma_x{}^2+\sigma_y{}^2+C_2)\}}$$

ii) DSSIM: This is the structural dissimilarity metric it can be derived from SSIM as follows

$$DSSIM(x,y)=1/(1-SSIM(x,y))$$

iii) MSSIM: The mean of SSIM is known as mean structural similarity index metric (MSSIM) [8] and it is given as:

$$MSSIM(X,Y)=\frac{1}{M}\sum_{1-1}^{M}SSIM(xl,yl)$$

c) Other Method:

i) Image Quality Evaluation method based on digital watermarking:

Digital watermarking based method can estimate the quality of an image in terms of the classical objective metrics PSNR, Weighted PSNR, Watson just noticeable difference (JND) without need of original image. In this method a watermark is encapsulated into the discrete wavelet transform domain of original images using a quantization method. If it is considered that different images have different frequency allotting, then vulnerability of the watermark for the image is adjusted using automatic control. After auto adjustment, the degradation of the extracted watermark can be used to estimate image quality in terms of other classical metrics with high accuracy. So calculated PSNR, WPSNR (weighted PSNR), are compared with those calculated using watermarking based approach.

IV. CONCLUSIONS

Above discussed the various approaches used to evaluate the quality of image. The MSE and PSNR methods are easy to implement but it does not correlate highly with human awareness. Quality assessment technique is real time used. More suitable for quality aware image or calculate the quality of image is reduced reference assessment methods.

ACKNOWLEDGEMENT

I am thankful to Prof. R. D. Sushir for here valuable guidance during project work.

REFERENCES

[1] International Journal of Innovative Research in Computer and Communication Engineering *(An ISO 3297: 2007 Certified Organization)* Vol. 2, Issue 7, July 2014

[2] Dabaset al., International Journal of Advanced Research in Computer Science and Software Engineering 3(3), March - 2013, pp. 260-263 © 2013.

[3] Rajiv Soundararajan and Alan C. Bovik "RRED INDICES: REDUCED REFERENCE ENTROPIC DIFFERENCING FRAMEWORK FOR IMAGE QUALITY ASSESSMENT" 978-1-4577-0539-7/11/$26.00 ©2011 IEEE

[4] Z. Wang and A.C. Bovik, "*Modern Image Quality Assessment*", New York, Morgan & Claypool, 2006.

[5] Zhou Wang, Member, IEEE, Guixing Wu, Hamid Rahim Sheikh, "Quality-Aware Images" IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 15, NO. 6, JUNE 2006

[6] P.Campisi, M. Carli, G. Giunta, and A. Neri, "Blind quality assessment system for multimedia communications using tracing watermarking," *IEEE Trans. Signal Process.*, vol. 51, no. 4, pp. 996–1002, Apr. 2003.

[7] Hamid R. Sheikh, Alan C. Bovik and Lawrence Cormack "BLIND QUALITY ASSESSMENT OF JPEG2000 COMPRESSED IMAGES USING NATURALSCENE STATISTICS" 0-7803-8104-1/03/$17.00 02003 IEEE

